



## Seoul's Morphology as 'Apartment Complex City' Shaped by Housing Development Methods

Soe Won Hwang\*

\* PhD, Environmental Planning Institute, Seoul National University, soehwang@gmail.com

Seoul has materialized a unique built form on its urban terrain through aggressively constructing apartment complexes, a large-scale, single-parcel private territory, over the last half-a-century. The historical formation of apartment complexes differs significantly based on elements such as the development policies in each period, development mechanisms, the degree of public control, and the extent of private engagement. The research will examine the consequences of the entire 'apartment complexes' in Seoul and their morphological characteristics, particularly affected by development methods over time. The analysis is composed of (1) basic historical overview on planning policies and development methods that principally encouraged the apartment complex construction in the context of Seoul's urban expansion since the 1970s and (2) morphological attribute of Seoul's entire apartment complexes (2,172). The formal characteristics of apartment complexes are analysed in term of such morphological elements as plot (apartment complex as single parcel), building, street and density among others. The morphological characteristic in relation to development method provides insights related to genesis aspects of apartment complex emergence regarding its morphological characteristics. By focusing on morphological aspect, the study intends to examine the spatial manifestation of massive apartment complex building that has formed and transformed Seoul over the modernization years

**Keywords:** Apartment Complex Urbanism, Seoul, Housing Development Methods, Apartment Complex Morphology

### Apartment Complex City as Asian Urbanism

During the past half century, Asian cities and their urban landscapes have undergone dynamic, chaotic, and contradictory evolution through the periods of colonization, modernization, urbanization, and globalization (Rowe, 2005; Lim, 2008; Watson, 2011). According to Parent et al. (World Bank, 2016), higher-income countries in East Asia demonstrate a higher degree of urbanization in terms of land and population, exemplifying the close relationship between urbanization and urban growth. In these countries, economic prosperity enables a proactive state to promote a world-class city in terms of infrastructure and reputation, resulting in similar urban environments. This is evident in the emergence of similar business districts, cultural venues, iconic towers, consumption architecture, and gated communities alongside increasing global activities (Marshall, 2003; Buck, 2006; Chang and Kim, 2016). The similarity of the Asian urban form has also been ascertained in residential environments. The limited time in which to become a prosperous world city and limited territory mean that similar high-rise and high-density apartment complex buildings have emerged in East Asian cities. Rowe (2014) explains that the 'superblock configuration' which was widely adopted in the form of mega-plots implemented with multi-unit housing with community facilities that were commonly developed in East Asian countries. In Singapore and Hong Kong, most public housing is supplied in the form of blocks, or otherwise complexes comprise mid to high-rise apartment buildings. The high-quality communal domain is grouped with diverse outdoor common spaces and facilities around tall residential towers (Rowe, 2005). Japan controls large-scale apartment complexes in the city center and channels them to the outskirts of the city. Since the early 21<sup>st</sup> century, China has strived to successively construct numerous apartment complexes. In Seoul, apartment complex buildings are regarded as the most efficient way to supply large-scale modern housing (Lim, 2008; Jun, 2009; Park I.S., 2013).

### Seoul as an 'Apartment Complex City'

Seoul's apartment complex development is an extraordinary urban phenomenon in which traditional housing types were replaced with new ones over a period of half a century, and distinctive spatial and morphological attributes materialized across the urban terrain. Apartment complexes have been aggressively constructed in Seoul, primarily to address its chronic shortage of housing (Figure 1). However, the quality and standard of housing has not been guaranteed as the supply focus has been on quantity and feasibility. The consequences are



high-rise, high-density apartments everywhere irrespective of the urban landscape, enforcement of uniform or standardized living environments, and native residents who cannot afford the redeveloped environment that is oriented to development profit (Lee, 2002: 114–115). Nevertheless, how did apartments become the popular housing type preferred by the majority, and specifically the middle class? Gelézeau brings up the profit-gain alliance between the government, the private sector (explicitly Jaebol, who owns major construction companies), and the middle class that supports the massive provision of apartments (Gelézeau, 2007). The intervention of the government and housing policy have been based on a market-dominated approach, encouraging ownership rather than renting because the notion of a “house” possesses high value as an asset and high marketability (Jun, 2009: 56).

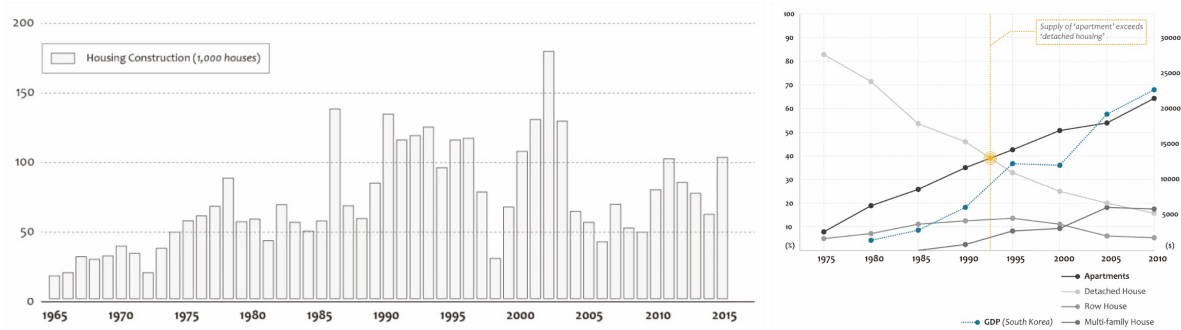


Figure 1. Annual housing constructions between 1965–2015 (left) and supply quantity by housing types in Seoul (right)

### Forming and Transforming Seoul by Multiple Housing Development Methods

Seoul became an apartment city consequent to the aggressive development of apartment complexes over the last half century. Unlike the traditional infill developments on small parcels, apartments were constructed on large parcels, resulting in numerous apartment complexes. Apartment complexes are constructed individually or in a group, spontaneously or following master plans depending on the development method applied. The historical formation of apartment complexes differs significantly based on elements such as the development policies in each period, development methods, degree of public control, and the extent of private engagement. The development methods as an implementation tool of public policy and city planning dictated how apartment complexes were shaped and their location. This section overviews the planning policies and development methods that principally encouraged the construction of apartment complexes in the context of Seoul’s urban expansion since the 1970s.

