ARCHITECTURAL RESEARCH, Vol. 19, No. 2(June 2017). pp. 35-43 pISSN 1229-6163 eISSN 2383-5575

Change Pattern of Residential Areas in Seoul: Based on Detached Houses Case Studies between 2000 and 2010

Ji Hyuk Jang and Young Sang Kwon
ABD, Interdisciplinary Program in Urban Design, Seoul National University, Seoul, Korea
Associate Professor, Department of Civil and Environmental Engineering, Seoul National University, Seoul, Korea

http://dx.doi.org/10.5659/AIKAR.2017.19.2.35

Abstract In South Korea, problems such as low fertility, aging population, and income polarization have recently become more serious. In this time of social change, it is necessary to examine the current changes occurring to residences in order to improve the stability and health of residential areas. The purpose of this study is to investigate the changes of residential areas that occurred between 2000 and 2010 based on detached houses, which are the foundation of residential areas in Seoul. Changes in residential areas can be observed by examining changes in the type of housing and the characteristics of the residents. Since the type of housing and the characteristics of the residents change in the same area, it is necessary to study them together, not as individual elements. Census data is suitable for this purpose, because it can show the changes that have occurred to the housing type and the residents' characteristics within the neighborhood unit. Among the census output areas identified as residential areas based on detached houses, six sites were selected as the case study area based on the rate of change of detached houses. From the result of the case study using the census data, the study area was categorized into three regional types: (i) an urban development and redevelopment area; (ii) an area with a concentration or increasing number of detached houses; (iii) an area with an increasing number of multi-family houses based on detached houses.

Keywords: Residential Area, Detached House, Housing Type, Characteristics of Residents

1. INTRODUCTION

Similar to other cities, Seoul in South Korea is constantly changing, and its residential areas consequently also change. Factors influencing the change of residential areas can be classified into macro and micro factors. The macro factors influencing the residential change are demographic structure, economic growth rate, etc. The micro factors influencing the residential change are location, urban organization, household characteristics, etc. These various factors act together to change the residential area. Recently, the socioeconomic structure in the city of Seoul has been rapidly changing. Although the total population of Seoul has recently stabilized, the population structure has changed drastically due to low fertility and an aging population (Kim and Lee, 2014). South Korea entered a low-growth phase with the International Monetary Fund (IMF) financial crisis in 1997 and the global financial crisis in 2008. Such low growth can intensify social conflicts and income polarization (Kim, 2016). In order to maintain stable and healthy residential areas in the context of such changes in socioeconomic structure, it is necessary to examine the changes occurring in residential areas in the present situation.

The physical changes in residential areas can be observed directly through changes in housing types. Changes in housing types are accompanied by changes in the characteristics of residents. Even if an existing detached house is newly constructed as a detached house, the residents can change. Moreover, if the detached house is changed to a rental house such as a multi-family house, the change of residents is inevitable. Of course, the characteristics of residents can change

Corresponding Author: Young Sang Kwon
Department of Civil and Environmental Engineering,
Seoul National University, Seoul, Korea
email: yskwon@snu.ac.kr

This paper was presented at the 2016 ISAIA(International Symposium on Architectural Interchanges in Asia) in Japan and is republished as a special paper after the review of this journal.
The basic data used in this research are based on the Statistical Geographic Information Service (SGIS) from the National Statistical Office, Korea.
This work was supported by Creative-Pioneering Researchers Program through Seoul National University (SNU-0668-20160204).
This research was supported by Small Grant for Exploratory Research through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and Future Planning(NRF-668-20160248).

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through a residential move without changing housing types. This type of residential move is possible because housing is durable. Glaeser, Gyourko, and Saks (2006) suggest that the durability of housing can reduce the rate of deterioration and it is possible to live in a deteriorating house until it collapses. Rapoport (1985) suggested that environmental factors affecting behavior are diverse and intertwined so that an integrated approach is needed rather than the use of an individual factor. This also applies to this study. In order to examine the change of a residential area, examination of the change of the housing type needs to be integrated with examination of the resident composition.

While the most common type of housing in Seoul is apartments, residential areas with detached houses are selected in this study as these areas are the foundation of the residences in Seoul and play an important role in the present and future residential development. Although large apartment complex constructions have been developed, the general residences in Seoul have been based on detached houses. As the population of Seoul has increased, detached houses have been changed into multi-family houses, row houses, apartments, and so on. In these changes of housing type, the general residential areas in Seoul have increasingly become residential areas for the middle and low income classes. Bae et al. (2009) argued that the government policy on the supply of apartments has distorted the housing market and existing detached houses need to be managed to secure housing diversity. Seo and Lim (2009) pointed out that the residential areas where detached houses are well maintained can adapt to changes in socioeconomic conditions as well as changes in the life cycle of households. In other words, they viewed the general residence as a resource that assists with socioeconomic change.

