Types and Housing Product changes according to changes in Population and Social Structure

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Abstract

Objectives: This study analyzed the changes in population and social structure according to the changes of population and household structure to predict new housing types and housing products. Methods/Statistical Analysis: First of all, the study analyzed the trend of changes of the housing market in South Korea, compared cases in Japan that had similar experience to us and suggested new housing types and housing products suitable for South Korea. Findings: As a result of the comprehensive analysis on changes of population and household structure and Japanese cases, the expansion of resident-customized products was predicted: Downsizing-themed compact housing, elderly-friendly-themed housing products, nomad-themed lease housing products, etc. Improvements/Applications: Based on the results of this study, detailed demands for each product were estimated and the foundation for follow-up research on commercialization was developed.

1. Introduction

With changes of demand structure, residential consciousness and preference in the South Korean housing market, it is now necessary to develop responsive housing products. They are considered critical issues especially in the recent time when population and household structure are changing rapidly. According to national statistics, the rate of population change is estimated −0.19% from 2035 and the population rate of the elderly over 65 from 5.1% in 1990 to 32.3% in 2040. As for household structure, due to drastic increases of one to two-person households, its proportion is expected to grow from 22.8% in 1990 to 68.3% in 2035 (Statistics Korea, 2014).

Although preceding studies have presented significant performance on changes in population structure according to the outlook of housing demands¹, there has yet to be research on alternative housing products satisfying such housing demands. Therefore, this study aims to perform a time-based revision of the problems suggested by research on future housing types²³ that have been conducted practically since the late 1990s and present housing types and housing products that reflect new changes and respond to the changes of population and household structures.

2. Theoretical Background

2.1 Changes in Population and Household Structure

The changes in population and household structure focused on and analyzed in this study are aging, low birth rates and increases in 1 and 2-person households and elderly households. Aging means the phenomenon where the population rates of the elderly increase in the total population. That is, the population of retirees exceeds the

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producing population, not only in South Korean, but also in the world, which has become an international problem. In South Korea, the growth rate of population was estimated to decrease from 0.99% in 1990, 0.84% in 2000, 0.46% in 2010 and 0.28% in 2020 to 0.01% in 2030. It is prospected to rise minus growth rate: –0.19% in 2035 and -0.39% in 2040 (Statistics Korea, 2015).

The problem of aging in South Korea results from its fast pace. The 65 and older population that exceeded 6 million in 2014 is expected to surpass 10 million in 2030 in Table 1. If this phenomenon continues, South Korean society will enter a super aging society where the elderly population accounts for 24.3% in 2030. This means that the South Korean society would only take 26 years to convert from an aging society to a super aging society, making it 10 years faster than Japan, who took 36 years and recorded the shortest period in becoming a super aging society. As such, fast-paced aging will cause changes in housing products in many possible ways. The core elderly problem due to aging is the elderly housing issue. Considering that it takes time to supply housing products, it is now necessary to prepare speedy countermeasures by developing housing types and housing products that meet consumer needs.

When it comes to low birth rates, the birth rate of South Korea recorded the lowest among OECD (Organization for Economic Cooperation and Development) member nations standing at 1.14. Compared to the US (2.01), France (1.99) and the UK (1.94), this figure is extremely low. South Korea is the only country to have a birth rate lower than 1.3. This is considered very serious based on the alternative birth rate (2.1), the basic birth rate index for maintaining the current population level. It shows age-specific birth rates in South Korea in Table 2. The

