Quality of Life and Semipublic Spaces in High-Rise Mixed-Use Housing Complexes in South Korea

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Abstract

High-rise Mixed-Use Housing (HMUH) buildings have favorable urban location conditions, innovative technology, and diverse urban cultural functions to efficiently and compactly enhance urban dwellers’ spatial accessibility. This study aimed to evaluate the quality of life of urban dwellers with regard to the semipublic spaces of HMUH complexes in order to propose a planning direction for sustainable HMUH complexes. The research methodologies that were used involved examining relevant past studies to derive subjective quality of life indicators of urban dwellers, as well as studying the design drawings of HMUH buildings to conduct qualitative and quantitative analyses of the semipublic spaces therein. Moreover, urban dwellers’ satisfaction with their quality of life was surveyed in order to analyze differences in levels of satisfaction according to various types of HMUH complexes. In conclusion, the physical quality of the semipublic spaces in HMUH complexes correlated with the quality of life of urban dwellers, created a general linear model between the semipublic spaces, and was varied according to the HMUH building types. In the case of HMUH complexes, the dwellers’ preference for social interaction was found to be lower than their preference for other indicators, with a high preference for safety and security. Further, in the case of small housing units equipped with double loaded corridors, the semipublic spaces negatively influenced the quality of life of the dwellers, and the sporting amenities in the semipublic spaces were the most frequently used for health and leisure activities and social interaction.

Keywords: high-rise mixed-use; quality of life; semipublic space; compact city; satisfaction; correlation

1. Introduction

The purpose of this study was to examine the quality of life of HMUH dwellers and the impact of the semipublic space in HMUH complexes on the dwellers, to offer a direction for urban high-density mixed-use development. Based on theories on dwellers’ quality of life models, quality of life indicators were derived, and based on the results of a comparative analysis of various HMUH building types, the factors that influence the quality of life of the dwellers were identified.

Following the industrial revolution in South Korea, the population began to be concentrated in the cities, and apartment houses were increasingly built after the 1970s to address the shortage of houses therein. In 2001, the number of apartment houses in the country reached 5.5 million or 47.8% of all the houses in Korea. HMUH complexes began to appear in the second half of the 1990s, where apartment complexes with more than 30 stories totaled 32 in the Seoul metropolitan area, and those with over 25 stories reached 47. This harbingered the trend of HMUH buildings becoming the new standard housing type in South Korea.

The numbers of high-rise mixed-use residential buildings have recently rapidly increased all over the world and are now endearing themselves to urban dwellers as sustainable dwelling spaces that favorably differ from the poor residential environments of the traditional public housing that emanated from a need to house a growing number of people living in the slums of inner cities (Costello, 2005). High-rise mixed-use housing symbolizes economic dominance and power, and the quality of diverse facilities in the semipublic spaces represents the social status of the dwellers (Yuen, 2005).

With the expansion of the numbers of high-rise, high-density mixed-use buildings, South Korea’s highest housing complex has surpassed the 60-floor level, yet high-rise mixed-use residential environments have not yet been properly evaluated. HMUH buildings...
have lengthened vertical traffic lines and heights, requiring particular spatial needs that differ from those of ordinary apartment housing. While they do not significantly differ from ordinary apartment housing with regard to guidelines on internal residential spaces, they require distinctive criteria for internal and external semipublic spaces where diverse functions are clustered, as well as distinctive design guidelines. As the physical environments of HMUH complexes differ significantly from those of ordinary apartment buildings in terms of location and architectural features, the dwellers' residential value may differ between the two types, and the dwellers of HMUH buildings may seek different lifestyles.

The ground areas of HMUH complexes, which accommodate both residential and semipublic spaces, have diverse functions and traffic lines, considerably complicating the design and probably differentiating the dwellers' evaluation of HMUH buildings. Thus, the semipublic spaces therein physically differ from those in ordinary apartment houses. HMUH complexes offer high quality dwelling spaces as well as diverse community and commercial facilities that meet the various needs of the dwellers. HMUH buildings, unlike ordinary apartments, can legally be developed in neighboring, general, and central commercial zones, thereby offering good accessibility to the neighboring facilities as well as convenient transportation. However, HMUH complexes are relatively vulnerable to urban environmental pollution and crime, which inhibit dwelling comfort. As of 2001, 63% of the HMUH buildings in South Korea were located in commercial zones and 16.6% in quasi-residential areas. Of the existing HMUH buildings in South Korea, 27.1% were located within 200 meters of the radius of commercially vital zones (Jeong, 2006). HMUH building construction problems must be tackled from the perspective of their dwellers rather than from a macroperspective. HMUH building construction should be examined in conjunction with urban dwellers' lifestyles and well-being, and a new architectural analysis of HMUH building features should be conducted to offer a direction for urban residences.

