

## Design Strategy for Residential Complex based on Landscape Urbanism

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### Abstract

*In this study, we aim to suggest direction for landscape design of residential complex in Korea by studying target areas to understand how landscape urbanism was applied to residential landscape design as it is the majority of landscape design in Korea and by closely examining design elements to be considered for design of residential complex based on landscape urbanism theory. For the purpose of the study, some of public multifamily housing complex were selected as target areas and a survey was first conducted to understand how landscape urbanism was applied to design of these target areas. Then, by analyzing the survey results, we identified which elements were of importance to designing of multifamily housing complexes in Korea and how practical design of landscape urbanism works. From this study, we concluded that landscape urbanism theory is not just about design strategies, but more of comprehensive design methodology covering both operation and management and that such theory can be appropriately applied to design of multi-housing complexes in Korea. We also discovered that in order to apply landscape urbanism in design stage for multi-housing complex, selecting which design strategy/words in the previous study is not what's important, but comprehensive understanding and interpretation of design languages is key.*

**Keywords:** *Networking, Level Plate, Infrastructure, Site, Scale, Process, Hybrid, Imaginary, Ecology*

### 1. INTRODUCTION

Recently, outdoor space of multifamily housing complex has gradually become empty and deserted place with low usage of residents. Yet there are not sufficient space provided within multifamily housing complex to serve different needs of residents such as space for elderly or children or for certain activities. In modern society, families are becoming small in size with 1or 2 persons household along with the nuclear family trend and people tend to stay inside at homes instead of mingling with neighbors. Communication with neighbors or other residents has significantly decreased compared to the past which is leading to more people feeling socially isolated and living less healthy lifestyle in resident complex. Against such backdrop, landscape engineering has experienced a dramatic growth in the area of residential complex design at a point where intensive usage of cities has accelerated due to industrialization. Also, most of landscape construction is now taking place in apartment complexes where landscape plays an essential role in improving living environment [1]. Furthermore, the importance of landscape in residential space is being emphasized amid a growing interest and demand to be close to nature and for pleasant living environment along with a growing social consensus on protection of ecosystem [2]. Naturally, landscape architecture of apartment complex, which is major residential style in Korea, has seen various changes according to social trends. As the importance of landscape engineering is rising, there are ongoing researches on outdoor space of apartment

complexes, but there has not been so much research done to examine in detail the changes of landscape architecture in apartment complex over the time and development trends with a comprehensive approach.

To understand and cope with changes of social trends, construction companies are working on strategies for development of residential complex to meet the new needs for multifamily housing complex. Construction companies are also creating new design trends for outdoor space by combining their brand concepts and images [3].

One of the most representative trends is landscape urbanism. Landscape urbanism is a theory on urban designed that was introduced in the late 1990s. The purpose of the theory is to understand vast ecosystem including human activities of a city and to solve many complex problems of a modern city. The idea of landscape urbanism was initiated based on a small-sized park and now it has developed to include a whole city [4, 5].

In this study, we aim to suggest direction for landscape design of residential complex in Korea by studying target areas to understand how landscape urbanism was applied to residential landscape design as it is the majority of landscape design in Korea and by closely examining design elements to be considered for design of residential complex based on landscape urbanism theory.

For the purpose of the study, some of public multifamily housing complex were selected as target areas and a survey was first conducted to understand how landscape urbanism was applied to design of these target areas. Then, by analyzing the survey results, we identified which elements were of importance to designing of multifamily housing complexes in Korea and how practical design of landscape urbanism works.

## **2. RESEARCH METHOD**

### **2.1 Extraction of Landscape Urbanism Keywords for survey**

By reviewing books and papers published by researchers in the landscape urbanism discipline, the design language of landscape urbanism can be summarized into “Networking”, “Level Plate”, “Infrastructure”, “Site”, “Scale”, “Process”, “Hybrid”, “Imaginary”, “Ecology”, “Medium”, “Operation/Execution method”, “Flexibility”, and “Movement” [6-8].