### Table 1. Changes of population structure in South Korea

| Year | Total population | Age 0-14 | Proportion | Age 15-64 | Proportion | Age over 65 | Proportion |
|------|------------------|----------|------------|-----------|------------|-------------|------------|
| 1990 | 42,869           | 10,974   | 25.6       | 29,701    | 69.3       | 2,195       | 5.1        |
| 2000 | 47,008           | 9,911    | 21.1       | 33,702    | 71.7       | 3,395       | 7.2        |
| 2010 | 49,410           | 7,975    | 16.1       | 35,983    | 72.8       | 5,452       | 11.0       |
| 2014 | 50,424           | 7,199    | 14.3       | 36,839    | 73.1       | 6,386       | 12.7       |
| 2020 | 51,435           | 6,788    | 13.2       | 36,563    | 71.1       | 8,084       | 15.7       |
| 2030 | 50,424           | 6,575    | 12.6       | 32,893    | 63.1       | 12,691      | 24.3       |
| 2040 | 51,091           | 5,718    | 11.2       | 28,873    | 56.5       | 16,501      | 32.3       |
| 2050 | 48,121           | 4,783    | 9.9        | 25,347    | 52.7       | 17,991      | 37.4       |
| 2060 | 43,959           | 4,473    | 10.2       | 21,865    | 49.7       | 17,622      | 40.1       |

Source: Statistics Korea, 2014

### Table 2. Birth rate changes in South Korea

| Year | Birth rate | Age 15-19 | Age 20-24 | Age 25-29 | Age 30-34 | Age 35-39 | Age 40-44 | Age 45-49 |
|------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1970 | 4.53       | 19.3      | 193.1     | 320.6     | 205.7     | 105.7     | 46.0      | 13.1      |
| 1980 | 2.83       | 12.4      | 135.9     | 242.7     | 114.0     | 40.2      | 15.1      | 5.6       |
| 1990 | 1.59       | 4.2       | 83.2      | 169.4     | 50.5      | 9.6       | 1.5       | 0.2       |
| 2000 | 1.46       | 2.5       | 38.8      | 149.6     | 83.5      | 17.2      | 2.5       | 0.2       |
| 2005 | 1.10       | 2.1       | 17.8      | 91.7      | 81.5      | 18.7      | 2.4       | 0.2       |
| 2006 | 1.12       | 2.2       | 17.6      | 89.4      | 89.4      | 21.2      | 2.6       | 0.2       |
| 2007 | 1.25       | 2.2       | 19.5      | 95.5      | 101.3     | 25.6      | 3.1       | 0.2       |
| 2008 | 1.20       | 1.7       | 18.2      | 85.6      | 101.5     | 26.5      | 3.2       | 0.2       |
| 2009 | 1.14       | 1.7       | 16.5      | 80.4      | 100.8     | 27.3      | 3.4       | 0.2       |
| 2010 | 1.22       | 1.8       | 16.5      | 79.7      | 112.4     | 32.6      | 4.1       | 0.2       |
| 2014 | 1.20       | 1.6       | 13.1      | 63.4      | 113.8     | 43.2      | 5.2       | 0.1       |

Source: Statistics Korea, Age-specific birth rates, 2014
South Korean birth rate gradually decreased from 4.53 in 1970, 2.83 in 1980 and 1.59 in 1990 to 1.2 in 2014. Such changes in the birth rate have caused variations in housing demands such as demands for expanded house areas according to not only economically active family members, but also lifecycles\(^5\).

The next analysis factor - household means one or more persons occupying a single dwelling and earning a living as a unit. In other words, it is a group of people living together in one house. The overall changes in the society, such as increased age at first marriage, low birth rates and development of medical technology, have reconstructed the structure of households from patriarchal large-family type to nuclear family and smaller family. With the advent of nuclear families and smaller families, various household types, including one person households, married couple households and elderly households, started to appear. Changes of households according to social changes have affected the increasing number of households.

In terms of the increase of single-person households, the rate recorded 23\% in 1990, 30\% in 1995 and 42\% in 2005; it rose more than 10\% within merely 10 years. Later, it is estimated to be 54\% in 2015, 62\% in 2025 and 68\% in 2035. Such significant increases of single person households also contributed to the changes in population and social structure in Table 3.