2. Method
The research methods used in this study were divided into three stages, as follows:

The dwellers' quality of life indicators were selected based on a review of the related literature. The criteria for mixed-use development, sociocultural phenomena, and quality of life indicators were interpreted and used to evaluate the physical environments of the HMUH complexes and the quality of life of their dwellers.

Design drawings of HMUH complexes were analyzed to examine the physical environments of the HMUH complexes. HMUH buildings of over 30 stories in South Korea were studied to examine the functions and sizes of their semipublic spaces and other quantitative indicators, and to describe the features of their physical-environment.

Four complexes were selected and examined based on their design drawings to survey the dwellers' perception of and satisfaction with their residences. Dweller satisfaction was divided into quality of life and satisfaction with the semipublic spaces.

Limitations existed in the development of comprehensive quality of life indicators. More systematic research is required to examine quality of life associated with life satisfaction. Diverse indicators suitable for residential environments should be developed. In a comparative analysis of HMUH complex dwellers' quality of life, limitations existed in the control of location conditions, occupancy time, equilibrium distribution, dwelling period, and economic conditions, among other exogenous variables.

3. Mixed-Use Development
Mixed-use development is defined as "the combination of different socioeconomic functions in the same area" (Priemus, 2004:270). It is a comprehensive phrase associated with urban development and, while the concept is not new, it has distinctively different features and is an important part of cityscape planning, which makes it difficult to accurately define it for common use (ULI, 1987; Rodenburg, 2004:274-288).

For compact cities, urban morphological theory can be used to address modern urban problems through sustainable urban development and urban morphological relations, and to reduce traffic volume through high-density mixed-use development, thus reducing environmental pollution. Compact cities essentially require high-density development as well as regional and business feasibility through mixed-use development that considers residence, business, and leisure activities. The intention of compact cities is to increase the use of public transportation to reduce traffic congestion, and to promote walking and bike riding, thereby addressing current urban problems (Jenks, 1996; Fulford, 1996; Coupland, 1997).

Quality of Life in Mixed-Use Development
The proponents of high-density mixed-use development have presented many cases to prove the superiority of high-density urban housing, and their studies argue that high-density development can offer enhanced services and can remain competitive (Brehan, 1996). The vitality and diversity of compact cities give urban dwellers shorter walking traffic lines, green transportation systems, and other sustainable urban environmental aspects, thereby offering revitalization and a high level quality of life (Fulford, 1996).
With regard to high-density mixed-use development, Masnavi (2000) defined four factors related to quality of life: accessibility to urban facilities, use of vehicles, health, and social interaction. He also conducted a comparative study of urban mixed- and single-use development and of suburban mixed- and single-use development. He then reported that urban high-density mixed-use development can reduce vehicle use and can ensure dweller satisfaction in terms of health and social interaction (Masnavi, 2000).

**Semipublic Spaces**

In HMUH complexes, the semipublic space, a buffer zone that connects the individual residential units and the external space, serves as a semiprivate space, a defensible space for the protection of the safety and security of the dwellers from external threats, and an amenity that enhances the convenience and welfare of the dwellers.

Residential territories are classified into three types: primary, secondary, and public territory. Primary territory is defined as a personal territory not to be interfered with or intruded into by others, while secondary territory is defined as a semipublic residential territory where partial ownership is recognized and that is somewhat distant from the users’ lives. Secondary territory includes clubs, pubs and other community amenities (Holahan, 1982).

The scope of public space in this study, based on its definition by Holahan (1982), was limited to communities, sporting facilities, commercial facilities, and lobby spaces, and does not include residential spaces within complexes. Although lobbies and community facilities are used mainly by the dwellers and sporting and commercial facilities are used not only by the dwellers but also by external users, public spaces in this study were considered as all the facilities and spaces that include the dwellers' amenities that provide enhancement and defensible functions and that can be used commonly by the dwellers.

