The Effect of Spatial Configuration and Land Use Pattern on Land Price Formation

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Abstract

Land use in a city has a unique structure, mostly due to the interactions between its spatial configuration and functions, developing into a patchwork of functional regions of various forms. Land price can be seen as one of the indices reflecting these advancements in spatial structure and land use.

Through an analysis of the influences of spatial configuration and land use on the formation of land price, this paper seeks to investigate the correlation among spatial configuration, land price and land use on a robust basis.

Seochodong area in Seoul, South Korea, has been selected for our case study. Seochodong area demonstrates various forms of land uses against the background of dominant residential areas.

This study will first derive space configurational characteristic factors by means of Space Syntax, a tool to analyze spatial configuration objectively, and then identify land use characteristic variables based on the systematic classification of land characteristic investigation list. By combining two characteristic factors, the correlation between land price and those factors can be determined.

As a result, it is found that space configurational characteristic factors have greater influence on the formation of land price than land use characteristic variables. We suggest that the credibility of the previous land-price formation models can be improved significantly by introducing space configurational characteristic factors as well as land characteristic factors.

By investigating the correlation among land use, spatial configuration and land price, this study may be used as a reference guide for evaluating proper economic potentials in particular landscapes and also for proposing alternative plans.

1. Introduction

1.1 Background and purpose of study

Land price is a synthetic factor which is determined by the interrelation of all other urban components. As a single index, it succinctly represents the socioeconomic factor of a city and sums up the general characteristic of urban space. More concretely, land price reflects positional fixation, heterogeneity, functional diversity, local value, surrounding environments as well as spatial configuration.

Land price - as it is formed by various factors - has been also utilized as a basic datum to measure changes in spatial configuration.

Land price is commonly estimated by considering land characteristics, distinctive environmental qualities, and accessibility. However, land price is currently calculated without considering the urban spatial configuration. Land use and accessibility take up a majority of previous studies, whereas studies on spatial configuration are rather scarce.

Accordingly, the purposes of this study are as below. First, this study will figure out the interrelation among land characteristics, spatial configuration and land price, which has not been considered in land price determination. Second, this study will establish a land price determinant model that takes into account both land characteristics and spatial configuration.

1.2 Scope and method of study

1.2.1 Scope of study

Seocho area in Seoul, South Korea, has been selected for our case study. Although the area is in close proximity to Gangnam district, the sub-CBD of Seoul, Seocho area has been rather underdeveloped due to Seocho-ro's low connectivity with Teheran-ro, the very center of commercial business. Jangjae Tunnel, which will connect Teheran-ro and Naebang Station, is supposed to be completed in 2009. Seocho area is anticipated to become a new addition to the current sub-CBD, as Jangjae Tunnel will directly connect Seocho area and Teheran-ro. Although this study seeks to create a land price determinant model with consideration of spatial configuration, we have selected an area that is anticipated to experience changes in spatial configuration in order to verify the model in the future.