When it comes to the increase of the number of elderly households, 1.7 million 65 and older elderly households in 2000 increased to 2.5 million in 2005 and the elderly households rate in 2035 is expected to be over 40\% in Figure 1. This has a correlation with aging and single-elderly households have been attracting social attention. The numbers of elderly households and single-elderly households are expected to continuously increase, which requires a supply of adequate housing types and housing products in Table 4. In particular, the problem of choosing what type of housing in the stage of old age is more than simply choosing housing types and residential areas; therefore, a holistic approach is required for the issue\(^6\).

![Figure 1. Change in South Korean single-person households.](image)

Source: Statistics Korea, Change in single-person households, 2014

### Table 3. Changes in the number of South Korean households (Unit, 1,000 households)

| Division                  | 1990 | 1995 | 2000 | 2005 | 2010 | 2015 |
|--------------------------|------|------|------|------|------|------|
| The total number of households | 11,244 | 14,507 | 14,507 | 15,971 | 17,359 | 18,705 |
| Increase rate            | 18.6 | 15.78 | 11.44 | 10.09 | 8.69 | 7.75 |

Source: Statistics Korea, 2014, the total number of South Korean households

### Table 4. Elderly households in South Korea

| Year | Total household | 65-and-older elderly households | Rate | 65-and-older single-elderly households | Rate |
|------|----------------|---------------------------------|------|---------------------------------------|------|
| 2000 | 14,507         | 1,733                           | 11.9 | 554                                   | 3.8  |
| 2005 | 15,971         | 2,535                           | 15.9 | 779                                   | 4.9  |
| 2010 | 17,359         | 3,086                           | 17.8 | 1,055                                 | 6    |
| 2015 | 18,705         | 3,851                           | 20.6 | 1,379                                 | 7.4  |
| 2020 | 19,878         | 4,772                           | 24   | 1,744                                 | 8.8  |
| 2025 | 20,937         | 6,172                           | 29.5 | 2,247                                 | 10.8 |
| 2030 | 21,716         | 7,689                           | 35.4 | 2,820                                 | 13   |
| 2035 | 22,260         | 9,024                           | 40.5 | 3,429                                 | 15.4 |

Source: Statistics Korea, Estimation of the future households, 2010
2.2 Housing Market in South Korea and Japan

Housing prices in the housing market are decided by supply and demand. The supply and demand of houses are changed by economic circumstances, changes in population and households and other variations. The housing market in Japan serves as a leading reference index for the South Korea housing market in Table 5. The comparison between the South Korean and Japanese housing market is as follows:

2.3 Housing types in South Korea and Japan

This study applies theories in the real estate field and housing types defined in architecture, etc. that were operationally defined as housing products. Terms and meanings used in preceding studies were organized by identifying the researchers’ intention as much as possible, but some of them were combined. The housing types in South Korea are as follows: In the 1990s, detached houses accounted for most proportions, but apartments gradually increased later on, reaching about 60% as of 2010 in Table 6. Ownership types of residents changed from 8.828 million home ownerships (57.34%) and 6.568 million lease homes (42.66%) in 2006 to 9.655 million home ownerships (55.21%) and 7.832 million lease homes (44.79%) in 2014 in Table 7; the number of lease homes has continuously increased.