As Table 1 shows, mainly seven development methods that were applied in the formation and transformation of apartment complexes in Seoul from the 1960s to 2010s. Development methods are differentiated as new development methods and redevelopment methods. The former applies to the construction of new apartment complexes on vacant sites, while the latter refers to renewal projects in existing built-up areas or apartment complexes. These development methods are supported by the planning laws institutionalized to respond to city planning issues pertaining to city growth, renewal, and housing supply at different times (Figure 2).

Table 1. Development methods and construction of apartment complexes over time

| Development Method                 |     | 1960s | 1970s | 1980s | 1990s | 2000s | 2010s | Total ACs* |
|------------------------------------|-----|-------|-------|-------|-------|-------|-------|------------|
| Han River Land Reclamation Project | HLR |       |       |       |       |       |       | 64 ACs     |
| Land Readjustment Project          | LRA |       |       |       |       |       |       | 259 ACs    |
| Housing Site Development Project   | HSD |       |       |       |       |       |       | 288 ACs    |
| Urban Development Project          | UDP |       |       |       |       |       |       | 138 ACs    |
| General Built-up Area              | GBA |       |       |       |       |       |       | 534 ACs    |
| Housing Redevelopment Project      | HRD |       |       |       |       |       |       | 380 ACs    |
| Housing Reconstruction Project     | HRC |       |       |       |       |       |       | 509 ACs    |

\* Total Apartment Complexes (AC)s count up to 2,172 in Seoul based on author’s investigation

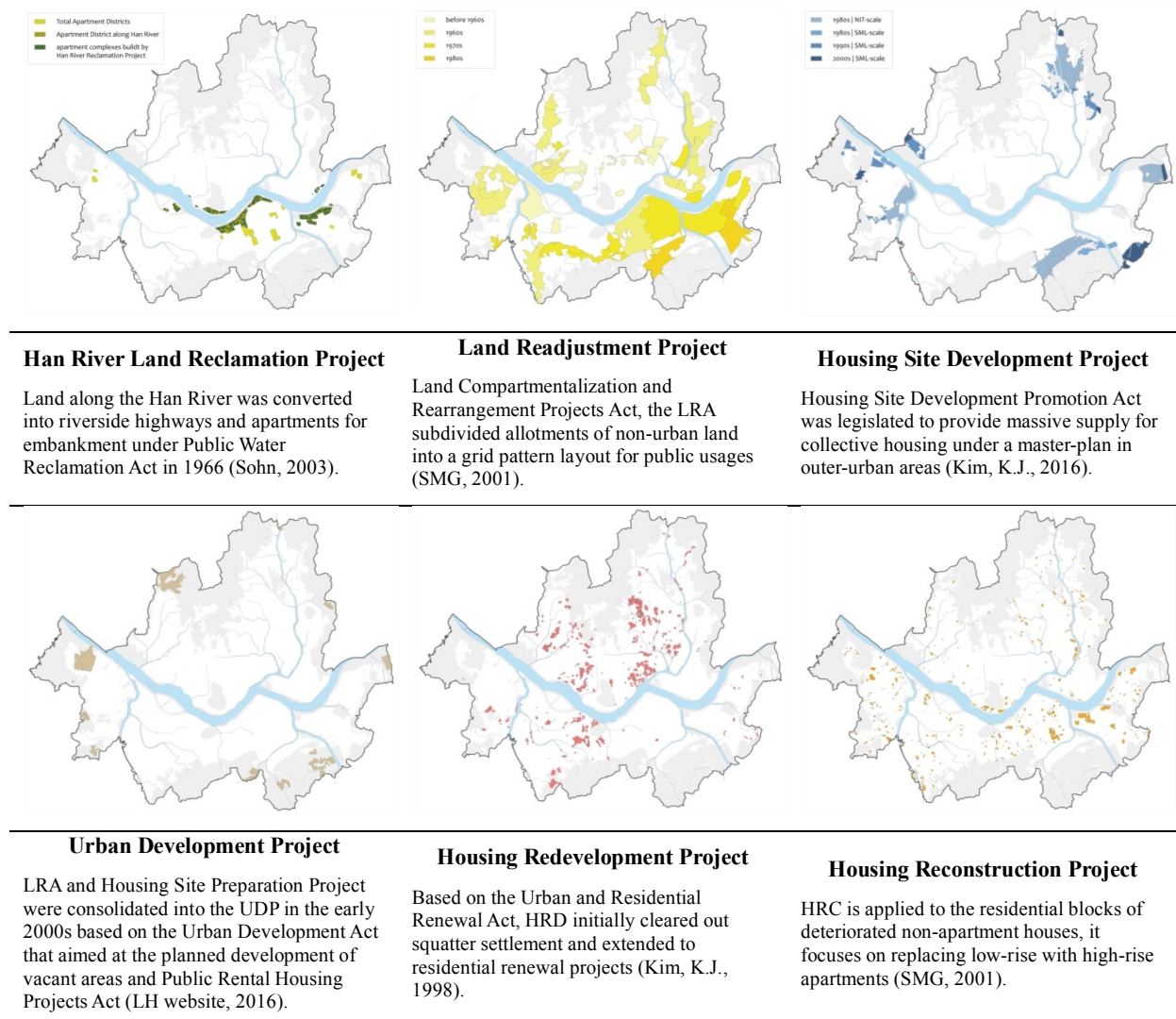


Figure 2. Multiple housing development methods promoting apartment complex construction

### Method

This study is based on the premise that Seoul demonstrates unique and indigenous morphological characteristics of apartment urbanism through the ‘cumulative effects’ of different periods of development in terms of the construction of apartment complexes. Based on this intention, the study employs analysis framework from the urban morphological studies, where a parcel is the base unit of urban form, while containments within a parcel such as buildings, building use, or open space around the building are considered as urban cells (Moudon, 1994). An apartment complex is a development unit viewed as an urban cell, and simultaneously embeds the quality of the urban tissue based on a large parcel that comprises multiple buildings as well as an internal road system, broad open space for parking, and greenery. Locational and geographical siting and density is added to the traditional methodology of analysing the dimensions of parcel, building, and street (Table 2). In addition the database, which was coded by formal type for each apartment complex, enables an examination of the internal and external forces influencing the morphological characteristics. The term internal force refers to the limitations and opportunities of morphological element, whereas each dimension of the morphological elements is investigated in terms of development methods, as they reflect the specific external forces shaping the urban form. The morphological elements were statistically examined through a descriptive analysis and chi-squared test to determine the current condition according to development method.