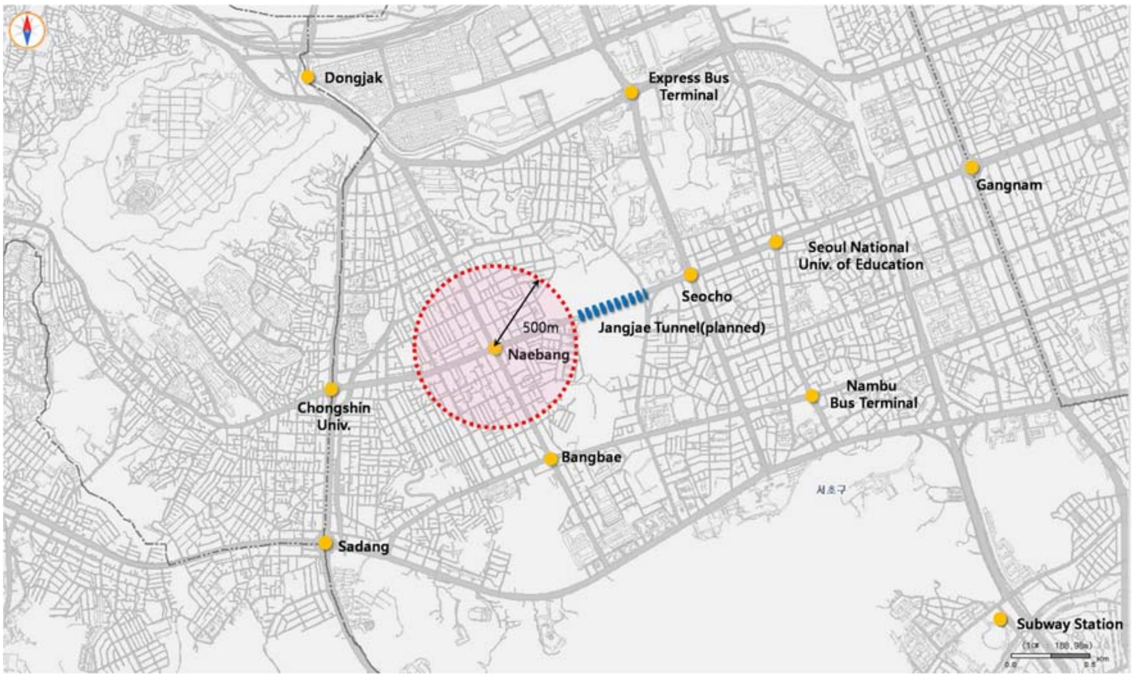

Figure 1
Spatial scope

The spatial scope of study is the subway station influencing area of Naebang Subway Station. Here, subway station influence area generally denotes the station's geographical sphere of influence. This scope will include people who pass through the area for everyday commutation or other purposes. In this study, in accordance to the Town Planning and Zoning Act, subway station influence area indicates an area within 500-meter radius from the station.

The subject of this study is limited to spatial configurational characteristics and land characteristic variables. Based on land characteristic survey qualities, the land characteristic variables are 5 variables eligible for the present condition of Seocho area. Furthermore, attributed to the spatial scope, the distance from the station is also included as a variable. Land price data are based on officially assessed reference land price, announced in January 1, 2008.

1.2.2 Method of Study

This study utilizes the following methods: First, it analyzes spatial configuration of the Seocho area, using axial maps. In order to acquire more accurate results, additional segment analysis was performed, which is expected to increase the precision of spatial configuration value for each land. Second, spatial configurational characteristic variables are selected and calculated based on previous analyses. Moreover, land characteristic variables are extracted by using land characteristic survey qualities. Variables with the two characteristics are considered together in order to analyze its correlation with officially assessed reference land price. Third, variables that influence land price are singled out to create final land price determination model by using stepwise regression analysis.