2. RELATED THEORY

In this study, the change of residences is examined through the change of the housing type and the change of the resident characteristics including the owner's household. Housing type changes in residential areas of Seoul can be understood as changes in housing supply. If a detached house is changed into a private rental house, the overall housing stock will increase. Housing supply causes changes in resident composition. Changes in resident characteristics are the result of residential movement.

The first theory focuses on residential mobility, residential stress, and residential satisfaction. Brown and Moore (1970) noted the decision-making process of households in residential movement. The decision to find a new home was made due to the stresses involved with living spaces, neighborhood, and location. The evaluation of the new house is determined according to the satisfaction and dissatisfaction with the utility of housing. Factors affecting the utility include aspiration for the area, physical environment, convenience facilities, social environment, characteristics of housing, and possibility of moving at a certain time. Speare (1974) explained residential mobility by using residential satisfaction instead of stress limit. Residential satisfaction was the key to determining whether to move or stay in the current location, and was influenced by the age of householder, residence period, home ownership, number of rooms, etc. Brummell (1979) sought to build a model of residential mobility in urban areas by utilizing the factors of utility, aspiration, needs, and amount of residential stress. He explained that the desire for a place and the utility of the residential environment, location, and neighborhood are the endogenous factors, and that the household income and house price are the main factors in residential mobility.

Another theory of residential mobility is based on life cycle and housing adjustment. Morris and Winter (1975) citing Rossi (1955) declared that if the housing environment does not match the housing needs according to the life cycle of the household, it can cause residential stress. Housing adjustment is a concept that includes residential movement, and explains behaviors such as residential adaptation. Morris and Winter argued that housing is assessed through cultural norms and family norms, and that residential mobility, residential adaptation, and family adjustment occur in order to reduce dissatisfaction. Clark and Onaka (1983) pointed out that although the life cycle plays an important role in residential mobility, the housing adjustment needs to be considered because it is difficult to explain residential mobility by life cycle alone.

In Korea, residential mobility has been actively researched. The study of residential mobility according to the characteristics of households can be divided into the life cycle or life course and the general case. A study on the pattern of residential mobility in the case of increasing or decreasing household members was conducted by Lee and Lee (2012). They suggested that even if the household members change, the patterns of residential mobility vary depending on the age of the householder, the type of housing, and the type of occupancy. Research on residential mobility for specific generations and ages was conducted. For example, studies have been conducted on residential mobility after the residents of the baby boomer generation had retired (Hwang, Lee and Yoon, 2010) and of elderly people who own homes (Chung and Lee, 2013). A number of studies have been performed that deal with the pattern of residential mobility depending on the economic situation of the household regardless of the life cycle or life course. Ryu, Jung, and Seo (2013) argued that assets play a more important role than income in residential mobility. They also suggested that spontaneous residential mobility for improving housing is mainly made in the case of households that own their own house, and that involuntary residential mobility due to external factors arises in the case where households rent their houses. A number of studies have been carried out on the effect of household characteristics on the housing type selection to determine whether the intention is to move or the result of an actual move (e.g., Choi and Nam, 2008; Lee and Ha, 2013). Studies have also been carried out on the effect of satisfaction about the neighborhood residence environment (Im, Kim & Lee, 2003), type of housing (Shim et al., 2014), and the effect of

social relations or community consciousness on the decision of residential mobility (Lee, 2008; Kim and Yoo, 2012).

One of the theories that explain housing supply focuses on price elasticity of housing supply and the state of equilibrium. The price elasticity of supply can be divided into short-term elasticity and long-term elasticity. The long-term price elasticity of housing supply is related to the growth of the city, and a difference between long-term elasticity and short-term elasticity of the city results in temporary fluctuation of house price and supply. If the urban space or geographical limitations and regulation hamper the supply of resilient housing, the price elasticity of supply becomes inelastic. When the housing demand changes due to population increase in high-density and highly regulated residential areas, and these affect the change in the housing price, the housing supply arises. The housing price concurrently rapidly increases and a bubble of housing supply is generated in some cases. However, in the long run, the equilibrium will be achieved by adjustment of house price and volume.

Saiz (2010) used terrain elevation, water sump, etc. of satellite data to identify the land available for development in a US metropolitan area. He argued that the inelasticity of supply can be divided into physical constraints and regulatory constraints. Geographical characteristics including physical constraints influence house prices and the floor area. Mayer and Somerville (2000) pointed out that housing construction differs from other investments because land is supplied on an inelastic manner in a metropolitan city. They argued that housing supply will increase if housing prices rise under the circumstances when the current housing prices have been undervalued compared to the long-term price. They therefore insisted that housing prices and construction would remain unchanged if the city does not grow or the housing stock deteriorated. However, if the city does not have a central area, the housing is constructed partly in sub-centers where employment is concentrated. Glaeser, Gyourko, and Saiz (2008) argued that housing prices surge when the housing supply bubble breaks in inelastic regions. They also pointed out that that the period of high housing prices in inelastic regions is generally longer than in resilient regions. They also stated that the over-supply of housing during the housing supply boom is a major cause of welfare losses.