The database on Seoul’s apartment complexes was constructed based on two resources: 1) The Seoul Metropolitan Government’s “2015 status of multi-unit housing data of Seoul,” and 2) the “2015 new address base map,” which is open data provided by the National Spatial Information Clearinghouse (NSIC), while other data information was employed to supplement these main sources (Table 3). The chronological extent of this study spans 45 years from January 1970 until December 2014, and encompasses 2,172 apartment complexes.



Table 2. Morphological analysis framework

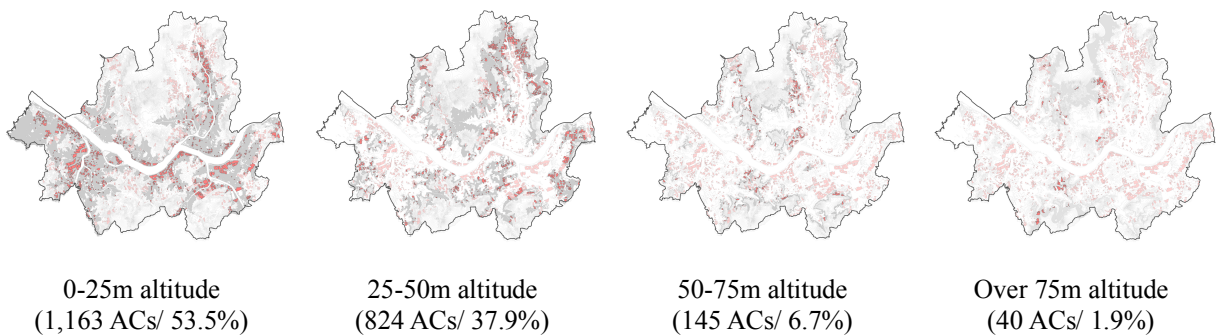
|  | Morphological Elements                    | Dimensions  |
|--|---|---|
|  | <b>Locational and geographical siting</b> | <ul style="list-style-type: none"> <li>• Planar spatial distribution</li> <li>• topographical siting</li> </ul>   |
|  | <b>Parcel</b>                             | <ul style="list-style-type: none"> <li>• Parcel Size</li> <li>• Parcel Shape</li> </ul>   |
|  | <b>Building</b>                           | <ul style="list-style-type: none"> <li>• Number of Buildings</li> <li>• Building Height</li> <li>• Architectural Style</li> <li>• Building Arrangement</li> </ul> |
|  | <b>Density</b>                            | <ul style="list-style-type: none"> <li>• Building Coverage Ratio (BCR)</li> <li>• Floor Area Ratio (FAR)</li> </ul>   |
|  | <b>Street</b>                             | <ul style="list-style-type: none"> <li>• Street Shape</li> <li>• Bordering Street Proportion</li> <li>• Bordering Street Hierarchy</li> </ul>                     |

Table 3. Surved database and sources

| Classification            | Morphological Elements     | Data  | Type  | Source  | Date       |
|---------------------------|----------------------------|---|-------|---|------------|
| General Urban Information | Geography                  | Topographical contour map with 5 and 10m interval | GIS   | National Spatial Information Clearinghouse                        | 2014       |
|                           | Seoul Development Projects | Seoul's development methods and strategies        | GIS   | Seoul Institute Korea National Spatial Data Infrastructure Portal | 2014       |
|                           |                            | Seoul's development projects                      | GIS   | Korea National Spatial Data Infrastructure Portal                 | 2015       |
| Morphological Survey      | Parcel - total             | Cadastral map                                     | GIS   | Korea National Spatial Data Infrastructure Portal                 | 2015       |
|                           | Parcel _ AC                | New address base map                              | GIS   | National Spatial Information Clearinghouse                        | 2015       |
|                           | Building - AC              | 2015 Status of multi-unit housing data of Seoul   | Excel | Seoul Metropolitan Government via Open Data Portal                | 2015       |
|                           | Building & Density         | Building ledger                                   | Excel | Building Data Open System & Naver Real Estate                     | 2015       |
|                           | Street                     | Surrounding street condition                      | Excel | Naver & Daum Map (Aerial and street views)                        | 2015, 2017 |

**Morphological Characteristic by Seven Development Methods**

*Siting Topography*



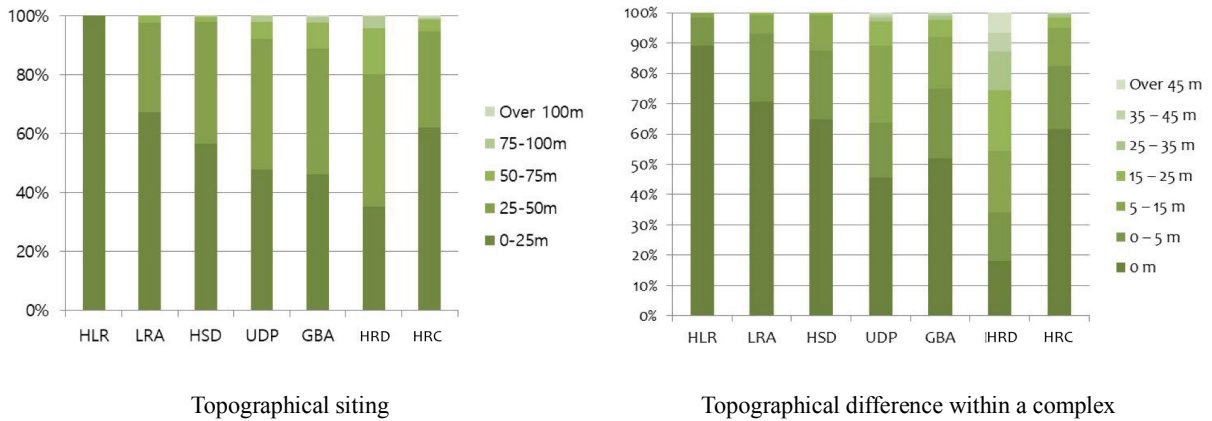
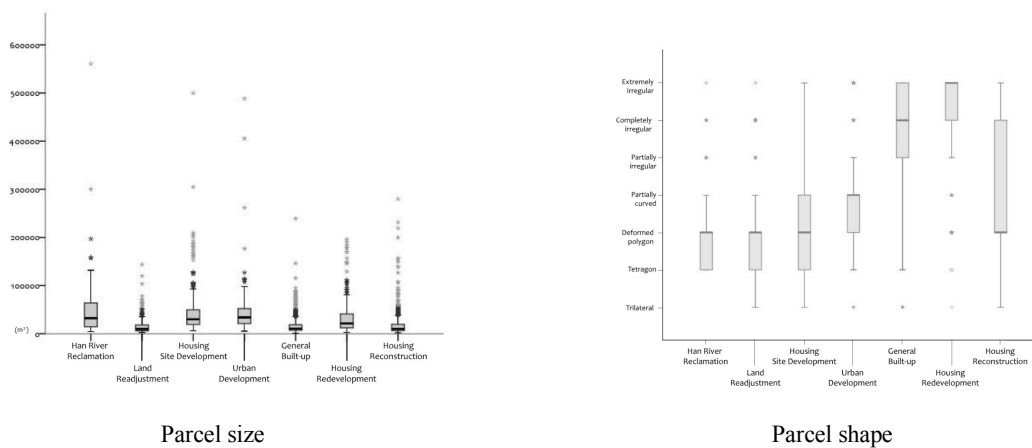