### 4. Quality of Life Indicators

One of the defining methods for quality of life is listing the factors or components of quality of life without weight, because it is impossible to form a theoretical consensus for defining the quality of life from a diverse academic-cultural background. An environmental psychological approach to quality of life focuses on human needs and behavior patterns excluding economic factors and, aims to create a built environment to meet behavior motivations through human needs for physical environments and understand human behaviors and attitudes in a complex environment (EPA, 1973).

The quality of life indicators in this study, based on Mitchell's indicators, were designed to consist of health, safety and security, leisure activities, social interaction, and environmentally-friendly features to explain urban dwellers' personal lifestyles. Factors that are prone to external influence, such as the utilization of resources and the convenience of materials, were excluded. Mitchell's (2001) quality of life indicators are concerned with urban dwellers' lifestyles, making them suitable for measuring the subjective quality of life of dwellers associated with residential environments. The indicators consist of five items: health and safety, personal development, community development, resources and convenience of materials, and physical environment. Raphael (2001) defined the three conceptual indicators of being, belonging, and becoming, as characteristics of the quality of life. While Raphael's quality of life indicators are very suitable for expressing a person's personal subjective assessment and psychological state, because their overall contents are incomprehensive and ambiguous, they cannot be used to measure the dwellers’ subjective assessment of a residential environment.

This study aims to measure the subjective quality of the life of dwellers in association with specific residential environments. Quality of life has thereby several indicators which require a specific definition. The indicators are evaluated based on residential satisfaction through the 5 point Likert scale.

**Health**, a major quality of life indicator, is widely applied in the health and welfare field by organizations such as the World Health Organization (WHO). According to Kim, Shim and Park (2005), of all facilities, community space and well-being space were pointed out as being most commonly needed by residents, regardless of age and gender. Here, indoor facilities represent various types of facilities which were prepared for the convenience of daily living such as indoor sports space, meditation space, sauna, audio-visual room and culture information room. **Social interaction** is seen as a particular indicator in a high-density environment. Through analyzing the interview transcripts of a number of high-rise building dwellers in Hong Kong, it was revealed that, although architectural design is important in forming a dwellers' community or consensus, HMUH building dwellers regard privacy as a more important factor than social interaction in a high-density environment (Lau, 2005). **Safety and security** is an essential factor in HMUH buildings (Cho, 2004). In HMUH buildings, unlike in ordinary apartment houses, the entrance features a lobby and deploys security personnel, enhancing the dwellers' perception of safety. When the entrances have more connections and enhanced control, crimes are further reduced because, rather than having simple spatial divisions or functions, the entrances have multiple spatial divisions or mixed functions (Choi et al., 1993).

Shin (1996) reported that as home-oriented leisure activities have increased, there is a higher demand for sports centers, community parks, libraries, cultural centers, and other amenities, and that as physical access to leisure spaces is required, it is important to
plan leisure facilities when developing complexes. 

Wang (1999) argued that the lack of environmentally friendly outdoor open spaces is the most frequent complaint of HMUH housing dwellers, followed by the lack of public facilities and equipment. This means that the enhanced convenience of and accessibility to diverse facilities in semipublic spaces would increase the dwellers' satisfaction with the social and physical services provided by the apartment complex.

### 5. Semipublic Spaces of High-Rise Mixed-Use Housing in South Korea

Diversity, size, amenity, and accessibility that quantitatively express the quality of semipublic spaces are important indicators for the analysis of the characteristics of the semipublic spaces of HMUH complexes. To analyze the physical quality of the semipublic spaces of HMUH complexes, 19 such complexes with more than 30 floors and over 250 households in commercial zones such as Gangnam, Seoul, and southern Gyeonggi-do were selected, and their design drawings were analyzed. There was a total of 23 complexes with over 30 floors and more than 250 households in the metropolitan area of Seoul which

**Table 1. State of Semi-public Space of the Super High-Rise Mixed-Use Housing in Korea**

| Code of Complexes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | Total |
|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Buildings | 202 | 70 | 600 | 900 | 1000 | 1100 | 1200 | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 |
| Gross Floor Ratio | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 | 3.52 |
| Number of Condominiums | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 | 1297 |
| Number of Offices | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 | 203 |
| Number of Households | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 | 1499 |
| Number of Floors | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 |
| Number of Households per House | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 | 4863 |
| Area of Semipublic Space per House | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 | 4.25 |
| Number of Amenities | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Gross Area | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 | 3.17 |
| Site Area | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 | 7.17 |
| Number of Floors | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |

**Fig 1. Analysis Method and Definition of Variables**

Meeting the standards by the year 2007, but the drawings of 19 complexes unavoidably had to be obtained from related architectural companies. **Diversity**

HMUH buildings are equipped with diverse amenities and facilities, unlike ordinary apartment houses. Based on the results of previous related studies, the semipublic spaces of HMUH complexes were divided into five to six categories according to spatial functions: basic support space for the dwellers, interaction space, personal leisure activity space, sporting facilities, learning facilities, and shopping space. The average number of public facilities was 10.95, ranging from 5 to 18 (Table 1.).
There is a difference in the size of the public spaces between HMUH complexes and general apartment complexes. Unlike existing apartment houses, HMUH buildings have high floor area ratios and narrow outdoor spaces due to mixed-use development, which lowers the quality level of the outdoor spaces. Thus, the use of narrow outdoor spaces led to the expansion of indoor public spaces.

It was found through the analysis of design drawings that the average gross floor ratio is 7.55 and the average number of floors is 43.21. The average number of households per hectare is 623.40, indicating a high-density residential environment, much higher than that of ordinary apartment houses (238.45) (Kim, 2004). The average semipublic-space area per household is 11.18 m², 15 times larger than the welfare facility areas of general apartment houses (0.75 m²) (Seo, 2004). The facilities with the largest area ratio are the shopping spaces (54.11%), ranging from 24.30% (Park View) to 79.74% (Richensia). The average area ratio of sporting facilities is 27.26%, making them the second-largest-area-occupying facility in an HMUH complex's semipublic space. As for the semipublic spaces, the average ratio of all the facilities that outsiders are allowed to use is 79.94%. For the dweller-centered public services, living services facilities represent 12.97% of the total area, the highest ratio.

Amenities

The HMUH complex secures wide semipublic spaces to provide diverse, state-of-the-art facilities and to overcome the weakness of the high-density and high-rise features, thereby offering pleasant services, thus improving the marketing strategy. The semipublic space is an environment with an integrated quality that contains mixed-use convenience based on the diversity and area of the facilities and on the accessibility to such facilities. In apartment house planning, amenity planning begins with a market survey of the users. If the apartments offer ample amenities desired by the dwellers, the house purchasers will pay the relevant prices, which is an advantage in the housing market. Amenities are divided into those that are active and those that are passive, and landscaping is regarded as a passive amenity. The efficiency and amenity of HMUH buildings are the essential aspects that make them most suitable for the new lifestyles of urban dwellers.

Accessibility

HMUH buildings have long vertical traffic lines. This means that accessibility to urban spaces is important. Notably, the increased access to semipublic spaces within HMUH complexes is crucial in activating semipublic spaces (Kim et al., 2006).

HMUH complexes in South Korea are divided into three categories according to the location of the public and nonresidential spaces: the residence-centered type, the parallel-type residence-office, and the vertical-type residence-office (Table 2.).

Table 2. Types of Super High-rise Mixed-use Housing in Korea

| Type of semipublic space | Diagram | Features |
|--------------------------|---------|----------|
| Residence centered type  | ![Diagram](Image 1) | The sheet-shaped, single-hall-type planning can make it easy to take care of the users' traffic lines and ensure a pleasant residential performance |
| Parallel Type of Residence-Office | ![Diagram](Image 2) | This type prevents confusion in relation to the dwellers' traffic lines, and residential mixed-use public spaces can be deployed at the lower areas of the residential buildings to secure pleasant public spaces |
| Vertical Type of Residence-Office | ![Diagram](Image 3) | The most widely used in the country. This type features single tower-type elevator halls and can ensure a high floor area ratio and efficient amenity spaces for the dwellers |