Table 5. Influence factors for the housing markets in South Korea and Japan

| Major factors                | South Korea                                                                 | Japan                                                                 | Comparison/ characteristics |
|------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------------|
| Population and household     | - Decrease from 2030                                                         | - Decreased from 2010                                                | - 20-year difference       |
| Household                    | - Decrease from 2030                                                         | - Decreased from 2015                                                | - 15-year difference       |
| Aging                        | - 2018: aging society                                                       | - 1994: aging society                                                | - About 20-year difference |
|                              | - 2026: super aging society                                                 | - 2006: super aging society                                          |                            |
| Economy                      | - Average 4% in the recent 10 years                                          | - Long-term depression since 1991                                   |                            |
|                              | - Basic trend of low growth established                                     | - Basic trend of low growth established                               |                            |
|                              | - Average 1% for the past 10 years                                          | - South Korea maintains 4-5% growth rate                             |                            |
| Housing market               | - 100% nationwide in 2002                                                   | - 100% nationwide in 1968                                            | - About 30-year difference |
|                              | - Lower than 100% in Seoul and metropolitan cities                           | - 100% in Metropolitan areas in 1972                                 |                            |
|                              |                                                                              | - 115% nationwide in 2010                                            |                            |
| Housing prices               | - After rapid price increase in the 2000s, stabilized for about 5 years     | - Bubble collapse in the early 1990s                                 | - No bubble collapse in    |
|                              |                                                                              | - Stabilized for the next 20 years                                    | South Korea               |
|                              |                                                                              |                                                                      | - Japan is 10 years        |
| Sense of home ownership      | - Weakened due to real estate economic downturn                              | - Strong sense of ownership                                          | faster and shows little    |
|                              |                                                                              |                                                                      | price variation            |

In 2009 in South Korea, many housing types and housing products aside from urban-type housing were
developed earlier in the market and institutional supplement and political support were implemented for them. During the process, new housing types and products that converged advantages of existing housing products appeared in the market. Changes and history of housing types in South Korea are shown in Figure 2.

Table 6. Housing types in South Korea

| Division             | 1990 Total | 1990 Rate | 1995 Total | 1995 Rate | 2000 Total | 2000 Rate | 2005 Total | 2005 Rate | 2010 Total | 2010 Rate |
|----------------------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|
| Total                | 6,958      | 100       | 8,862      | 100       | 10,566     | 100       | 12,296     | 100       | 13,732     | 100       |
| Apartment            | 1,628      | 23.4      | 3,455      | 39        | 5,231      | 49.5      | 6,627      | 54        | 8,185      | 59.6      |
| Detached houses      | 4,727      | 68        | 4,337      | 49        | 4,069      | 38.5      | 3,985      | 32.4      | 3,797      | 27.6      |
| Row houses           | 488        | 7         | 734        | 8.3       | 813        | 7.6       | 520        | 4.2       | 504        | 3.8       |
| Multi-households     | 115        | 1.6       | 336        | 3.7       | 453        | 4.4       | 1,164      | 9.4       | 1,246      | 9         |

Table 7. Housing types by home ownership type in South Korea (Unit: 1,000 homes)

| Ownership types     | 2006 | 2008 | 2010 | 2012 | 2014 |
|---------------------|------|------|------|------|------|
| Home ownership      | 8,828| 9,269| 9,406| 9,532| 9,655|
| Lease               | 6,568| 6,674| 7,471| 7,699| 7,832|

Japan, on the other hand, as the environment changes, an increase in population and households contributed to the decrease of housing demands; when it comes to economic environment, the basic low-growth condition continued and real incomes of a majority of the people decreased. Such phenomena resulted in a lower ability to purchase houses, a declined expectation for high housing prices in the housing market and a sharp drop of demands for holding houses as investment properties. This caused changes in housing types and the preference for reduced house sizes as well as bigger price gaps between new houses and existing houses.

As such, in order to respond to various changes of awareness of dwellers, business owners related to Japanese housing have expanded the housing-related service market that values residence. Elderly support and demand-customized service and single person household-oriented service have been developed and projects on compact mansions, concept houses, lease, existing house market (reform), housing service and elderly-specialized business have created markets, leading the changes of housing types. Under the circumstances, housing facilities for the elderly, including elderly housing, senior houses, outstanding rental houses for the elderly, care houses, paid senior homes, etc. have been formalized.

2.4 Housing products in South Korea and Japan

Traditional housing products in South Korea and Japan have been developed through a convergence of existing housing types and housing products. Through the process, hybrid housing products have emerged and until now, housing providers are making such efforts. This study aims to investigate new housing products that recently appeared in the market with recent macroscopic trends and consumer needs and based on which, suggest alternative housing products.