Figure 3. City-wide siting topography and topographical difference within a complex

In general, most planned apartment complexes are located at a low altitude in terms of topography. In addition, most low-level flatlands are distributed along the lower area of the Han River, namely in the Gangnam region and towards the Southwest area which has a broad flatland area lower than 5 m. Over the years, Seoul apartment complexes have become located at a higher elevation. Among those situated at an altitude higher than 50 m, more than 50% were developed in the 2000s and after, mostly through the Housing Redevelopment Project. This siting pattern sometimes exaggerates the natural topography, creating a massive enclosure of ordinary residential neighborhoods in the lower part of the city. Most apartment complexes were developed on the flatlands or slightly inclined sites under Han River Reclamation, Land Readjustment and Housing Site Development, while spontaneous and individual development method shows certain degree of topographical differences in a single complex (Figure 3)..

**Parcel**



| Regular              |   |                                       |   | Irregular                  |  |  |
|----------------------|---|---------------------------------------|---|----------------------------|--|--|
| <b>Trilateral</b>    | <b>Tetragon</b>                             | <b>Deformed polygon</b>               | <b>Partially curved</b>                     | <b>Partially irregular</b> | <b>Completely irregular</b>                      | <b>Extremely irregular</b>                       |
| Right/ Acute/ Obtuse | Square/ Rectangle/ Trapezoid/ Parallelogram | Protruded/ Recessed/ Deflected (bent) | Partially planned curve with straight lines | mixed with straight lines  | over all shape 'or' meandering, crooked boundary | Overall warping shape 'and' zig-zagging boundary |
|                      |   |                                       |   |                            |  |  |

Reference for specific parcel shape classification

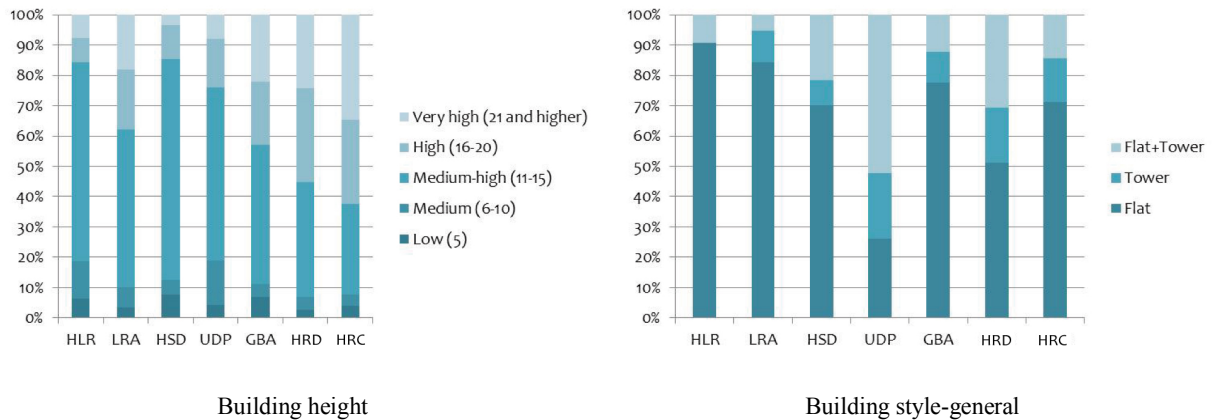
Figure 4. Parcel size and specific parcel shape by different housing development methods



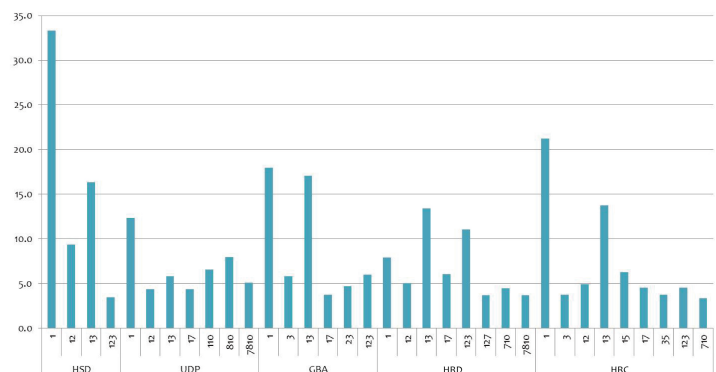
A relatively high proportion for the largest type measuring more than 100,000 m<sup>2</sup> can be attributed to the population influx, which exceeded 10,000,000 people in 1988, and the government's active role in promoting the provision of large-scale complexes in policies such as the Housing Site Development Promotion Act, Housing Construction Promotion Act, and projects like the Han River Reclamation and Housing Site Development. Housing Redevelopment Projects were implemented on a smaller scale according to the Housing Redevelopment Master Plan and smaller apartment sites of less than 50,000 m<sup>2</sup> were under the developing Land Readjustment Projects and Housing Reconstruction Projects executed for smaller complexes. This was reflected in the overall decrease in parcel size in the 1990s and 2000s. However, in the 2010s, large development projects such as the Eunpyeong Newtown, Sang-am Housing Site Developments executed under the Housing Reconstruction Projects of large apartment complexes along the Han River and these reconstructions of existing apartment complexes increased the portion of parcel sizes ranging from 10,000 m<sup>2</sup> to 50,000 m<sup>2</sup>.