6. Case Study

Several HMUH complexes with over-30-story buildings in the Seoul metropolitan area were selected by type and were surveyed according to their location features. They included Jamsil Galleria Palace (a large complex in Gangnam, Seoul), Mapo Hanwha Obelisk (a small complex in Mapo, Seoul), Daewoo Trump World-I (a commercial and work zone in Yoido, Seoul), and Jeongja Royal Palace (a commercial zone in a new town in Gyeonggi-do) in Table 3.
Table 3. Synopsis of Cases

| Division | Galleria Palace | Obelisk | Trump Tower-I | Royal Palace |
|----------|----------------|---------|---------------|-------------|
| Location | Jamil Seoul    | Dobha Seoul | Yeoido Seoul | Bundang, Songam |
| Number of households | 741 | 462 | 282 | 566 |
| Completion | Feb 2003 | Oct 2004 | Oct 2002 | Feb 2003 |
| Gross Floor Area | 23,620.45 m² | 9,526.60 m² | 5,289.00 m² | 18,721.30 m² |
| Area of basement | 76,922.56 m² | 39,109.36 m² | 16,588.90 m² | 48,143.61 m² |
| Area of site | 188,873.15 m² | 81,263.61 m² | 62,077.73 m² | 177,714.90 m² |
| Gross floor ratio | 799.62% | 853.02% | 1048.25% | 735.61% |
| Height | 149.55 m | 109.9 m | 132.9 m | 101.55 m |
| Number of stories | 46 | 37 | 32 | 31 |
| Area by Apartment | 64,461.95 m² (89.95%) | 29,785.17 m² (81.37%) | 11,657.2 a (76.30%) | 61,063.06a(23.90%) |
| Function | Commerce | Commerce | Commerce | Commerce |
| Retail | 2,735.04 m² (3.87%) | 1,184.4 m² (3.25%) | 127.704 m² (1.04%) | 2,989.04 m² (3.70%) |
| Office | 63,043.14 m² (83.95%) | 59,086.44 m² (35.70%) | 16,417.54 m² (14.78%) | 14,587.45 m² (12.27%) |
| Sports | 6,275.94 m² (0.87%) | 3,157.96 m² (1.45%) | 3,064.62 m² (1.70%) | 2564.25 m² (1.08%) |
| Total | 265,764.90 m² (100%) | 103,376.97 m² (100%) | 76,666.13 m² (100%) | 105,585.13 m² (100%) |
| Area of landscape | 69,017.77 m² | 25,657.43 m² | 10,152.11 m² | 120,372.97 m² |
| Privately owned public space | 7,570.94 m² | 2,591.73 m² (16.46%) | 814.46 m² (0.53%) | 2,947.96 m² (12.08%) |

Physical Quality of Semipublic Spaces

With regard to the definition of a compact city based on the related literature, to analyze the performance of South Korea's HMUH complexes, vehicle use convenience and the safety of the semipublic spaces were surveyed (Table 4.).

Mapo Hanwha Obelisk was found to have the shortest commuting distance while Jeongja Royal Palace has the longest. Jeongja Royal Palace, however, has the highest average time of vehicle use for leisure, but the difference between the complexes in this regard was found to be insignificant. The use ratio of the neighboring facilities was the highest for Jamsil Galleria Palace and the lowest for Daewoo Trump World-I. The nighttime security around all the complexes was above average, with Galleria being the safest and Trump World-I being the least safe. Noise and pollution were major concerns with Mapo Hanwha Obelisk, which was the most exposed to heavy outdoor air pollution. The overall protection from privacy infringement was good, and the average was found to be insignificant.

The results show that the commuting distances differ significantly according to the locations, but a short commuting distance does not necessarily mean less vehicle use. Moreover, in the case of Jamsil Galleria Palace, the neighboring facilities are used a great deal, but private cars are used the most, suggesting that the simple schematizing of the closeness between residence and workplace and of the concept that mixed land use in modern cities reduces vehicle use are not valid. Large complexes are safer for nighttime walking, while the HMUH complexes of the inner city are heavily exposed to noise and air pollution, requiring countermeasures.