These 13 design languages are selectively used depending on social background and site conditions. Also, depending on a designer, 1 or 2 words are mainly used or all of 13 words are used. Therefore, one can conclude that landscape urbanism is not a theory defined by certain words or processes. For the study, we excluded “Medium”, “Operation/Execution Method”, “Flexibility”, “Movement” because we concluded that these 4 words are not applicable or low in importance to the design of public housing complexes [6-8].

### **2.2 Question investigation**

We conducted a questionnaire survey to examine design & planning experts or professionals’ understanding/perception on the theory of landscape urbanism and to understand how the landscape urbanism design strategies are being implemented. The survey was conducted between May 6-17 2020 with designers who have been working in engineering companies and landscape design offices for more than 12 years. 50 answers are counted valid.

### **2.3 Analysis Method**

Questions of the survey include whether a participant is a graduate of landscape major or not and currently working in landscape industry, if a participant is aware of landscape urbanism theory and if he/she has an experience of applying landscape urbanism theory in his/her design. Also, participants were asked what would be the main focus when applying landscape urbanism theory to multi-housing complex design and how the design for multi-housing complex will be different from other construction sites in multiple

choice questions. They were also asked to identify one or more elements that could become issues or are lacking when applying landscape urbanism. Other questions include elements and problems (Narrative form) to consider when applying landscape urbanism to multi-housing complex design. Also, there were questions to understand elements to consider and problems (Narrative form) for design of other types of construction sites.

Based on the results of the survey, strategic words (language) needed for multi-housing complex design were derived. The extraction of strategic language was quantified based on 3point scale in which participants chose one or more words based on priority. Then a factor analysis was conducted using the average from the survey and strategic language were derived. Participant's explanations are reviewed and supplemented with strategic language then the result is used as the framework of an analysis for design methods of multi-housing complex. In this study, the survey analysis was carried out with Excel statistics 2007 and a frequency analysis and factor analysis were conducted for questions of the survey. A frequency analysis is to understand any distribution traits of original data from distribution tables, and it is used for traits of population statistics. A factor analysis was conducted to identify main factors of design strategies of landscape urbanism and to further understand traits of each factor. Accumulation contribution ratio was set to be more than 90% and an orthogonal rotation (Varimax) was conducted to retain independence of factors and for easy interpretation.

### 3. RESULTS

#### 3.1 The Survey Results

The survey results show that there was a total of 50 participants. Sex ratio (Table1.) is 63% male to 37% female and 44% of participants are in 30s, 42% in 40s and 14% in 50s for age group (Table2.). So, male in 30s to 40s is a majority group of participants. All of participants had a major in landscape engineering and are currently working in the landscape industry. Also, 43 of them had an experience of designing housing complex and 29 participants were well-aware landscape urbanism. 21 of them have design experience with some application of landscape urbanism. To summarize, participants of the survey are landscape professionals currently working in landscape industry who were graduates of landscape engineering majors. Most of them were aware of landscape urbanism and 86% of them had an experience designing for housing complex.