Relational patterns emerge from the specific parcel shapes and development methods. Regarding the form of the parcel, those in the Land Readjustment and Housing Site Development Project are mostly of a square, rectangle, or protruded rectangle shape. However, in the Urban Development Project, most parcels are partially curved, which is also evident in Housing Site Development. This is related to the locational siting of the two development methods, which were planned for the hilly or mountainous outskirts areas of Seoul. There is slight difference between the General Built-up Area and Housing Redevelopment Project in terms of shape, although the extremely irregular shape dominates, as the General Built-up Area includes parcels in the polygonal and completely or partially irregular shape. Most of the Housing Redevelopment Project is composed of extremely irregularly shaped parcels. This may be the result of topographical siting differences, as the former type is likely to be located among flatlands and the latter on hilly or mountainous areas. The Housing Reconstruction Project includes parcels shaped like a square, rectangle, or deformed polygon, and a high portion of parcels is extremely irregularly shaped, as reconstruction occurs in both planned and spontaneous areas (Figure 4).

**Building**



| General Shape | Specific shape |      |
|---------------|----------------|------|
|               | Classification | code |
| Flat-type     | Row            | F1   |
|               | Stepped Row    | F2   |
|               | Bent (0-point) | F3   |
|               | Bent (2points) | F4   |
|               | Intersect      | F5   |
|               | Combined       | F6   |
| Tower-type    | Compact        | T1   |
|               | L/T Shape      | T2   |
|               | H/X Shape      | T3   |
|               | V/Y Shape      | T4   |



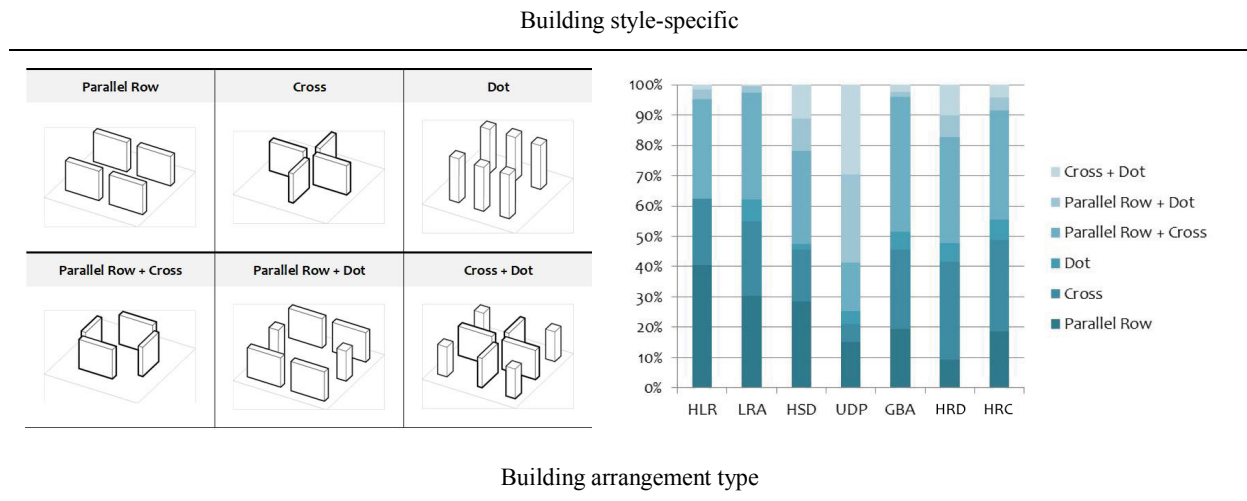


Figure 5. Building height, general/specific-style, arrangement types by different housing development methods

Large-scale apartment complexes with many buildings were developed through the Han River Reclamation Project or extremely large-scale Housing Site Development Projects in the 1970s to 1980s, followed by medium and small-sized developments through the Housing Site Development Project, Land Readjustment Project, and Housing Redevelopment Project in the 1990s to 2000s. Recently, the Residential Reconstruction Project has been implemented for the previously large block apartment complexes.

The changing patterns in building height over time are related to the development methods. Medium height apartment buildings (11 to 15 stories) were the norm in the Land Readjustment Project and Land Development Project in the 1970s and 1980s. After the 2000s, buildings constructed through the Development Project were also mostly of medium height of 11 to 15 stories. Park I.S. (2013) mentioned that the Housing Redevelopment and Reconstruction Projects elevated the average building height through the construction of extremely high buildings ranging around 30 to 40 stories. To control the ever-increasing height of apartment buildings, the Seoul Metropolitan Government's Comprehensive Plan set a 35-story height limit for these constructions.

During the 1970s-1980s, Han River Reclamation Project, Land Readjustment Project, Housing Site Development Project, and general built-up area project were majorly built with flat-type buildings. Specific architectural style includes significant proportion of row (F1) and row and bent together (F1F3). In the 1980s and 1990s, Housing Redevelopment projects also showed flat-type as the main building style, but more recently tower-type or mixed type relatively took high portion. In the 2000s and 2010s, Urban Development Project employed mixed-type the most while flat-type building scored low. Specifically, compact and 'V-shape' tower building mixed turns out to be the most dominant style along with various tower and flat-type combinations of F1T4, T1T2T4, F1T1 and so on. Similarly, in general built-up area project and Housing Reconstruction Projects in recent years, there are more variation of different flat-type buildings mixed, such as F1F3, F1F2, F1F5 and F1F2F3.