Herein, a review is given of the literature on housing supply considering the situation of South Korea. Ko and Ahn (2010) analyzed the supply volume by housing type from 1975 to 2005, and found that apartment-centered housing supply was provided. They also suggested that diversification of housing supply will be necessary in the future. Hwang (2015) pointed out that most of the housing types supplied in Gyeonggi Province since 2000 were apartments because of the construction of new cities such as Dongtan, Gimpo, Paju, Gwanggyo, etc. In addition to the construction of a new city, the redevelopment of the existing residential area also played a considerable role in the supply of apartment-centered housing. Jang and Kang (2011) argued that the proportion of detached housing among all housing has been declining since the 1970s, but the amount of detached housing construction has been increasing since 2005. They suggested that detached houses can be regarded as housing coexisting with apartments. Studies have also been carried out that have examined the changes of these housing types in terms of urban tissue and institutional characteristics (e.g., Park and Choi, 2003; Bang, 2011).

While the above sections discussed the main theories of residential mobility and housing supply and the studies in Korea, it is now necessary to examine the relationship between residential moving and housing supply. Simmons (1968) considered migration over a long period of time as an important factor influencing the transformation of spatial patterns of demographic characteristics, and pointed out that in some cases, dramatic changes occur in a short period of time if a region is not large. He pointed out that people tend to live in the same area in which they had previously lived, if their social environment does not change drastically. In his view, this tendency reduces the available housing and creates a differentiated local sub-market. He also argued that the selection of new homes when people move is constrained by housing supply, such as price, type, and quality of the house, as well as demand. Clark and Onaka (1983) argued that dissatisfaction with housing that does not match the lifecycle situation could lead to housing demand, but not necessarily lead to housing adjustment such as new housing construction. They explained that various constraints such as the economic situation of the household could prevent housing adjustments.

Based on the above literature review, the relationship between residential movement and housing supply is as follows. First, the housing stock is diversified in local submarkets. If the city is not a mononuclear area, but a multi core structure or have lively sub-centers, the physical characteristics and applicable regulations can vary from region to region. Second, short-term housing supply in small areas can lead to changes in population composition. Third, residential mobility does not directly affect housing demand, which means that residential mobility does not necessarily lead to housing supply. In summary, it can be reasoned that housing supply is influenced by local conditions and acts as a factor in generating residential movement, which affects the characteristics of residents.

3. METHOD

The purpose of this study is to determine how residential areas change, as the result of residential movement depending on the change of housing type which reflects the regional situation. The spatial unit for research needs to be small in order to more closely examine the regional situation, the change of housing type, and the composition of the inhabitants. Census data is suitable for the purposes of this research because census data is not only the smallest unit of data provided by Statistics Korea, but also shows the change of resident characteristics with housing type.

The first task in conducting this research is to identify the residential areas based on detached houses from the Census

Output Areas of Seoul between 2000 and 2010. The method of identifying the residential areas based on detached houses involves four steps. In the first step, the non-residential areas are excluded. These areas are defined as those areas where the number of houses is zero in both 2000 and 2010. In the second step, areas where development has been completed after the demolition or demolished for development are excluded. In the third step, the census output areas in which there were no detached houses at 2000 are removed. Through these first three steps, it is possible to investigate the housing type change of detached houses in the selected areas. In the fourth step, areas with a cumulative frequency of less than 5% and greater than 95% are excluded, based on the number of houses and the area of the census output area in order to exclude the unusual cases. After performing these four steps, 7,697 areas among the 16,230 census output areas of Seoul were selected. The total area selected of the census output area is 161.78km^2 of 606.99km^2.

The second task in this the study involves selecting the locations of the case study among the identified general residential areas. It is important to determine the criteria to be used for selecting the case study areas in the identified general residence area. As this study is based on the change of the housing type of the detached houses, the rate of change in the detached houses is reasonable as the criterion for selecting the case study area.

$$\text{The rate of change in detached house} = \frac{x_i^{y_2} - x_i^{y_1}}{x_i^{y_1}} \quad (1)$$

x : House unit of detached houses
i : Number of census output area
y^2 : 2010 year
y^1 : 2000 year

Equation (1) is used for calculating the rate of change in detached houses. If in the area of the house units of detached housing increased in 2010 compared to 2000, the rate of change would have a positive value. If the area of house units of detached housing declined, it would have a negative value. Similarly, if the house units of detached housing do not change, it will have a value of zero.

The increase in the number of detached houses can be categorized into two cases. The first case is the increase in the number of typical single-family houses. The second case is the increase in the number of multiple houses (多家口住宅). Multiple houses are similar to multi-family houses (多世帶住宅), but ownership structure is the same as that of single-family houses. Housing type information from the census data provided by Statistics Korea does not distinguish between single-family houses and multiple houses. Therefore, in this study, detached houses were used that are applicable for single-family houses and multiple houses. As the research site is an old residential area, the increase in the number of housing units of detached houses can be attributed to the construction of new multiple houses rather than new single-family houses. A negative rate of change implies that the detached houses have changed into multi-family houses, row houses (聯立住宅), or apartments.