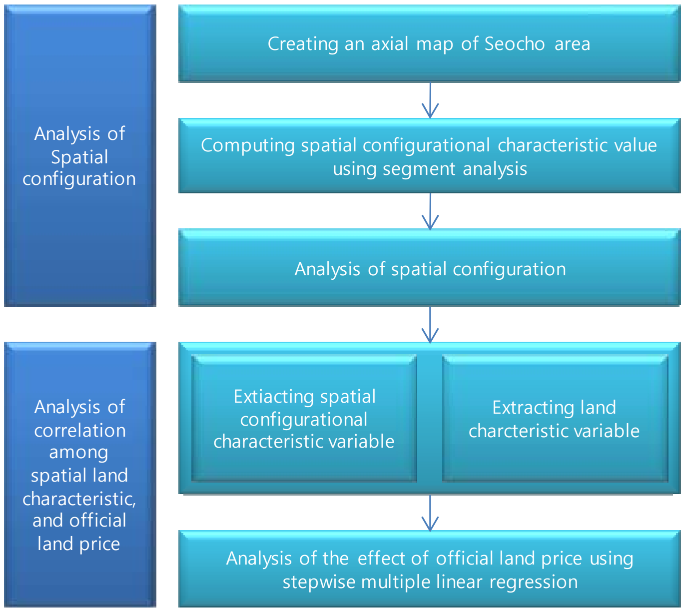

Figure 2
Progress of study

2. Theoretical consideration

2.1 Precedent studies

Land price consists of city's various factors, and it is comprised of many different indices. In Korea, Song and Mills(1975) initiated various studies on identifying spatial configuration, accessibility, and use district.

Prior studies related to this investigation are divided into two categories. One is studies on land price and land usage analysis, and the other is analysis of the correlation between land price and land usage by applying spatial configurational characteristic variables of space syntax.

Extensive studies on land price and land usage have been performed in the past, highlighted with some brilliant discoveries. Chae(1998) analyzed the effect of central district's accessibility and location on land price. As a result, the investigation had shown that location(use district, land purpose, number of adjacent roads, school district, etc.) exerts greater influence than accessibility. Also, the multicentric model, which includes both accessibility and location, turned out to have higher correlation with land price than the monocentric accessibility model. Chae also drew a conclusion that the effect of accessibility on land price must be analyzed with the location factor in order to obtain more accurate results. Min(2006) employed hedonic analysis, and analyzed changes in each variable's influence on land price by comparing each land characteristic's coefficient. Moreover, Lee(2006) proved the correlation between land's distance from road and land price by analyzing accessibility and location's effect on land price. Kim and Hwang(2007) applied the hedonic regression model to analyze the influence of land's physical factors(land size, use district, city planning establishment site, topography, commercial establishment accessibility, public institution accessibility, land purpose, number of adjacent roads, road accessibility) in the same use district on land price determination. Generally, statistical factors were considered when dealing with accessibility and use district in order to investigate its correlation with land price, and they discovered high land price correlation. While use district, land purpose, number of adjacent roads, and topography were commonly analyzed as variables, different variables were used as accessibility variables. Among those variables regarding spatial configuration's characteristics, only accessibility to CBD and sub-CBD were considered.

title	Author (year)	variable	method of analysis	result	limitation	
Spatial Deistribution of Land prices and Its Determinants in Seoul	Chae (1998)	CBD accessibility, sub-CBD accessibility, use district, land purpose, number of adjacent roads, school distric	Hedonic Price Model	Effect of CBD accessibility and location on land price Location(use district, land purpose, road, school district, etc.) exerts greater influence than accessibility and multicentric model, which includes both accessibility and location, is far more illustrative than monocentric accessibility model	- Mainly performed general analysis on land characteristic variable(use district, land purpose, road, land shape) - Accessibility variable not consistent - Except for accessibility to CBD and sub-CBD, all variables regarding spatial configurational characteristics were neglected - Lack of consideration of spatial configurational characteristics	
A Study on the Situation of the Land Use and the Factor of Determining the Land-Price in CBD	Kim Lim Song (1998)	Land use, number of adjacent roads, road width, land shape, CBD accessibility, distance to public institutions	Hedonic Price Model	Use district and land price have high correlation		
A Study of a Land Special Quality Effect on Posted Land Price	Min (2006)	Use district, city planning establishment site, use status, land shape, number of adjacent roads, harmful institution	Hedonic Price Model	Analyzed changes in each variable's influence on land price by comparing each land characteristic's coefficient		
The Correlation Analysis Between Land Price and Accessibility and Land Use Zone in the North Cheonan City	Lee (2006)	Use district, accessibility	Multiple Regression	Proved correlation between land's distance from road and land price by analyzing accessibility and location's effect on land price		
Analysis on Land Price Determinants of the Downtown Area using Stepwise Regression Analysis	Kim Hwang (2007)	Official individual land price, land size, use district, city planning establishment site, land shape, commercial establishment accessibility, public institution accessibility, land purpose, number of adjacent roads, road accessibility	Hedonic Price Model	Analyzed the influence of land's physical factors(land size, use district, city planning establishment site, land shape, commercial establishment accessibility, public institution accessibility, land purpose, road accessibility) in the same use district on land price determination		
A Study on the Relationship Between Spatial Configuration and Land Price	Lim Kim Ban (2002)	Global integration, road width, connectivity, control, local integration, depth, use status, surrounding environment	Multiple Regression	Found correlation between global integration(a space configurational characteristic factor) and land price	- Investigation was confined to a single use district that all land characteristics except spatial configuration were not considered - When there are multiple lands correspond to one axial line, the values are substituted with an average value, resulting in inaccurate results.	- Contributed to the discovery of correlaiton between land price and spatial configuration variables by using spatial syntax - Only dealt with spatial configuration-land price and spatial configuration-land characteristic - Need for investigation into land price-spatial configuration+land characteristic
A Study on the Locational Characteristics of Facilities Considering Spatial Configuration	Moon (2004)	Physical variables in land use (subway station, principal road, bus stop, road width) Building variables (total floor area, number of stories, land price) Spatial configurational characteristics (Global integration, Local integration, use district discriminant analysis)	Correlation, Multiple Regression	Global integration-land price configuration Global integration-land use Found correlation between each pair	- The effect of global integration and land use on land price was neglected	
Analyses of CBD Land-Use Characteristics Based on the Space Syntax	Seok Lee (2008)	Official land price, width, number of store entrances	Multiple Regression	Land use status-global integration Land price-global integration Found correlation between each pair		