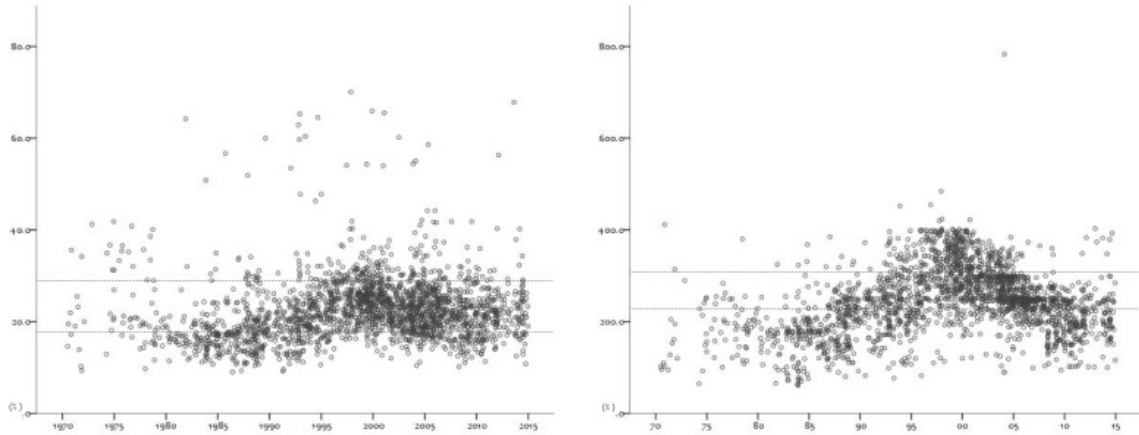
This is also similarly apparent in Housing Redevelopment Projects where mixed type of F1T1 and F1F2T1 is dominant followed by combinations of tower-type, such as T1T4 and T1T2T4. All these patterns show that Seoul's apartment buildings are getting higher, slimmer and more free-shaped in architectural style, leaving the traditional south-faced, regularly-shaped forms. This change gives Seoul a character of its own urban form.

The dominant arrangement was the "parallel row," in which multiple rows were lined up to face the south, as seen in the Han River Reclamation Project and Land Readjustment Project. This type produced the uniformly repetitive, monolithic horizontal landscape. In the 1980s, along with parallel row, the courtyard style (parallel row + cross) emerged as the most dominant arrangement, as seen in the Housing Site Development Project. During this period, the cross arrangement became popular, involving simple variations by rotating the building's orientation. From the 1990s, the parallel row arrangement lost steam, making way for the parallel row + cross (courtyard style) and cross arrangements. This changing pattern is related to the decreasing parcel size of apartment complexes alongside higher density development pressure in development methods including the Housing Redevelopment Project and a number of small and medium-scale Housing Site Development Projects. In the 2000s, when the tower type apartment buildings were introduced through the Housing Redevelopment Project, Housing Reconstruction Project, and Urban Development Project, the arrangement shifted towards the dot arrangement, as the linear footprint was no longer necessary. Thus, the cross arrangement became as popular



as the parallel + cross type, while the dot arrangement also increased in popularity, either in the dot form or mixed with the parallel row and cross arrangements. However, the preference for row type apartments persisted, resulting in mixed arrangements of tower and row or cross type apartments (Figure 5)

Density



BCR (left) and FAR (right) change over time period

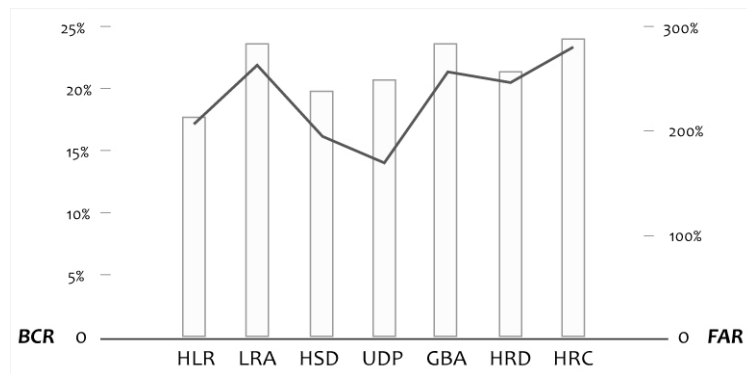


Figure 6. Density (BCR and FAR) by different housing development methods (line graph: BCR, bar graph: FAR)

The average BCR of the 2,172 apartment complexes in this study is 22.4%. During the period 1970–2015, the average BCR remained at around 20%, more or less similar despite a slight decrease to 18.6% in the 1980s . However, an examination of the BCR pattern over the 10-year period indicates a slight decrease in BCR. As seen in Figure 00, the portion of complexes with a BCR higher than 30% is decreasing, while that of complexes with a BCR less than 20% is increasing, although this is not significant. In the 1980s, the BCR pattern deviates, likely because of the Housing Site Development Projects implemented as master-planned promotion projects at the time.

The average FAR fluctuated between 186 and 278% during the period 1970–2015. In the 1970s, only 5-story walk-up apartments were constructed with FAR values of less than 100%. The average FAR during the 1980s was similar (186%), although from the 1990s, it increased significantly to more than 250%. The average FAR was 276% in the 1990s and 261% in the 2000s. This trend in terms of density can be attributed to the housing demand and market-driven housing policy that relaxed height and FAR regulations and promoted privately initiated residential renewal. At this time, in Seoul’s housing industry, most apartment constructions were based on the self-financing formula, especially in the Housing Redevelopment Projects and Housing Reconstruction Projects that supplied housing in the 1990s to 2000s (Figure 6).