The selected residential areas can be divided into two groups. The first group is the area where the housing type is composed of detached houses. The second group is the area with a mixture of all the types of housing mentioned above. The two groups are used because the difference in the mix of housing types may lead to differences in resident composition. Three census output areas were selected for each group. The selection criteria are the rate of change of detached houses is highest, zero, and lowest. Therefore, a total of six census output areas are selected for the case study.

Table 1. Census output areas characteristics

	Administrative District	Housing Type	The rate of change in detached houses
Site 1	Eungam 3-dong	Mixed	3.10
Site 2	Cheongpa-dong	Mixed	0.00
Site 3	Sangam-dong	Mixed	-1.00
Site 4	Sinchon-dong	Only detached	0.76
Site 5	Imun 2-dong	Only detached	0.00
Site 6	Oksu-dong	Only detached	-0.69

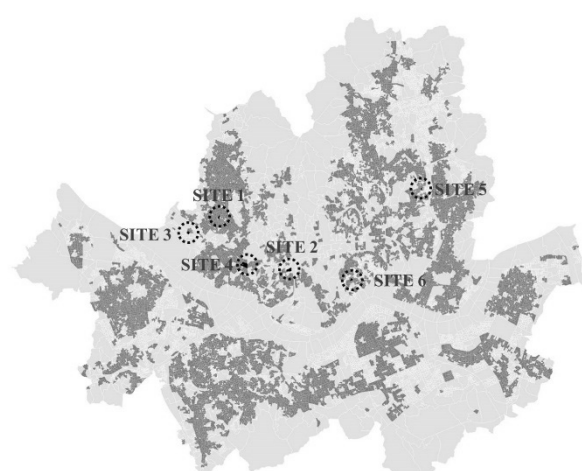

Figure 1. Selected census output areas for case study

In the selected area, it is important to examine the changes of housing types and inhabitants. These can be determined from the number of changes that have occurred in housing type, resident population, average age, number of households, and average number of household members. To investigate changes in resident composition, it is necessary to examine the changes in the cohorts of owner households and tenant households. The residents are divided into these two groups because owner households can play a more active role in terms of housing

Table 2. Amount of change

	Amount of change of housing type (house unit)					Amount of change of indicators related the characteristics of residents			
	Sum	Detached	Multi-family	Row	Apt	Population	Average age of population	Number of Households	Average member of households
Site 1	+48	+62	-90	-9	+85	+45	+4.2	+60	-0.5
Site 2	+11	0	+11	0	0	-84	+4.3	+108	-0.9
Site 3	+498	-19	-8	0	+525	+1,354	+7.7	+481	0
Site 4	+42	+26	+16	0	0	-199	+1.2	+106	-1
Site 5	0	0	0	0	0	-146	+8.2	-10	-0.8
Site 6	+158	-69	+227	0	0	-324	+5.9	-67	-0.3

Table 3. Changes in cohort of household member

	Changes in cohort of owner household member								Changes in cohort of tenant household member							
	0~9	10~19	20~29	30~39	40~49	50~59	60~69	70~79	0~9	10~19	20~29	30~39	40~49	50~59	60~69	70~79
Site 1	0	-8	-34	+21	-10	-13	+41	+12	-1	+8	-17	0	+4	+30	+13	+12
Site 2	-8	-23	-36	-12	-13	-35	0	+5	-68	-22	+61	+19	+12	+34	+1	+3
Site 3	0	-5	0	-6	0	-5	-9	0	+111	+159	+150	+194	+191	+208	+173	+75
Site 4	-5	-9	-19	-18	-13	-34	-13	0	-42	-55	+29	+3	-25	-10	+5	+5
Site 5	-9	-9	-26	+1	+1	-20	+8	+6	-37	-19	-40	-21	-1	+9	+11	+2
Site 6	-12	-15	-39	-19	-1	-39	-2	+4	-68	-32	-96	-53	-14	+36	+4	+18

supply than tenant households. Among these cohorts, 30~39, 40~49, 50~59, and 60~69 cohorts can be considered to be important because they are seen as having the ability to buy or build a house when considering income and capital in their life cycle.

4. CASE STUDY

The six regions selected for the case study are analyzed through regional contexts and the number of changes in investigating items between 2000 and 2010. Investigating items are the housing type, the characteristics of population and household, and the cohort of owner households and tenant households.

(1) Site 1: Eungam 3-dong

Figure 2. Site 1: Eungam 3-dong

This site belongs to Eunpyeong-gu and is one of the typical residential areas of Gangbuk (North Side of Seoul) due to land readjustment. It is 400m from Bulgwnag Stream of Han River which flows between Bong and Baekryeon Mountain. This site is located more than 500m from Jeungsan Station, which is the Seoul Subway Line 6. It is also 700m from Myongi University of Seoul campus.