Table 1

Analysis of Previous studies

Lim, Kim, Ban(2002) utilized space syntax methodology to investigate the correlation between global integration - a space configurational characteristic factor - and land price in Insa-dong area. However, the scope of this investigation was confined to a single use district that all land characteristics but spatial configuration were not taken into account. Moon(2004) discovered the correlation between global integration and land price configuration, as well as global integration and land use by utilizing discriminant analysis. Similarly, Seok and Lee(2008) analyzed land use status and global integration, as well as land price and global integration through regression analysis. In this way, space configuration was considered by employing space syntax, but space configuration factor and land characteristic's effect on land price nor their difference were not considered.

In prior studies of the first subject, high correlation between land price and use district had been proved in many aspects, but space configurational characteristics were not fully reflected. Studies on the second subject contributed to the discovery of correlation between land price and spatial configuration variables, which were not previously considered. However, this investigation only focused on the correlation among each factors, and lacked consideration of influence on land price. Thus, this study will employ objective spatial configurational characteristic variables in order to analyze spatial configuration and land characteristic variables' influence on land price.

2.2 Officially assessed reference land price

Officially assessed reference land price is the price of sample land per square meter. 0.5 Million lands among 27.9 million lands nationwide are selected as for sample lands. Sample land is chosen for its similarity in factors such as land use status, surrounding environment, and other natural and social factors. OARLP is notified in January 1st of every year. OARLP is an official public land price which serves as an assessment standard for official individual land price. In determination of land price, change in market price due to trader's circumstances is neglected. Official individual land price is assessed according to OARLP, using comparative land price reference table.