As for South Korea, peanut house – an unfamiliar term for South Koreans – has become a popular housing product. A peanut house is called so for its appearance that two homes are built in a lot side by side; it is called a duplex home in the US. It has the advantages of the comfort and the comfortableness of detached houses with a half-reduced financial burden by two households sharing the life expenses. However, there are disadvantages as well such as ownership issues, security and the protection of privacy. Recently, pea houses, multiple peanut houses that are combined so that 3-4 families can live together have become popular.

As opposed to the peanut house, there is a wide-spread housing product called kangaroo house. A kangaroo house is a new type of housing product where a spacious country house is shared by two households.
This is considered a partial lease type of country house in terms of usage as well as a hybrid type of product that achieves two goals of housing and economic support for retirees. The next type of housing product is the dome house, which is a detached house being modeled after the igloos of the Eskimos. Its relatively affordable construction costs and shorter construction period have attracted customers who pursue a nomad lifestyle. Moreover, its pillar less interior provides higher space efficiency and the high energy efficiency allows a reduction of heating and cooling costs. Therefore, the government and local governments have supported this housing type. When it comes to a shared house, where multiple people share a home, the residents can use private rooms individually and public areas in common. In South Korea, it started with ‘Yeonghee Mibaum’ and the government has supported it with various benefits. As such, the housing culture in the future has gradually evolved so as to fulfill new consumer demands.

Environmental changes and consumer-responsive housing products in Japan are as follows: Japan showed a serious downscale of the construction market and structural changes in the early 1990s due to the bubble collapse as well as long-term stagnation. Such changes led to the development of existing products with additional service rather than the release of new housing products. First, low-cost houses appeared; cost-saving houses with ECONO concept started to be widely supplied. Second, compact housing products started to be highlighted resulting from the uncertain prospect on the real estate market and the trend of purchasing with a focus on house values. This phenomenon created a supply of housing products called compact mansions in Table 8. Sized at about 30-50 m², compact mansions were supplied mostly in Tokyo. They were created focusing on areas with a good transportation system, in the structures of a studio or 1LDK and 2LDK with one or two living rooms and kitchens. Compact mansions targeted small households, focusing on residential stability, comfort ability, design and others.

Third, share houses have been developed as similar to those in South Korea, yet spread faster than in South Korea. Share houses in Japan have different concepts according to consumer needs: Share houses for single moms, English-speaking only share houses, tenement houses, share houses with agricultural functions and pet houses. As such, they have positioned and targeted share house products according to various concepts by subdividing the market. Fourth, concept mansions were

| Table 8. Cases of Japanese concept mansions |
|---|---|---|---|
| **Division** | **HN apartment** | **NE apartment** | **MM apartment** |
| Location | Suginami, Tokyo | Suginami, Tokyo | Setagaya, Tokyo |
| Year of completion | March 2007 | December 2007 | September 2009 |
| Areas | Site area 125.40 ㎡ | Site area 201.89 ㎡ | Site area 98.30 ㎡ |
| | Building area 64.88 ㎡ | Building area 96.34 ㎡ | Building area 65.53 ㎡ |
| | Floor area 186.60 ㎡ | Floor area 289.02 ㎡ | Floor area 196.59 ㎡ |
| Nearby station | Honancho | Nishi-eifuku | Meidaimae |
| Characteristics | - Far distance to Honancho station  
- Elongated site: affordable purchase prices  
- Adjacent to arterial roads | - Planned after the success of Honancho mansion  
- Hard to view surrounding areas  
- Undecided land use purpose: affordable prices as inventory | - Frequent passing of trains, and developed on the site near the railroad crossing  
- Vulnerable to noise  
- Compact mansions |
| Current status | - Lack of motorcycle parking lot in rental house sites in Tokyo  
- Risks of motorcycle theft | - Lack of motorcycle parking lot in rental house sites in Tokyo  
- Risks of motorcycle theft | - Noise near the railway  
- Risks of motorcycle theft |
| Target | Motorcycle users | Motorcycle users | Motorcycle users |
| Applications | - Motorcycle parking facility in the houses  
- Separate living space on the 2nd and 3rd floors | - House arrangement focused on the square near the entrance  
- Motorcycles on the 1st floor and living space on the 2nd floor and above | - Special sound-proof structures: Available for even musicians  
- Spiral space: optimized space utilization |
planned to exclude unnecessary facilities, complement what residents need and improve resident satisfaction so that residents can organize social communities. For example, biker-concept mansions have been widely spread for motorcycle users. As such, concept mansions enhance resident satisfaction by targeting potential consumers and applying facilities and operational methods to fulfill their needs. Also, by commercializing various concepts of products, a wide range of choices are open to potential consumers.