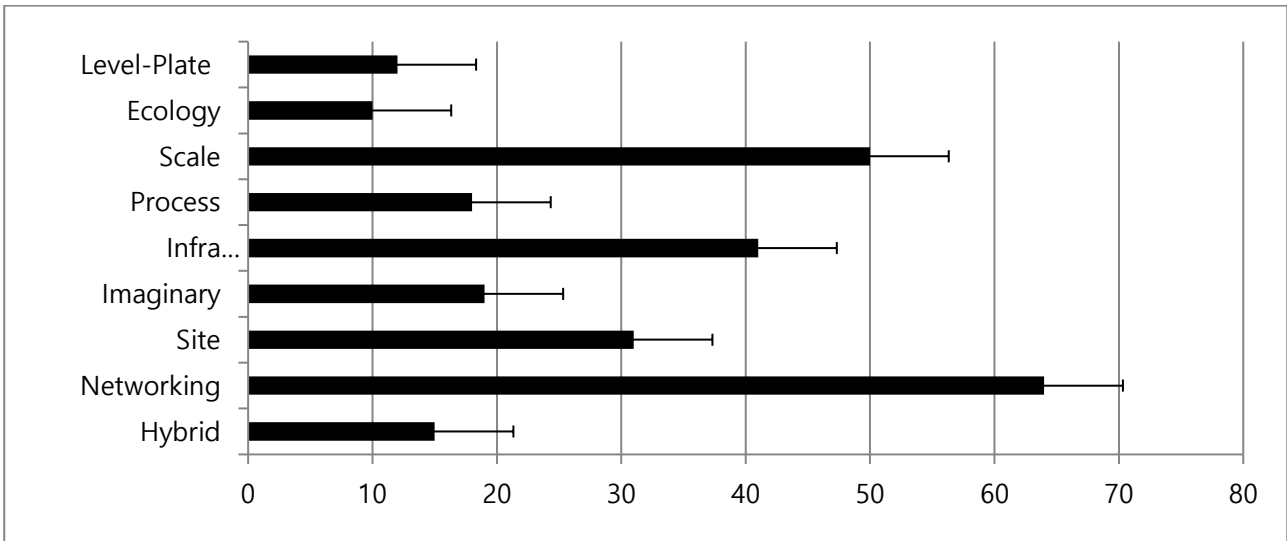
**Table 1. Demographic characteristics (Gender)**

Gender	Men	Women
Frequency	32	18
Total	50	

**Table 2. Demographic characteristics (Age)**

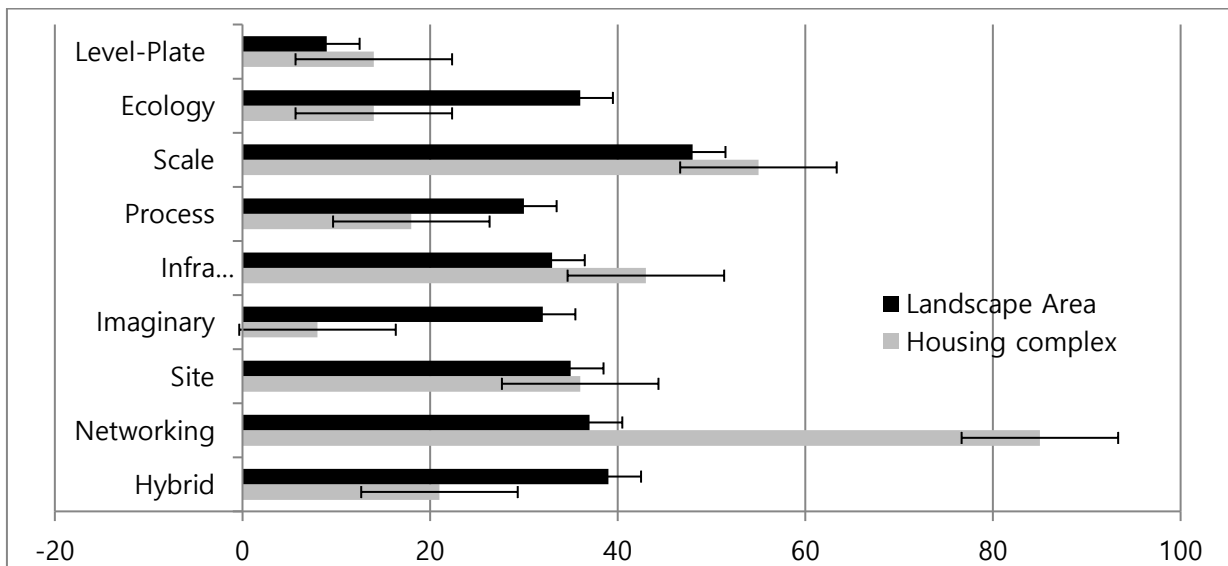
Age	20's	30's	40's	50's	60's	Total
Frequency	0	22	21	7	0	50

There was a question about the first thing (Figure1.) to consider when using landscape urbanism and networking and ecosystem came up the most for an answer. Level-plate and hybrid had the lowest ratio which indicates that the acknowledgement/understanding of landscape urbanism is mostly around Site and Networking and ecology related to a site.