The area has a mixture of various housing types, and the site has the highest rate of change of detached houses. The number of multi-family houses and row houses decreased, but the number of detached house and apartments increased. It is highly likely that the decrease in multi-family houses and row houses led to an increase in the number of apartments. The number of populations and households increased due to the increase in the number of house units. In terms of owner household members, the cohort of 30~39, 60~69, and 70~79 increased. The cohort of 30~39 have a possibility to buy or build a detached house for their new family according to their life cycle. The cohorts aged 60~79 have a possibility to buy or build a detached house for rental income after retirement. In terms of tenant household members, the number of cohorts aged 40~79 increased, while the number of cohort of 20 ~29 decreased. It is thus very likely that low-income middle-aged and elderly people have moved into this area as tenants. The decrease in the cohort of 20~29 suggests that the proximity of subway stations and universities in this area does not directly influence their decision of where to live.

(2) Site 2: Cheongpa-dong

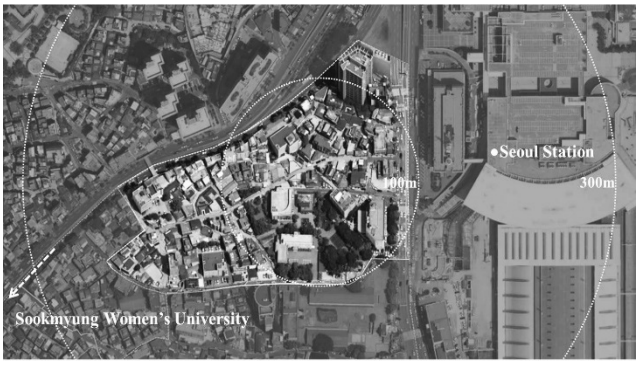

Figure 3. Site 2: Cheongpa-dong

This site belongs to Yongsan-gu. The site is located 100m from Seoul Station, which is connected to Seoul Metro Line 1, Seoul Subway Line 4, Airport Railroad, etc. It is located 800m from Sookmyung Women's University. This site is also close to the center of Seoul, 1.5km from City Hall. Despite the close distance, it is difficult to walk from Cheongpa-dong to City Hall due to the boulevard and the ground railway. In terms of urban planning, this area comprises a mixture of commercial zoning and residential zoning. The area therefore comprises commercial and business facilities besides residential facilities.

Considering housing alone, this site is a mixture of detached houses and multi-family houses. The number of multi-family houses has only increased by eleven. The increase in the number of households is noticeable compared to the increase in the number of house units. This indicates that the number of households living in non-housing has increased, and existing idle or non-residential buildings have been converted into residential buildings in commercial areas. In the tenant household members, the number of members increased in the entire cohort excluding the cohort of 0~9 and 10~19. In particular, the increase in the cohort of 20~29 and 30~39 differs from Site Eungam 3-dong. Because this area is close to the center of the city and the transportation network is well equipped, it comprises various age groups without children who are living as tenants. The increase in the number of these tenants is not only related to the supply of residential buildings for rent, but also to the movement of existing owner households. If a residential building is constructed in a non-residential area without the existing housing being demolished, the number of owner household members is divided into cases which have a value of zero and cases which have a positive value. The case of non-occupied owner household has a zero value, while the case of occupied owner households has a positive value. Negative values for all cohorts except for that of 70~79 indicate that the owner households have frequently moved. This means that the move of owner households has led to an increase in the number of tenants. It could be disputed that the satisfaction of owner households in the area is low.

(3) Site 3: Sangam-dong

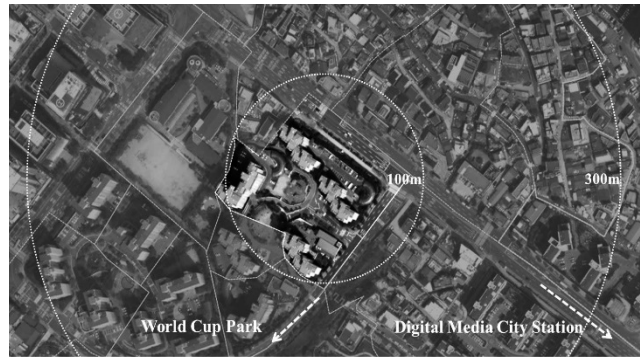

Figure 4. Site 3: Sangam-dong

This site belongs to Mapo-gu. World Cup Park (Nanji Island) and Han River are 2km to the southwest of the site and Digital Media City Station is 600m from the site. This station is a transit station at the intersection of Seoul Subway Line 6 and Airport Railroad. Digital Media City is in the southwest of the site and Sangam-dong, which has yet to be developed, is in the northeast.

In a mixed-housing district, the area has the lowest rate of change in detached houses. All houses including detached houses were demolished for the Digital Media City urban development project for media and IT business facilities. The number of owner households did not increase due to public rental housing construction. With the supply of public rental housing, the population, number of households, and number of tenant households increased sharply.