3. Trends of Housing types and Products in the Future

The causes of changes in population and social structure are a prolonged average life span owing to scientific development, qualitative improvement of life environment and decreased birth rates due to ability-dependent social changes, etc. As for future scenarios for housing, suggested diversification of housing types, generalization of green intellectual buildings and increased interest in housing amenities. Some studies suggested directions for the development of real estate products as eco-friendly and emotional keyword. As for college students, the representative samples of young potential consumers, they reportedly considered the characteristics, location requirements, complex environment, economic efficiency, etc. in preference of the future housing environment. This study aims to suggest trends of housing types and products in South Korea in the future as follows. They are expected to be developed as major items that speak for practical naming and the age through market segmentation process in the future.

3.1 Downsizing and Compact Housing Products

In South Korea, a gradual increase of single-person households has diminished the demand base for large houses. As a result of analysis, single-person households prefer commuting via public transportation and job-housing proximity. This means that large housing towns constructed in the suburbs would not be favored anymore and small housing products would become popular in the process of regenerating the existing original downtown. According to, single-person households are concentrated in the center and sub-centers of the city, subway station areas and university towns focusing on the subway line number 2. For products responding to such a trend, micro compact housing products with areas of exclusive use smaller than 30 m² in the downtown, metropolitan area. Figure 3 shows the phenomenon of returning to compact housing in metropolitan areas in Japan.

![Figure 3. Average house prices and areas in the metropolitan area in Japan.](source: HASEO, CRI (Comprehensive Real-estate Information), No. 361, 2008. 8. 25)

3.2 Elderly-Friendly and Senior Housing Products

With an intensifying aging population, it is required to spread elderly-friendly housing products. It is especially necessary to consider housing prices that senior people can afford, etc. for the products. There can be differences in the housing products according to region, but it is considered to become alternative and representative products in the housing market from now on. Currently, there are more senior housing products than the national average in metropolises such as Seoul, Gyeonggi and Busan. This can be said that there is more of a demand for senior care centers in bigger cities, which led to a continuous increase in supply. On the other hand, in rural cities, there was less supply of senior care centers due to the lack of awareness of consumers. Therefore, it is required to provide new types of elderly-friendly housing products where various facilities and operational methods are converged. Like the ever increasing number of senior care centers according to an aging population, the aging population has affected the housing product market in a new way. As baby boomers get old, more housing products for the elderly population will be required, which means diversification and activation of elderly-friendly and customized senior housing products.
3.3 Nomad and Lease Housing Products
Recently, the nomad lifestyle has become popular among young people. Contrary to the past, they purchase cars before buying a home and prefer traveling to the priority of having house ownership. This is why a variety of lease housing types has been supplied. Also, the high-end lease housing market has been getting bigger, focusing on high earners unlike the past. Such trends have been widely prevalent in Japan and it is expected that in South Korea, corporate-type lease housing, New Stay, will be further expanded with a bigger market scale. Moreover, such vitalization of leasing is considered to provide an opportunity for housing service providers to enter the new housing market with changes in population and household structures, population aging and other multiple environmental changes.