Street

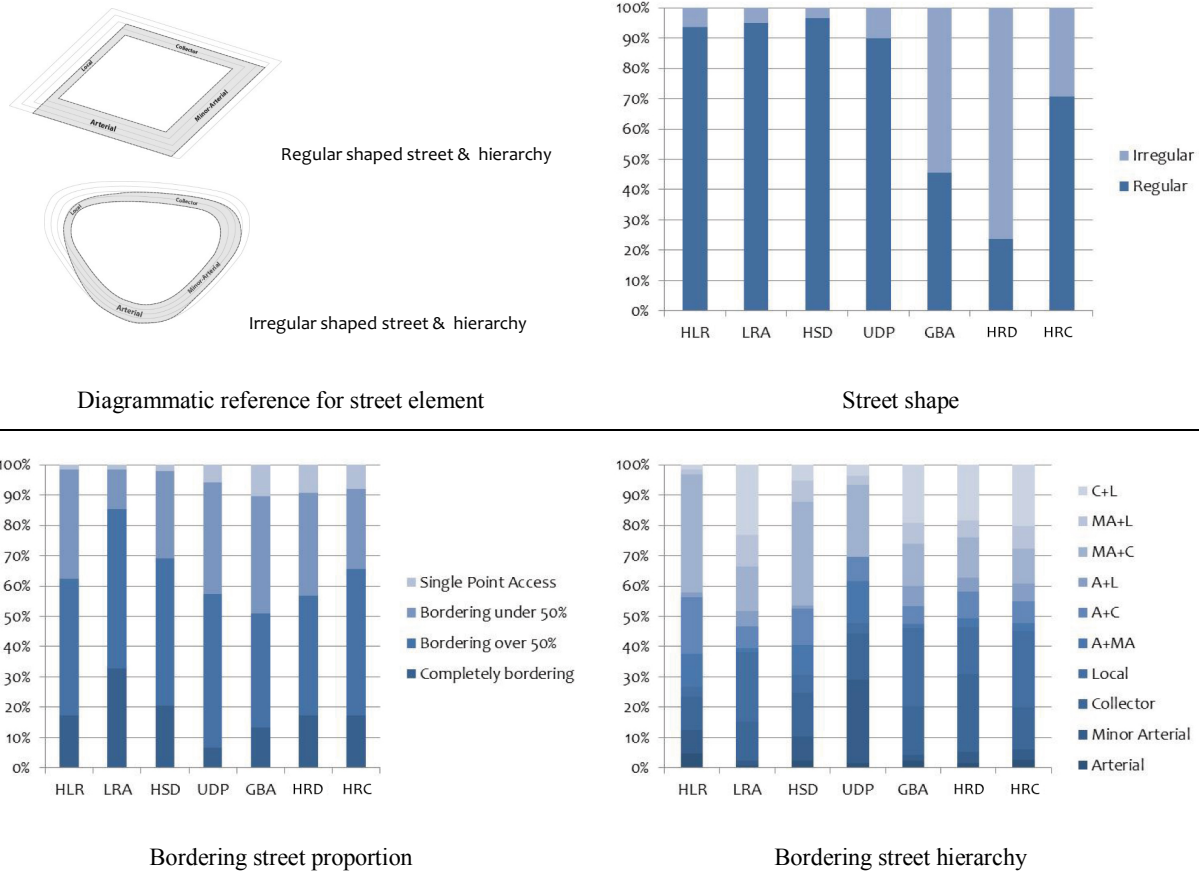


Figure 7. Street shape, bordering proportion and bordering hierarchy by different housing development methods

Regular-shaped streets dominated, since most apartment complexes were developed on relatively flat land in a planned manner through the Housing Site Development, Land Readjustment, and Urban Development methods. The Housing Redevelopment Projects were implemented throughout the 1990s and 2000s, and numerous individual parcels were joined for redevelopment. Apartment complexes developed with grid-based road structure, such as Land Readjustment and Housing Site Development tend to be bound with more amount of street. In addition, master-planned super-block complexes are likely to border wider street hierarchy including Han River Land Reclamation Project, Housing Site Development and Urban Development Project (Figure 7).

Discussion

Urban morphology as a field of studying urban form has both descriptive and explanatory dimensions in its inquiries. this section reviews the relation of development method and the morphological characteristics of apartment complexes. As an external force, the development method is assumed to reflect public policy, residential planning, and the housing market at the time it was employed. The development methods applied to the construction of apartment complexes in Seoul can be classified into 7 categories.

The statistical correlation analysis shows if these 7 development methods demonstrate correlations with the formal character of morphological elements. Table 4 shows that except for building layout and hierarchy of the bordering road, all other formal aspects are meaningfully related with the development methods (Chi-square value <0.005). Specifically, parcel shape and street shape demonstrate a relatively strong correlation ( $R > 33\%$ ), followed by building height and FAR. This indicates that in general, the morphological characteristics of apartment complexes are influenced by the development methods applied, although this correlation is not strong enough to have explanatory power. Yet, the relationship is strong enough to explain that parcel shape and road shape were influenced by what development methods were applied.



Table 4. Correlations between morphological elements and 7 development methods

| Morphological elements     | Pearson R value* | Chi-square (p-value)** |
|----------------------------|------------------|------------------------|
| Parcel size                | 14%              | 0.000                  |
| Parcel shape               | 36-41.5%         | 0.000                  |
| Specific shape             | 33-40%           | 0.000                  |
| No. of buildings           | 7%               | 0.001                  |
| Building height            | 24-27%           | 0.000                  |
| Building style             | 7-10%            | 0.000                  |
| Building arrangement       | 4%               | 0.039                  |
| BCR                        | 14-15.5%         | 0.000                  |
| FAR                        | 24-26%           | 0.000                  |
| Bordering street shape     | 32.4-36.7%       | 0.000                  |
| Bordering street portion   | 11-14%           | 0.000                  |
| Bordering street hierarchy | 1-3%             | 0.124                  |

\*Converted into percentage (Pearson R value \* 100)

\*\* Statistically significant when  $p < 0.05$

In general, in the Land Readjustment Project produced a regularly shaped parcel in small scale. Most apartment complexes constructed using this development method in the 1970s and 1980s comprised buildings that were of the flat type, had 11 to 15 stories, an average BCR of 15–25%, and average FAR of 150–250%. The Housing Site Development projects also produced regularly shaped parcels, where most of the complexes were small or medium sized, although the projects were large in scale. Furthermore, plank type apartments with buildings 10 to 15 stories high were typical in the 1980s and 1990s. The density pattern differs slightly depending on the project scale. The Urban Development Project, a newer version of public planned development, demonstrated a pattern similar to that of Housing Site Development. It is evident that flat and tower architectural style with a taller height was dominant, while the density pattern follows the typical development of apartment complexes with an average BCR of 15–20% and average FAR of 150–200%. In the General Built-up Area projects, a less planned nature is conspicuous with irregularly shaped parcels and bordering roads abound. Most are also flat type buildings of 10–19-stories. The dominant density pattern is an average BCR of 20–25% and average FAR of 200–300%, which is typical of apartment complexes constructed in the 1990s and 2000s. Housing Redevelopment Projects as a clearance renewal of spontaneous deteriorated areas on hilly locations, an irregular parcel shape and irregular and narrow bordering roads are common. The density pattern is an average BCR of 15–25% and average FAR of 200–250%. Regarding architectural style and building height, the tower style is more common and buildings tend to have more than 20 stories, as is more common in recent developments. The Housing Reconstruction Projects showcase visually outstanding aspects in terms of super-high-rise buildings, high density, and relatively low BCR. Mostly, these have replaced former apartment complexes with newer versions. When existing apartment complexes were constructed through planned methods these are of a regular parcel and street shape, while irregular shape was more common in the housing reconstruction implemented in the general built-up area.