(4) Site 4: Sinchon-dong

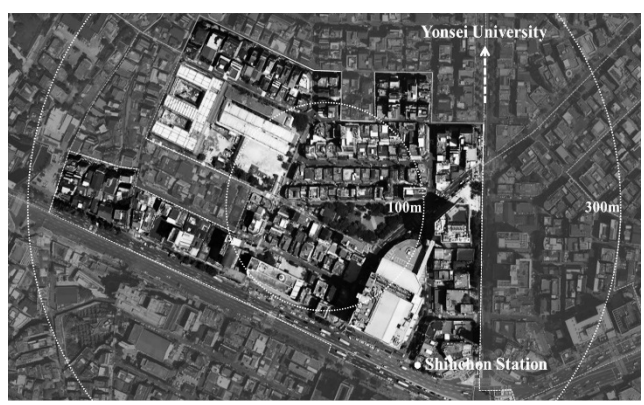

Figure 5. Site 4: Sinchon-dong

This site is located in Shinchon-dong, Seodaemun-gu. Universities are concentrated in this area. This site is 500m from Yonsei University and Sogang University. Ehwa Woman's University and Hongik University are located within 1km. Also, Shinchon is one of the sub-centers of Seoul. Sinchon Station on Seoul Subway Line 2 is located inside the site. According to the city management plan, this area comprises a mixture of commercial zoning and residential zoning.

In 2000, the site only comprised detached houses. This site

has the highest rate of change of detached houses. The number of detached houses and multi-family houses increased. While the resident population decreased, the number of households increased. This can be explained by the largest decrease in the average number of households among the six regions. Also, the increase of average age is the lowest among the six regions. This suggests that the newly moved population is younger than that in other regions. The number of owner household members decreased in almost all cohorts. Similar to Cheongpa-dong, non-occupied owners have played an important role in increasing the number of housing units. In the case of tenant household members, the cohort of 20~29 showed the highest increase. The cohorts of 0~9, 10~19, 40~49, and 50~59 showed the greatest decrease. Considering the average member of households, it can be seen that households with 3~4 persons were replaced by 1~2 person households in the cohort of 20~29, 60~69 and 70~79.

(5) Site 5: Imun 2-dong

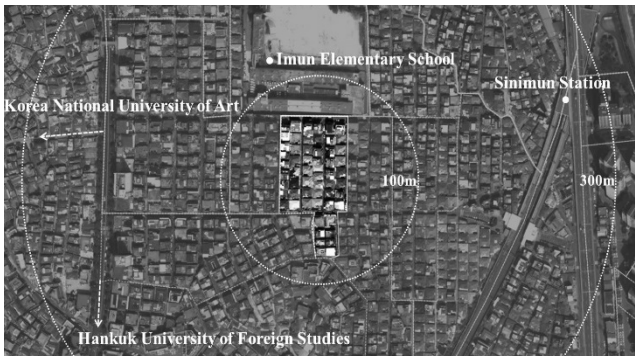

Figure 6. Site 5: Imun 2-dong

This site is located in Imun 2-dong, Dongdaemun-gu. Imun Elementary School is located adjacent to the north side of the site. This area also has the form of a residential area built by land readjustment projects such as Eungam 3-dong. Sinimun Station on Seoul Metro Line 1 is 300m from the site. Hankuk University of Foreign Studies and Korea National University of Arts are located 700m from the site, and Kyunghee University is located 1km from the site. Cheonjang Mountain and Jungnang Stream of Han River are 700m from the site.

Since 2000, the site accommodated only detached houses and no change is shown in the number of houses in all types of housing including detached houses. The population and number of households decreased. This region has the largest increase in the average age and the most significant amount of loss in the average member of households among the six regions. The increase in the number of owner household members was observed in the cohorts aged 30~49 and 60~79, and decreased in the remaining cohorts. For the tenant household members, the cohorts aged 0~49 decreased while the cohorts aged 50~79 increased. This change is associated with an increase in the average age and a decrease in the average number of households. Younger families with children and the cohort of 20~29 left the area and the cohorts aged 50~79 entered the area. Considering the surrounding schools and subway stations, it was judged that rental demand for the cohort of 20~29 was high, but in reality this cohort declined. Similar to Site 1, subway stations and universities seem to be less influential on residents' choice of location. The cohorts aged 50~79 are likely to consist of 1~2 person households due to changes in family numbers, where children leave home. If the function of the housing deteriorates without physical change and the number of elderly residents continue to increase, this region is more likely to decline than other regions.