3. Analysis on Seocho area

3.1 Land price status of Seocho area

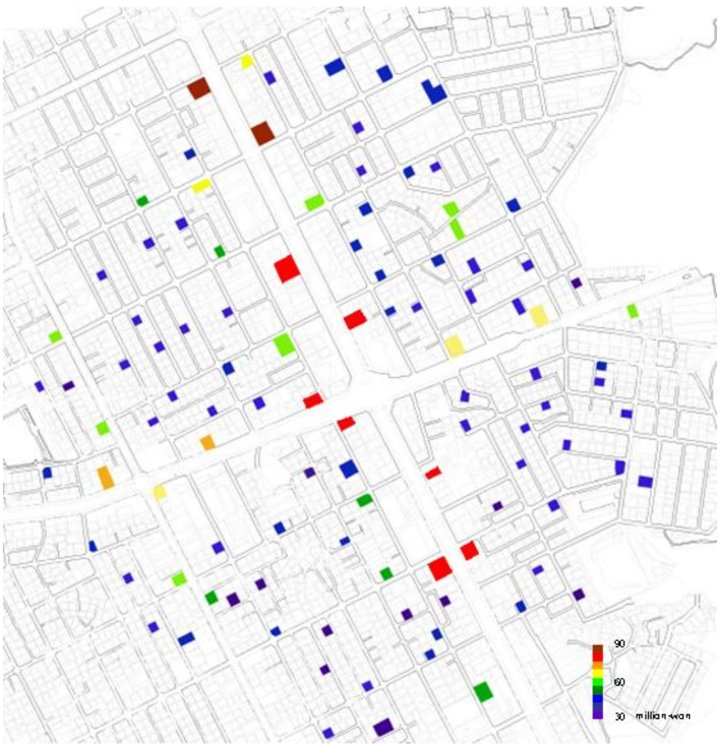

Figure 3
Distribution of land price

Table 2 is based on OARLP of 106 landmarks released on January 1, 2008, more specifically within 500m radius of Naebang Station. The lands in the vicinity of main roads such as Seocho-ro and Bangbae-ro areas also display high land price. According to the average OARLP, Seocho-ro area prides the highest land price, followed by Banpo-ro and Dongjak Bridge area.

3.2 Analysis on Seocho area's land characteristics

3.2.1 Land characteristic status

As a city grows in size, its social structure becomes more sophisticated. Its function is subdivided into more specific divisions, and displays more unique structure due to its interaction with land usage. The city evolves into a combination of districts with various functions. Land usage is a basic structure which constitutes a city's spatial configuration, and it is one of the crucial factors that determine land price.

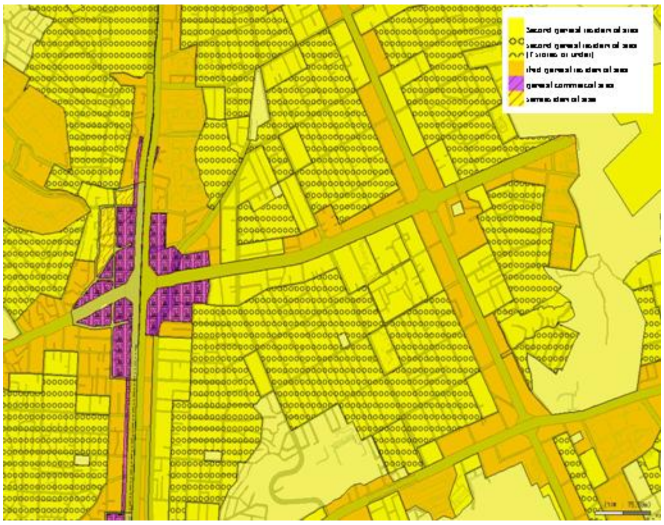

Figure 4

Present condition of Seocho-gu use district

Seocho area is divided into "second general residential area" and "third general residential area." Second general residential area allows construction of buildings with a height limit of "7 stories or under" or "15 stories or under." In "7 stories or under" areas, houses take up a majority of the buildings, whereas apartment buildings comprise a majority in "15 stories or under" areas. Third general residential area does not have a limit on height and is mostly comprised of high-rise apartment buildings. Third general residential area is spread within Seocho-ro and Bangbae-ro, while second general residential area is adjacent to minor streets. Use status is often divided into residence and business.

3.2.2 Establishing land characteristic analysis indices

Land characteristic variable is established using land characteristic survey qualities, which are the basic factors in determination of OARLP. Among all variables, those eligible for Seocho area's status have been singled out. The land characteristic variables are sorted into two categories.