## Conclusion

Seoul's active construction of apartment complexes was promoted through various development methods and strategies supporting the urban and housing policies of the central government and City of Seoul. The most direct spatial and morphological consequences of Seoul's apartment complex construction for the last 45 years is its ubiquity. Although the 2,172 apartment complexes occupy less than one fifth (18.4%) of the residential area, these complexes are widely scattered across the urbanized area, because the residential area (88% of the built-up area) dominates the space in which most are located. This ubiquity forms the unique visual pattern of the urban grain, spatial configuration, skylines, and general collective form. It provides Seoul with its image of an apartment city, as the clustered tall apartment buildings hide the more widespread low-rise areas, dominating the city's visual exposure.

The morphological patterns of each development method reconfirm the evolutionary process of the development of Seoul's apartment complexes. Only the shapes of the parcel and bordering street are related to the development methods, which differ in terms of public intervention and planning approaches as well as in the



topographical and local situations in which they are applied. Other elements demonstrated only a weak relationship with development methods, reflecting that they are determined by the financial feasibility of the project in the market-driven, privately initiated apartment complex construction industry in Seoul. This private sector nature of Seoul's apartment construction industry is accompanied by the weak provision of roads and other community infrastructure. In many cases, apartment complexes were poorly serviced in terms of the hierarchy and bordering portion of the roads, even though most were planned and developed through development methods for which the government provided legal foundations.

The development methods examined in this chapter demonstrate that the morphological characteristics of apartment complexes have largely been determined by the nature of the methods. Each development method has its own policy goals and subsequent land provisions that require different planning approaches and development processes. Furthermore, each method reflects the period in which it was introduced under the current socio-economic situation. As such, development methods are the window through which to understand the morphological origin of apartment complexes. Further studies would integrate various factors such as market forces, regulation changes regarding BCR and FAR, architectural style and complex design majorly determined by construction companies would also broaden the spectrum of understanding urban morphological change by apartment complexes in Seoul along within the frame of development methods.

### Disclosure Statement

No potential conflict of interest was reported by the author.

### Notes on contributor(s)

#### Soe Won Hwang

Soe Won Hwang holds a PhD in the Urban Planning from Seoul National University, a Master's degree in architecture from Harvard University Graduate School of Design and a Bachelor's degree in interior architecture from the School of the Art Institute of Chicago. Her research focuses on community/residential development, urban regeneration, and shaping of the urban form. Publication includes urban regeneration of public spaces, reutilization of urban void spaces and embedded resources.

### Bibliography

- Baker, Judy. "East Asia's Changing Urban Landscape." *Measuring a decade of spatial growth. The World Bank, Washington, DC* 184 (2015).
- Buck, David N. (2006). *Asia now: architecture in Asia*: Prestel.
- Building Data Open System, <http://open.eais.go.kr>.
- Chang, Ji-in, & Kim, Kwang-Joong. (2016). Everyday life patterns and social segregation of expatriate women in globalizing Asian cities: cases of Shanghai and Seoul. *Journal of Housing and the Built Environment*, 31(3), 545-564.
- Daum Map, <http://map.daum.net/>.
- Gelézeau, V. (2007). Ap'at'ũ Konghwaguk (On the Republic of Apartments) [in Korean]: Kil Hye-yŏn (trans.). *Humanitas, Seoul*.
- Jun, Sang-In. (2009) *Indulging in Apartments* [in Korean], Seoul: Design House
- Kim Kwang Joong. New Form, Classic Problem: Psuedo-Public Residential Redevelopment in Seoul. *Built Environment* (1998): 235-250
- Kim Kwang Joong . *Seoul's Growth and Urban Development in Seoul History Compilation Institute (ed), Seoul 2000-Year History* [in Korean]., Seoul: Sisapyeonchanhyue, Vol.35
- Korea National Spatial Data Infrastructure Portal, <http://www.nsd.go.kr>.
- Korean Statistical Information Service, <http://kosis.kr>.
- Lee, Kyu-Mok (2002) *The modern Korean townscape* [in Korean], Seoul: Yeolhwadang.
- LH (Korea Land & Housing Corporation), <http://world.lh.or.kr>.



- Lim, William. (2007). *Asian Alterity: with special reference to architecture and urbanism through the lens of cultural studies*.
- Marshall, Richard. (2013). *Emerging urbanity: global urban projects in the Asia Pacific Rim*: Routledge.
- Moudon, Anne Vernez. (1994). Getting to know the built landscape: typomorphology. *Ordering space: types in architecture and design*, 289-311.
- National Spatial Information Clearinghouse, <http://market.nrsdi.go.kr/>.
- Naver Map, <http://map.naver.com/>.
- Naver Real Estate, <http://land.naver.com/>.
- Park, In Seok (2013) *Korean Society of Apartment* [in Korean]. Seoul: Hyunamsa.
- Rowe, Peter G. (2005). *East Asia modern: shaping the contemporary city*: Reaktion books.
- Rowe, Peter G, & Kan, Har Ye. (2014). *Urban Intensities: Contemporary Housing Types and Territories*: Birkhäuser.
- Seoul Metropolitan Government(SMG) (2001) *Seoul's Urban Historical Record*. Seoul: Seoul Metropolitan Government.
- Seoul Metropolitan Government via Open Data Portal, <https://www.open.go.kr>.
- Seoul Solution, <https://seoulsolution.kr>.
- Seoul Statistics, <http://stat.seoul.go.kr>
- Son, Jeong-Mok. (2003). *The Story of Seoul Urban Planning 1-5* [in Korean].. *Hanwool, Seoul*.
- Watson, Jini Kim. (2011). *The New Asian City: Three-Dimensional Fictions of Space and Urban Form*: U of Minnesota Press.

### **Image sources**

- Figure 1: Compiled data of utilizing Seoul Solution and Korean Statistical Information Service (left) and utilizing 1970-2010 Census Data and Seoul Statistics Chronology (right) by author
- Figure 2: All maps by author generated image utilizing GIS
- Figure 3: Author utilizing GIS (above), original work (lower left) and generated in Excel by author (lower right)
- Figure 4: Generated in SPSS (upper left and right) and original work (lower) by author
- Figure 5: All bar graphs generated in Excel and original work (middle and lower left) by author
- Figure 6: All generated in SPSS by author
- Figure 7: All bar graphs generated in Excel and original work (upper left)