(6) Site 6: Oksu-dong

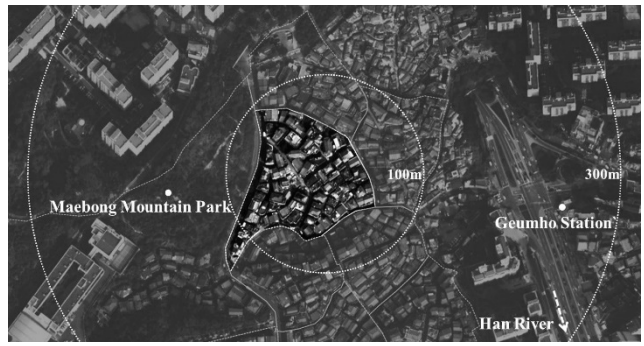

Figure 7. Site 6: Oksu-dong

This site is located in Oksu-dong, Seongdong-gu. This site is located on the hill of Maebong Mountain, which is 1km from Han River. Many redeveloped apartments are located to the south of the site. Geunho Station on Seoul Subway Line 3 is directly connected to Gangnam, the center of the business area of Seoul, and is located 300m from the site.

In 2000, the area only comprised detached houses, and the site has the lowest rate of change of detached houses, except the site where detached houses were replaced with apartments. Despite the decline in the number of detached houses, the number of house units increased by 158 due to the rapid increase in multi-family housing. While the number of house units increased, the population and number of households decreased because the site was incorporated as part of the 13th Oksu Redevelopment Zone in 2008. The number of owner households reduced in all cohorts except for that of 70~79. In the case of the number of tenant household members, the cohorts aged 50~79 increased and the remaining cohorts decreased. When the site incorporated the redevelopment zone, the owners' families moved, except for the oldest household members, while low-income middle-aged and elderly people entered the redevelopment zone as tenants.

5. DISCUSSION

A case study was conducted to examine the recent changes in residential areas in Seoul by examining the changes in housing types and characteristics of residents. In selecting the case study area, a difference was observed in the rate of change in detached

houses by region. This implies that regional factors influence the supply of houses. Actually, the housing type, the index of resident characteristics, and the value of cohort varied from case to case. However, the average age of residents and the group of tenant cohorts aged 60~79 increased in all cases. The influx of older people into the area as tenants influenced the average age of the residents.

As a result of the case study, the areas can be classified into three types. The first type includes urban development and redevelopment regions. The urban development of Sangam-dong shows that the physical and social characteristics in the area have changed drastically. In the case of Oksu-dong, which was incorporated into the redevelopment area, it was found that distortions occurred in the supply of housing and the residential movement. Clark and Onaka (1983) referred to this phenomenon as Forced Moves, an involuntary residence that is the main cause of dismissal and removal by private or public acts.

The second type of area is that with a concentrated or increasing number of detached houses. Eungam 3-dong and Imun 2-dong are examples of this type. In these regions, middle-aged and older people are entering as tenants. These results are consistent with the findings by Lee, Yang, and Song (2012) that suggested that tenants of elderly 1~2 persons are concentrated in old residences. In addition, in these regions, not only the 30s age group who are married and have a family but also the 60s~70s age group are likely to participate in housing development. As the size of the 60s~70s age group increases in both the owner and tenant groups, the number of assets owned between these generations differs.

The third type of area is that in which the number of multi-family housing developments is increasing, based on detached houses. Cheongpa-dong and Sinchon-dong are examples of this type. In these regions, the 20s~30s age group without children have moved to rental housing. These areas are close to the city center and the sub-center, and this proximity is convenient due to less driving time required. These factors are likely to have affected the role of the landlord and the developer.

In the second and third regions, households with 3~4 people had changed to those with 1~2 people. These changes may be interpreted as a change in population and the structure of the household, but it also implies that the residential area based on the detached houses no longer acts as a residential area for households of 3~4 people. According to the above-mentioned study by Lee, Yang and Song (2012), tenants in the 20s age group were concentrated in the vicinity of the university, which is not completely consistent with this study. Sites 1, 2, 4, and 5 are accessible to the University on foot. In Sites 2 and 4, the population in their 20s increased, but it decreased in Sites 1 and 5. Comparing the two groups, it appears that the hierarchy of urban space structure is more influential on the increasing number of tenants in the 20s age group.

Despite these findings, the study has some limitations. A diverse range of actors can change their housing types, such as existing residents, buyers, builders and developers. However, the behavior and results of each type of actor have not been considered. In this study, changes in the characteristics of residents can be understood as the result of residential movement. The study of the causes and directions of residential moves in individual or household units is limited. In order to investigate the causes, patterns of detailed residential moves, and housing type changes, it is necessary to study the units of parcels or individual households. Through the case study, it was observed that the changes of the residential areas reflect the characteristics of the neighborhood. However, the study lacks generalization of the cases, although in this case study, the criteria of case site selection were set. Even with the limitations of this study, it is expected to be used as a basis for explaining the changes of residential areas by integrating the changes of housing type and resident composition.

REFERENCES

Kim, I. & Lee, J. (2014) "2030 Seoul Plan (Survey Report)." The Seoul Institute: 45-58.

Kim, S. (2016) "Transition of urban policy paradigm on low growth age." Urban Information Service, 409: 2.

Glaeser, E., Gyourko, J. & Saks, R. (2006) "Urban growth and housing supply." Journal of Economic Geography, 6: 76-78.

