

A Study on the Plan Typology Based on the Web Database^{*}

Hyun Soo Lee and Sue Hyon Kim
Department of Housing and Interior Design
Yonsei University

Introduction

The number of apartments in Korea has increased dramatically since 1970s and as of the late 1990s, the apartment has become one of the dominant urban housing types. As houses reflect the residents' state of living, the apartment housings reflect the urbane residents' state of living. Moreover, the idea behind a floor plan represents the interpretation of a certain notion of living. Despite many efforts made to enrich the floor plans in Korea, prevailing criticisms emphasize on the uniformity and inflexibility of unit plans. However, insufficient researches have been made on characteristics of dominant floor plans that take place within each time period, about how the floor plans are replaced by new ones, and how inflexible the floor plans are.

The purpose of this study is to analyze the characteristics of apartment floor plans based on the changes made on spatial elements and layouts of dominant plan types according to time periods. The web database provides an efficient ways to analyze characteristics of huge number of floor plans. Based on the web database constructed in PC platform, various floor plans are classified into several types.

Methodology

Data : Total of 1,749 apartment floor plans in Seoul were collected using literatures. The selected apartments were built between 1972 and 1998. This study only dealt with buildings made by private sectors. The maisonette plans and plans larger than 135 square meters were excluded.

Managing Data : In order to effectively manage the large number of data on floor plans, Access 97 database system was used. The organized data on each floor plan consist of the date of construction, the size, the name of the apartment in which the plan belongs, the access to each unit, the number of bays in each unit, the width and the depth of the plan.

Size Ranges : Since the size of units is related to overall characteristics of floor plans, floor plans were grouped by the size ranges. Size ranges were identified based on Korean Promotion Law of Housing Construction and the average number of bedrooms in specified size ranges. As the law states, the sizes of the floor

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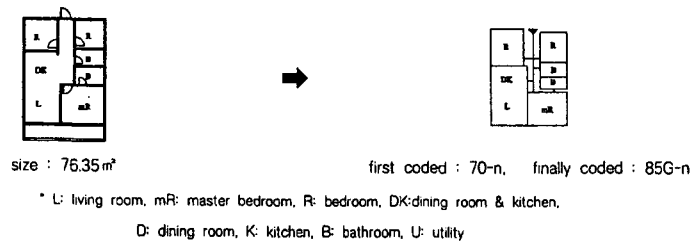
areas, 40 m², 60 m², 85 m², 102 m², 115 m² and 135 m² are of legislative importance due to the construction requirements and the loan system. Plans larger than 20 square meters to smaller than 30 square meters have one bedroom on an average; plans larger than 30 m² and smaller than 60 m² have two; plans in range of 60 m² to 90 m² have three, and plans of 90 m² to 135 m² have four bedrooms on an average. Regarding the above aspects, ranges of 20 m² to 50 m², 50 m² to 70 m², 70 m² to 95 m² and 95 m² to 135 m² were designated to explain floor plan types.

Classifying Plan Types : Floor plans were classified through three steps as shown in <Figure 1>.

		Step 1	Step 2	Step 3
		Schematize according to	Group according to	Classify according to
Classifying method	Original Data	⇒ ① spatial layout ② size range of 10 m ²	⇒ ① access ② number of bays ③ spatial layouts	⇒ ① the identified size ranges ② the order of dominance in cases
Number	1,749	219	77	39
Identification (Codes)	Name of the apartment to which the plan belongs	20-n, 30-n, 40-n, 50-n, 60-n, . . .	G1-n (gallery access with one bay)	45G-n, 60G-n, 60S-n . . .

<Figure 1> Classifying Floor Plans

At first, each floor plan was typologically schematized as shown in <Figure 2> to show the characteristics such as the layout of the rooms, the access, and the number of bays. Each plan was coded according to the size ranges of 10 square meters to classify 219 plan types. Then, the plan types were categorized according to the access type and the number of bays to categorize into 77 groups. Finally, the groups of plan types were allocated within the identified size range using the average size of the plan type. Codes 45, 60, 85 and 120 were used to categorize the size ranges. Codes G and S were used to distinguish the gallery type from the stairwell. Types appearing in less than two cases were excluded. The floor plans were eventually narrowed down to thirty-nine types.