**Figure 1. The Most important factors to design landscape urbanism**

Questions of the survey also examine different factors to consider between housing complex and landscape area when applying landscape urbanism to design. The survey results shows that networking, scale and infrastructure are factors to be considered with high priority when designing for housing complex whereas Scale, Hybrid, Networking and ecology are evaluated to be factors with high priority when designing for general construction sites. From such results (Figure 2.), we conclude that networking is the most important keyword for both types of sites and that level-plate has the lowest ratio in answers and imagination is considered of low importance for housing complex design.



**Figure 2. The first factor to consider**

On the other hand, some words/languages are considered difficult to represent landscape urbanism. For

housing complex, Scale and Process are considered difficult areas to apply landscape urbanism. Reasons are as follows. First, the design of housing complex is perceived as complex and not simple because convenience of residents should be given high priority during design stage. Second, depending on scale or size of the complex, there is much variance. Reason for choosing process as difficult concept is that applying flexibility in terms of change is difficult and there is not much room during the design process due to tight timeline.

For other construction sites in general, imagination and collaboration are considered difficult factors (Figure 3.). Construction sites are usually big in scale and clients' requirements can vary. In many of cases, profitability is an important priority leaving little room for imagination. Also, there are many areas for collaboration with other work functions, but in fact, collaboration with other functions of construction is limited due to various reasons.

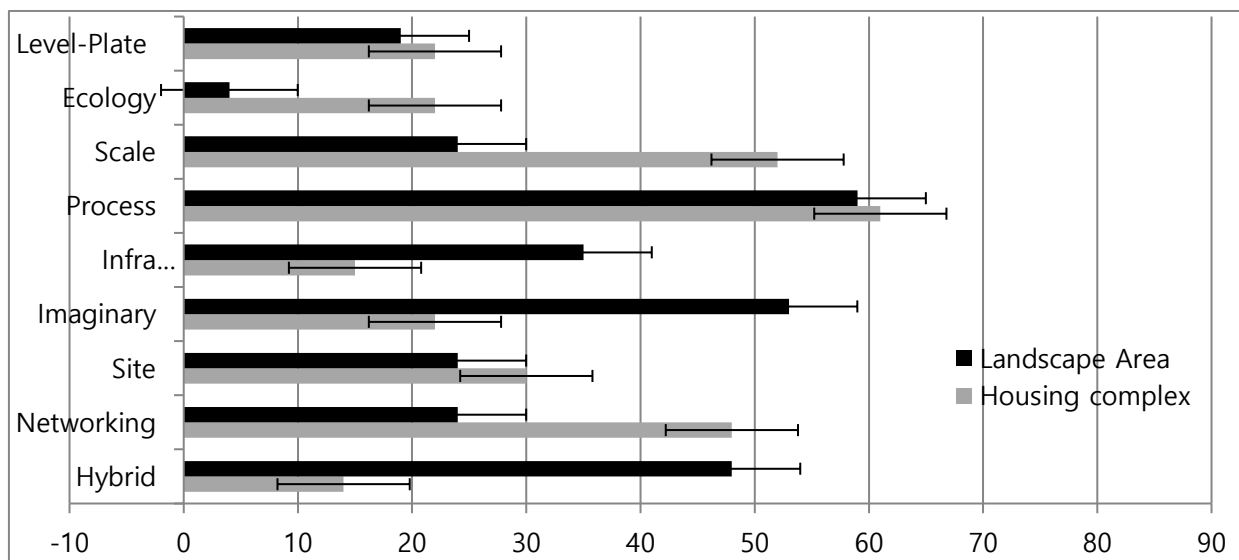


Figure 3. The most difficult factor to design Landscape Urbanism

### 3.2 Results of Factor Analysis

The survey results with answers from professionals in landscape business are quantified on 3 point scale and a factor analysis was conducted. The result of factor analysis shows that accumulated contribution ratio of the first 3 factors after Varimax rotation reached more than 90%. Therefore, 3 factors are extracted.