Regarding the satisfaction with the physical quality of the public facilities by complex, Mapo Hanwha Obelisk was highly unfavorable in terms of the diversity, amenity, and size of its semipublic space, except for accessibility, and the average difference between the complexes was significant (Table 6.). In terms of diversity, amenity, and appropriateness of size, Trump World-I was the most favorable among the complexes. This is because the semipublic space therein is located between the work and residential facilities, boosting the convenience of their use by the dwellers and allowing such facilities to be perceived as part of the dwellers' exclusive spaces. Mapo Hanwha Obelisk is directly linked to a subway, and the spatial division of its first-floor semipublic facilities is not distinctive between the users of the work facilities and the residents. Jamsil Galleria Palace is superior to Trump World-I in terms of the number and size of its public facilities, but Trump World-I is more favored, providing good implications for planning. Moreover, although its semipublic facilities neighbor residential complexes, Trump World-I is less favorable in terms of accessibility than Jamsil Galleria Palace (where the public facilities are located on the first floor and in the basements, making it the most favorable) and Jeongja Royal Palace (where the public facilities are distributed on a small scale on the first floors of its numerous residential buildings).

Quality of Life in Complexes

A general linear model involving satisfaction with the physical and quality of life with regard to semipublic spaces was examined, and a correlation was found between the physical quality of semipublic spaces and the quality of life of the dwellers (Table 5.). The correlation was not observed in social interaction, and there was a correlation between the amenity of the semipublic spaces on one hand and health, leisure, security, and outdoor open spaces on the other. Diversity and size were found to be correlated with safety/security.

In all the complexes, the satisfaction with safety and security was higher compared with the other items, valid.

Table 4. Residents' Evaluation of Compact Cities

| Sustainability (Mean) | Jamil Galleria Palace | Dobha Seoul | Yeoido Seoul | Bundang, Songam | F | Sig. |
|-----------------------|-----------------------|-------------|-------------|----------------|---|-----|
| Shortening the commuting distance | 3.96 | 3.83 | 4.38 | 3.44 | 10.65 | 0.000* |
| Using individual vehicles for leisure | 2.99 | 3.50 | 3.45 | 3.54 | 2.24 | 0.085 |
| Using the neighboring facilities by foot | 2.45 | 2.67 | 2.43 | 4.09 | 0.008* |
| Feeling secure at night around the complex | 4.24 | 3.33 | 3.78 | 3.95 | 5.47 | 0.001* |
| Feeling unbearable due to noise and air pollution | 2.81 | 2.90 | 3.45 | 2.59 | 6.43 | 0.000* |
| Feeling that one's privacy protection is being violated | 2.19 | 2.23 | 2.20 | 2.17 | 0.27 | 0.847 |

Likert scale: 5 - Strongly agree; 4 - Agree; 3 - Neither agree nor disagree; 2 - Disagree; 1 - Strongly disagree

Table 5. General Linear Model Showing Relationship between Quality of Life and the Physical Quality of Semipublic Spaces

| Source | Dependent Variable | Type III Sum of Squares | Mean Square | F | Sig. |
|--------|--------------------|-------------------------|-------------|---|-----|
| Corrected model | Health | 25.80 | 44 | 2.45 | 0.000* |
| Interation with neighbors | 57.26 | 64 | 0.85 | 1.057 | 0.242 |
| Leisure | 89.14 | 64 | 1.392 | 2.548 | 0.008 |
| Security/safety | 56.95 | 64 | 0.890 | 2.514 | 0.000* |
| Outdoor open spaces | 80.03 | 64 | 1.251 | 1.682 | 0.007* |
| Diversity | Security | 5.03 | 4 | 1.678 | 4.738 | 0.002* |
| Amenities | Health | 11.25 | 4 | 2.899 | 6.022 | 0.000* |
| Leisure | 9.44 | 64 | 2.362 | 4.317 | 0.005* |
| Security | 1.47 | 4 | 0.869 | 2.454 | 0.049* |
| Outdoor open spaces | 18.35 | 4 | 4.534 | 6.097 | 0.000* |
| Size | Security | 4.03 | 4 | 1.009 | 2.836 | 0.027* |
indicating that HMUH complexes offer excellent safety and security. In all the complexes, the satisfaction with interaction with one’s neighbors was the lowest, suggesting that HMUH complexes do not facilitate interaction with neighbors (Table 6.).

Interaction with neighbors was the least favorable among all the indicators, while safety/security was the most favorable, revealing that the dwellers are more concerned about safety/security than about interaction. By complex, the satisfaction with all the indicators was low for Mapo Hanwha Obelisk. Notably, the satisfaction with interaction with neighbors, health, and eco-friendly features of Mapo Obelisk was the lowest in all the complexes, showing a high dissatisfaction with residential environments. This is very significant in that the overall physical quality of the public spaces was rated low.