Rapoport, A. (1985) "Home environments." In I. Altman & C. Werner (Eds), Thinking about home environments: a conceptual framework. New York: Plenum Press 255-260.

Bae, S., Kim, H., Kang, M., Seo, J., & Kim, H. (2009) "Analysis of the single family detached housing market to promote the diversity of housing types." Korea Research Institute for Human Settlements: 241-260.

Seo, S. & Lim, Y. (2009) "Diversification of housing renewal method for preservation of existing tissue." Architecture & Urban Research Institute: 19-40.

Brown, L. & Moore, E. (1970) "The intra-urban migration process: a perspective." Geografiska Annaler. Series B, Human Geography, 52(1): 1-6.

Speare, A. (1974) "Residential satisfaction as an intervening variable in residential mobility." Demography, 11(2): 173-188.

Brummell, A. (1979) "A model of intraurban mobility." Economic Geography, 55(4): 338-352.

Morris, E. & Winter, M. (1975) "A theory of family housing adjustment." Journal of Marriage and Family, 37(1): 79-88.

Clark, W. & Onaka, J. (1983) "Life cycle and housing adjustment as explanations of residential mobility." Urban Studies, 20:47-57.

Lee, C. & Lee, S. (2012) "A birth cohort approach to the household life-cycle model of residential mobility: the case of Jinju city." Journal of the Korea Planning Association, 47(4): 205~217.

Hwang, S., Lee, Y. & Yoon, H. (2010) "A study on patterns of baby boomer's post-retirement housing mobility plan: focusing on life course." Korea Institute of Ecological Architecture and Environment, 10(5): 101-108.

Jung, E. & Lee, K. (2013) "Residential mobility and housing tenure choice decisions of older homeowners." Housing Studies Review, 21(3): 47-60.

Ryu, K., Jung, H. & Seo, T. (2013) "A study on the residential mobility characteristic by the level of income and asset." Journal of the Korea Planning Association, 48(5): 145-163.

Choi, Y. & Nam, J. (2008) "An analysis on the elements of housing choice by household attributes: focusing on the features of variation from 1996 to 2006." Journal of the Korea Planning Association, 43(2): 195-210.

Lee, S. & Ha, S. (2013) "A Study on the factors affecting choices of housing types by household characteristics in Seoul." Journal of the Residential Environment Institute of Korea, 11(2): 93-109.

Im, J., Kim, H. & Lee, C. (2003) "A study on residential satisfaction and residential choice: the case of a residential area in the built-up area." Journal of the Korean Housing Association, 14(6): 15-22.

Shim, J., Lim, B., Lee, S. & Ji, N. (2014) "A comparative study on the housing satisfactions and influence factors between residents of apartment and single housing: the case of Daejeon city." The Geographical Journal of Korea, 48(1): 1-16.

Lee, K. (2008) "Effects of residents' social relationship on housing mobility decision: a case study of 12 areas in Seoul." Journal of the Korea Planning Association, 43(5): 23-33.

Kim, Y. & Yoo, B. (2012) "Effects of residential satisfaction and the sense of community: focused on Gwangju metropolitan city." Journal of the Architectural Institute of Korea Planning & Design, 28(6): 220~226.

Saiz, A. (2010) "The geographic determinants of housing supply." The Quarterly Journal of Economics, 125(3): 1253-1296.

Mayer, C. & Somerville C. (2000) "Residential construction using the urban growth model to estimate housing supply." Journal of Urban Economics, 48: 85-109.

Glaeser, E., Gyourko, J. & Saiz, A. (2008) "Housing supply and housing bubbles." Journal of Urban Economics, 64: 198-217.

Ko, S. & Ahn, K. (2010) "A study on the transitional characteristics of the ratio of housing type in Korea." Journal of the architectural Institute of Korea Planning & Design, 26(8): 45-54.

Hwang, Y. (2015) "A study on the analysis the changing of housing types in Gyeonggi-do province" Journal of the Regional Association of Architectural Institute of Korea, 17(3): 17~24.

Jang, M. & Kang, C. (2011) "The spatial patterns of single family housing in Seoul 1970~2009." Seoul Studies, 12(2): 19-40.

Park, K. & Choi, C. (2003) "A study on the urban tissue of residential area according to the change of building code." Journal of the Architectural Institute of Korea Planning & Design, 14(10): 69-76.

Bang, J. (2011) "The effects of development regulations on change of housing type in Hwagok land readjustment project area." Journal of the Architectural Institute of Korea Planning & Design, 27(12): 285-295.

Simmons, J. (1968) "Changing residence in the city: a review of intraurban mobility." Geographical Review, 58(4): 622-651.

Lee, J., Yang, J. & Song, H. (2012) "Housing policy directions for single and two-person households in Seoul." Seoul Development Institute: 29-64.

(Received Feb. 3, 2017/Revised Mar. 9, 2017/Accepted Jun. 5, 2017)