4. Conclusion
This study analyzed the changes of housing types and products according to the changes in South Korean population and household structures. As a result, it is expected that resident-customized products would be expanded and compact housing with the theme of downsizing, housing products for the elderly with a senior-friendly theme and rental housing products with the theme of nomad, etc. were thought of as alternatives. Accordingly, follow-up studies on the estimation of specific demands and commercialization for each product are required in the future. This study limited its research subject to South Korea and Japan; therefore, case studies on various countries with similar scale and culture and time sequential analysis are necessary.

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6. Reference
1. Chul CE, Jin CS. Demographic changes and long-term housing demand in Korea. Korean Planners Association. 2005; 40(3):37–46.
2. Kyoung HM, Kyu KH, Seong JH. Design guidelines for future housing types: A study based on survey of housing experts and consumers. Journal of the Architecture Institute of Korea. 1998; 14(5):129–40.
3. Gyou LH, Woo JJ, Seong KB. A study on a trend of the study and research direction in the block housing as new residential style. Architecture Institute of Korea. 2003; 23(2):43–6.
4. Ja SM. A desire and preferences for old life housing environments in rural areas among middle and old life residents. The Graduate School of Hanseo University; 2014.
5. Hee KM. The preference of housing for the elderly among the middle-aged households for aging society. The Koran Housing Association. 2006; 17(1):117–26.
6. Jeong KM. Study on the impact of demographic structure changes on housing price changes: Focusing on the aging and baby boom retirement of metropolitan areas. The Graduate School of Chung-Ang University; 2014.
7. Jung KH, Min LY, Hwa HH, Young Kj, Shil YH. Process of forming housing notion for later life based on life-time housing experiences of the elderly. The Korean Housing Association. 2013; 24(3):95–108.
8. Sook PJ, Sup LM. A study on the type and planning characteristic of residential facilities for the elderly in Japan - Focused on the residential facilities for the elderly in the suburbs of Tokyo. The Architecture Institute of Korea. 2009; 25(10):39–46.
9. Won LH, Ho SM, Won RJ, Bum LJ, Seok LK. Architectural planning characteristics of urban share house for single-household. Residential Environment Institute of Korea. 2014; 16(3):51–60.
10. Hyeon JJ. A study on the apartment houses as merchandise after 2000. The Graduate School of Korea University; 2012.
11. Yesbolova AY, Ibraimova SSS, Mergenbaeva AT, Urazbayva GZ, Narkulova SA, Abishova AU. Econometric analysis of the poultry industry development in Kazakhstan. Indian Journal of Science and Technology. 2016; 9(20):1–8.
12. Soo JY, Kuk LJ. A study on the demand and supply of housing due to population and changes in household: On the social causes of the changes in the population structure in the center. Journal of Korean Housing Association. 2014; 25(3):123–30.
13. Chang KY, Ho LS. Future analysis of housing based on futures research methods. Journal of Geography. 2010; 56(1):69–90.
14. Keun YY. A study on the strategy of products development for mass housing. Koran Digital Architecture and Interior. 2010; 10(2):31–8.
15. Sandbhor SS, Chaphalkar NB. State of art report on variables affecting housing value. Indian Journal of Science and Technology. 2016; 9(17):1–6.
16. Ho Y. A study on the future housing environment preference among the college students. Incheon Development Institute, Incheon Study. 2004; 20(1):5–10.
17. Won LH, Ho SM, Won RJ, Bum LJ, Seok LK. Architectural planning characteristics of urban share house for single-
18. Hoon LD. Small rental housing supply expansion plan for the one-person households. Seoul Development Institute. 2012; 4(109):1–24.

19. Jeong WY, Jeong SU. A comparison of consumption expenditure patterns and their determinants of low-income and high-income elderly households. Korean Social Security Studies. 2010; 26(4):21–48.