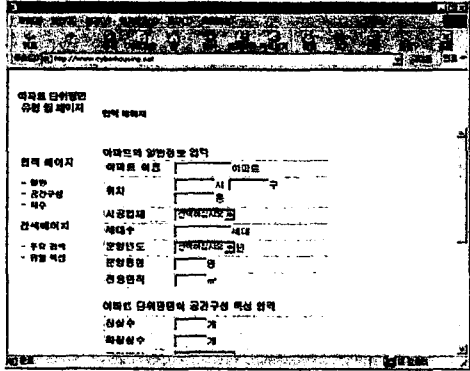
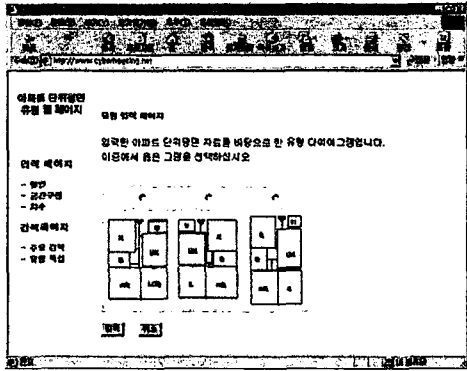
<Figure 2> Process of Diagramming

Analyzing the characteristics of plan types : By managing data on floor plans on a database system and classifying the type for each plan, characteristics were analyzed. Each schematized type specifies spatial characteristics such as the layout

of rooms, the access and the number of bays. By analyzing the floor plan data in the database, the average size of each type, the initial construction date of the plan type and the duration of the floor plan for each type were accumulated. The changing process and the chronological characteristics were also described.

Web Database Construction

The contents of the web database was built based on the characterization of unit floor plan information. The unit floor plan consists of general knowledge and knowledge of spatial order. The general knowledge involves location, construction company, unit number, area size and floor plan type. Knowledge of spatial order deals with type of the floor layout and dimensional information. The type of the floor plan layout is determined by the number of bed room, number of the bath room, LDK relationship and number of the bay. The Figure 3 shows input forms which contain information to be stored into the web database. The access relational database system was used to build the database.

Spatial and Dimensional Information	Plan Layout Type
	
Input 1	Input2

<Figure 3> Input forms for construction of the web database.

The search key words to be used to retrieve contents of database involves construction year, unit area size, number of bed room, number of bath room, number of bay, approach type and LDK relationship. The key words to retrieve typological information are case number of the plan type, beginning year and disappearing year of the plan type and range of unit size. The Figure 4 shows input form for information retrieval and result of the information retrieval.

Results

The widely adopted plan types in Korean apartment housings are as shown in <Figure 5>. By using the steps provided in <Figure 1>, thirty-nine types were identified from the 1,749 floor plans analyzed.

Spatial Characteristics based on Size ranges

① Size range 1 (20 m² - 50 m²)

The houses usually have two bedrooms, one bathroom, and consist of one-bay. They usually have no living rooms and are accessible from galleries. Houses are practically narrow meaning the depth is larger than the width. Before the late 1980s, the plan type 45G-2 had prevailed. Houses consisting two-bays such as 45G-3 appeared in significant number. Since the late 1980s, the plan type 45G-1 has been dominant in small apartment houses.

② Size range 2 (50 m² - 70 m²)

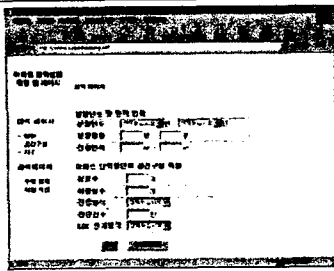
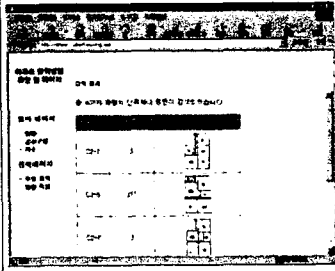
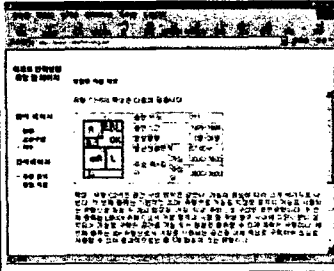
The houses usually have a living room, two bedrooms, one bathroom, and consist of two-bays. They are usually accessed from galleries, but from 1980s, the plans accessed from stairwells have come to use. Houses are deep relative to the width. Before the early 1990s, the plan type with two bedrooms, 60G-1 had prevailed; since the early 1990s, the plan type with three bedrooms, 60G-2 has become dominant.