Table 3. Basic Statistics

	Networking	Level-Plate	Infrastructure	Process	Site	Ecology	Scale	Hybrid	Imaginary
n	4	4	4	4	4	4	4	4	4
Sum	194.00	64.00	126.00	168.00	125.00	76.00	179.00	122.00	115.00
Average	48.50	16.00	31.50	42.00	31.25	19.00	44.75	30.50	28.75
Standard deviation	22.72	4.95	10.23	18.50	4.76	11.70	12.23	13.61	16.39

**Table 4. Correlation matrix**

	Networking	Level-Plate	Infrastructure	Process	Site	Ecology	Scale	Hybrid	Imaginary
Networking	1.0000								
Level-Plate	-0.153	1.000							
Infrastructure	0.349	-0.602	1.000						
Process	-0.692	0.810	-0.723	1.000					
Site	0.712	-0.689	0.284	-0.867	1.000				
Ecology	-0.011	-0.586	-0.279	-0.325	0.650	1.000			
Scale	0.756	-0.256	-0.138	-0.552	0.867	0.588	1.000		
Hybrid	-0.699	-0.322	0.425	0.109	-0.460	-0.188	-0.829	1.000	
Imaginary	-0.930	0.157	-0.055	0.612	-0.812	-0.293	-0.940	0.852	1.000

**Table 5. Contribution Ratio**

	Contribution Ratio	Accumulate Contribution Ratio
Factor	45.44%	45.44%

**Table 6. The amount of factor loads**

Variable	Factor 1	Factor2	Factor3
Networking	0.913	0.387	0.125
Level-Plate	0.067	0.763	0.643
Infrastructure	0.061	0.973	0.224
Process	0.443	0.842	0.308
Site	0.6662	0.469	0.585
Ecology	0.145	0.050	0.988
Scale	0.884	0.020	0.467
Hybrid	0.928	0.371	0.036
Imaginary	0.974	0.156	0.162