The overall satisfaction with semipublic spaces was very low for Mapo Hanwha Obelisk. Compared with the other complexes, Mapo Hanwha Obelisk had the lowest dweller satisfaction concerning all the items, except for participation in the dwellers’ meetings and shopping culture. This suggests that there may be a correlation between the dwellers’ satisfaction with public spaces and their quality of life. Moreover, as shown in the dwellers’ satisfaction with their quality of life, in all the complexes, the social interaction related items (knowing the names of one's neighbors well, frequently participating in residents' meetings) were rated low, suggesting that even in public spaces, interaction with one’s neighbors is not activated.

The fitness centers in the HMUH complexes were found to be used the most by the dwellers to improve their health (Table 7.).

They were followed by saunas, swimming pools, and indoor golf centers. Most dwellers used the sporting facilities in the complexes to meet their health improvement needs. Some used the reading rooms, walked on the outdoor landscaping spaces, and shopped at the retail centers, trying to gain mental and psychological stability to maintain their good health. Only a small number of dwellers indicated that they use the facilities for interaction, but many dwellers indicated that they use the fitness centers, saunas, and golf practice centers for interaction with their neighbors while exercising. The first-floor lobbies, outdoor landscaping spaces, and low-story shopping spaces were used by few dwellers to interact with neighbors. The dwellers used the sporting facilities to enjoy their leisure time, and they also indicated that the reading rooms help them use their leisure time well and improve their health.

7. Conclusions

Luxury semipublic spaces provide a wide range of amenities in HMUH complexes, offering enhanced amenity and accessibility, and thus produce positive effects on the quality of life of the dwellers. Notably, commercial and sporting facilities comprise the largest portion of the total area, averaging 81.37%. It was found that the physical quality of the public spaces in HMUH complexes have a general linear correlation with the quality of life of the dwellers, proving a positive correlation between the two. In the analysis of the dwellers’ personal preferences among the quality of life indicators, the preference for interaction with one’s neighbors was the highest, suggesting that in the case of dwellers with urban lifestyles in premium residences, spatial accessibility does not influence their friendship with their neighbors, and that the dwellers’ dependence on their neighbors is very low, thereby proving the results of the research conducted by Michelson. This is consistent with Gold’s (1982) argument that there is no distinctive division between the urban and rural lifestyles.

It was found that the sustainability of HMUH complexes through the approximation of residence and work does not greatly impact contemporary lifestyles, where vehicle use is regarded as important, but the increased use of the surrounding amenities and the enhanced safety through the development of low-story areas as defensible spaces have positive effects on the improvement of the quality of life of the dwellers.
in HMUH complexes involving small residential units and double loaded corridors, and a low quality of life of the dwellers therein, were observed, implying that the dwellers feel "crowded" and thus develop antisocial interaction tendencies (Holahan, 1982). The low quality of life of the dwellers, however, is associated with diverse variables; thus, no unilateral conclusion can be arrived at concerning this matter.

The analysis of the semipublic spaces in HMUH complexes showed that the dwellers use the sporting facilities not only to improve their health but also to interact with their neighbors and for leisure purposes, suggesting that planning for the establishment of sporting facilities in the semipublic spaces of HMUH complexes is very important. On the other hand, the living service facilities or banquet halls for the dwellers, which are aimed at encouraging interaction among them, are utilized less often, indicating a need for plans that ensure the amenity and integration of the facilities rather than their diversity.

In conclusion, design direction regarding HMUH should focus on improving residents' health and safety/security by securing the amenity of semipublic spaces and privacy to reduce the crowding and density of a typical floor. Invasion of privacy and crowding of residential areas reduces the satisfaction and use of semipublic spaces. Sports facilities and large lobbies should be planned as main spaces because social interaction could result from chance meetings between residents. Also, designers should consider flexibility by planning other facilities regarding changes in residents' lifestyle and needs.

The limitations of this study include a lack of more diverse evaluation indicators for semipublic spaces and the inability to properly evaluate their physical quality. There is a need to conduct more objective and quantitative research on dweller-centered satisfaction, and to develop indicators that can yield quantitative and objective results.

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Note
1 KB Realty Price Information, http://est.kbstar.com/

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