③ Size range 3 (70 m² - 95 m²)








































The houses usually have a living room, three bedrooms, one or two bathrooms, and consist of two-bays. Galleries usually provided the access before the mid 1980s, but from 1980s, stairwells have become prevalent. Depth of the floor plan is slightly larger than the width. Before the mid 1980s, the plan type with one bathroom and gallery-accessing 85G-1 had prevailed; since then, the plan type with two bathrooms with stairwells 85S-1 have become dominant. Currently prevalent plan types 85S-1, 85S-2 and 85S-3 all have identical layouts.

④ Size range 4 (95 m² - 135 m²)

The houses usually have a living room, four bedrooms, two bathrooms, and consist of three-bays. They usually are accessed by stairwells. Plans are generally shaped in squares since the width and the depth are of the same length. Before the mid 1980s, a maid room (a room to be accessed through the kitchen) was usually planned, but plans with maid rooms have not been adopted since then. Currently dominant plan types are 120S-1, 120S-2, and 120S-4. They all have identical layouts, and are only categorized in terms of the shape of the kitchen and the dining room. These plans are criticized for their uniformity in layouts.

Retrieval Keyword	Retrieval Results	Typological Characteristic
		
Retrieval Window 1	Retrieval Window 2	Retrieval Window 3

<Figure 4> forms for information retrieval.

Size ranges	Plan types					
Size range 1 (20m ² -50m ²) Total : 82 cases	 45G-1 (38.3%)	 45G-2 (33.3%)	 45G-3 (10.0%)	 45G-4 (11.7%)	 45G-5 (6.7%)	
Size range 2 (50m ² -70m ²) Total : 373 cases	 60G-1 (62.4%)	 60G-2 (28.1%)	 60G-3 (1.2%)	 60G-4 (0.9%)	 60G-5 (0.9%)	 60S-1 (6.5%)
Size range 3 (70m ² -95m ²) Total : 884 cases	 85G-1 (13.8%)	 85G-2 (5.5%)	 85G-3 (3.4%)	 85G-4 (1.9%)	 85G-5 (2.2%)	 85G-6 (0.5%)
	 85G-7 (0.5%)	 85G-8 (0.4%)	 85S-1 (40.0%)	 85S-2 (17.0%)	 85S-3 (9.4%)	 85S-4 (1.6%)
Size range 4 (95m ² -135m ²) Total : 410 cases	 85S-5 (1.8%)	 85S-6 (0.9%)	 85S-7 (0.8%)	 85S-8 (0.4%)		
	 120G-1 (5.2%)	 120G-2 (1.2%)	 120G-3 (1.2%)	 120S-1 (37.8%)	 120S-2 (24.8%)	 120S-3 (8.4%)
	 120S-4 (5.5%)	 120S-5 (5.2%)	 120S-6 (4.0%)	 120S-7 (3.2%)	 120S-8 (2.6%)	 120S-9 (1.2%)

<Figure 5> Types of floor plans in Korean apartments

Conclusion

As a result of the above analysis, the plans smaller than 95 square meters display changes in the number of bedrooms and bathrooms; the access type along with layout have changed within time series - from galleries to stairwells. In larger plans, no significant changes except the disappearance of the maid room are revealed; the layouts have not been modified much. In most of the cases, dining rooms are adjacent to kitchens, and living rooms are placed at the center of the houses. This kind of uniformity typifies the floor plans in Korea. The plans of newly constructed apartments in 1990s are not widely used because floor plans from the 1980s still prevail. Therefore, new plans to suit the residents' changing demands are needed. This study only focused on the physical characteristics of Korean apartment unit plans; therefore, unit plans must also be analyzed in terms of life patterns in the near future.

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