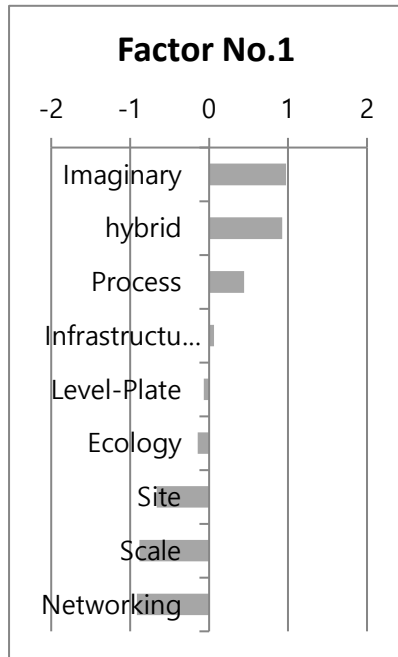


Figure 4. Software

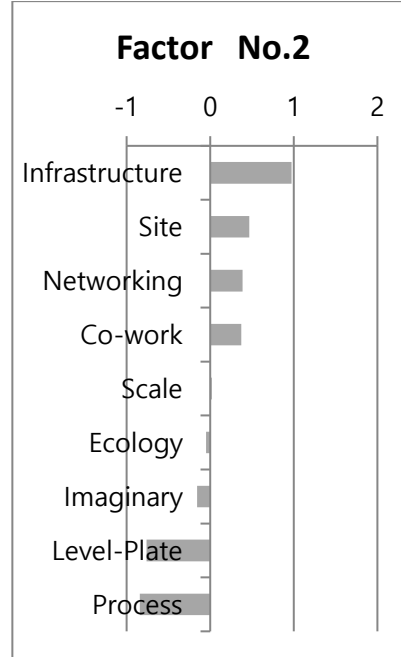


Figure 5. Hardware

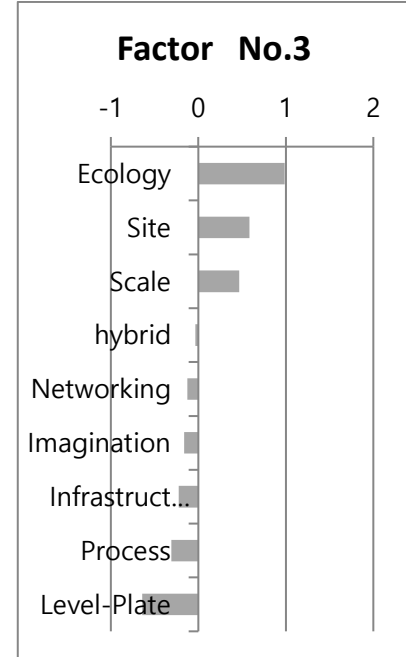


Figure 6. Ecology

The factor analysis results indicates that design strategies of landscape urbanism can be categorized into 3 factors. For the factor no.1, Imaginary, Hybrid and Process had the highest load while Networking, Scale, and Site had minus load which demonstrates that the factor no.1 is related to software. For the factor no. 2, infrastructure, site and networking had high load and it can be concluded that the factor no.2 is related to hardware. Lastly, for the factor no.3, Ecology, Site and Scale had the highest load which means that it is related to “Ecology”.

Also, we try to understand why certain design strategies are chosen under each factor. For “Software” related factor, words such as art, theme, and communities are used. For “Hardware” related factor, connection, Greenfield patch, and corridor are used. On the other hand, for “Ecology” factor, contents varied much and most of the contents are related to energy, plus resource circulation and climate wage as well. One thing to note about “Imagination” is that many of the answers are somewhat theoretical citing little flexibility due to timeline of construction and related policies and we concluded that it is not appropriate to be used for a factor analysis.

#### 4. CONCLUSION

In carrying out the study, we aim to understand and identify design strategies appropriate for the Korean market and as a conclusion, we derived 3 factor groups. We believe that the conclusion drawn with these 3 factors groups are meaningful because they are practical result and data essential to design, usage and maintenance. A plan/design can be grand, but it is sometimes not properly executed. Or construction works/designs are used only for a short term and left in negligence without maintenance in a long term.

From this study, we conclude that landscape urbanism theory is not just about design strategies, but more of comprehensive design methodology covering both operation and management and that such theory can be appropriately applied to design of multi-housing complexes in Korea.

We also discovered that in order to apply landscape urbanism in design stage for multi-housing complex, selecting which design strategy/words in the previous study is not what’s important, but comprehensive

understanding and interpretation of design languages is key. Furthermore, we analyzed that when working on design strategies, we need to consider design, usage and maintenance to really accommodate properties of multi-housing complexes.

Landscape urbanism is still in an early stage of establishment without fully developed definitions or theory yet. Also, its complexity makes it hard to determine that landscape urbanism is solely defined by design strategies. (That design strategies are sole traits of landscape urbanism.) We need to collect more data from more target areas and a continuous study into the theory of landscape urbanism is needed.

We believe that the landscape urbanism is strategic design methodology with much flexibility as an approach to evolving city design. The landscape urbanism is not yet fully developed nor established in detail, but it can be considered the biggest advantage of the landscape urbanism as such theory with flexibility is needed to express changing and evolving city lifestyle and living conditions.

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