- Land use variables : variables pertaining to behaviors within the land, such as purpose or use status
- Physical variables : variables pertaining to innate physical characteristics, such as topography or size

Nominal scales, which are not suitable for regression analysis, have been converted into dummy variables, and topography and traffic (accessibility, number of adjacent sides) have been converted into ratio scale according to the CLPRT. CLPRT is a simple land-price determination table devised to determine the price of massive landscape with ease. OARLP and the land characteristic have been analyzed with multi-regression, and the extracted ratio per characteristic have been combined into a matrix.

category		index	Selection of variable	Division	scale
land characteristic survey category	land use variable	use district	O	①second general residential area ② third general residential area	nominal scale
		land use status	O	① commercial use ② business use ③multi-purpose apartment complex ④ residential use	nominal scale
		surrounding environment	O	① residential land ② commercial land	nominal scale
		farming land index			
		forest and field land index			
		land category			
		harmful facility accessibility (railroad/electric railway, waste/water pollution)			
	physical variable	size	O	land size(㎡)	ratio scale
		topography(height)			
		topography(shape)	O	① square ②horizontal rectangle ③ vertical rectangle ④ trapezoid	ratio scale*
station influence area variable		subway accessibility	O	distance(m)	ratio scale

Table 2

Setting analysis index according to land characteristic survey categorizing system

3.3 Analysis on spatial configuration of Seocho area

3.3.1 Analysis on spatial configuration of present-state Seocho area

Figure 5

Axial map of present-state(before completion of the tunnel) Gangnam district, including Seocho area

In order to examine spatial configuration of Seocho area, an axial map was established, using a land registration map of Seoul with a reduced scale of 1:1000. As shown in (Figure 5), Hakdong-ro has the highest global integration value. Adjacent districts, including Banpo-ro, Hyoryoung-ro, and Bangbae-ro, also display high values in that order. Gangnam sub-CBD, the west of Seocho area has high integration value, whereas that of Banbae-dong neighborhood is relatively low. Although Gangnam district has high integration value, it does not exert influence on Seocho area. Thus, approach to Seocho area from the eastern side has relatively low accessibility compared to that from the west, and mountainous topography, which spatially disconnects the two regions, keeps high accessibility of Gangnam district from influencing Seocho area.

3.3.2 Establishment of spatial configuration analysis indices

Given the analysis of established axial map, spatial configuration analysis indices are created. Selected indices are the following:

mode	measure	transformation
Axial map	Global integration	X
	Intensity	X
Segment map	Mean depth	ln(mean depth)
	choice	ln(choice)

Table 3
Spatial configuration analysis indices

Integration and intensity were obtained from axial map analysis. Moreover, segment analysis, which allows classification of values pertaining to certain lands, was executed for accuracy. From this analysis, choice and mean depth were obtained. Choice and mean depth went through logarithmic transformation for normal distribution.

The basic rules for substitution of spatial configurational characteristic value into corresponding land are the following:

First, establish axial lines in corresponding lands and the main entrance of target building.
Second, substitute official land price into the axial line of a wide road adjacent to the land.

4. Correlation among spatial configuration, land characteristic, and land price

In order to analyze the factors that influence official land price, stepwise multiple linear regression was employed. Stepwise multiple linear regression is an analysis which selects the most illustrative variable, given that linear models are constants. The examination is comprised of 4 steps and the following indices of 10 variables in 4 categories:

- spatial configurational characteristic variables(choice, mean depth, global integration, intensity)
- land characteristic variables - land use variables(use district, use status, surrounding use)
- physical characteristics(topography, size)
- station influence area variable(accessibility to subway)

Among those variables, one index per category is selected, considering multicolinearity.

4.1 Substitution of all variables

First, the correlation analysis is performed using all 10 indices (Table 4).

Among 10 variables, ln(choice) displays the highest correlation. Other spatial configurational characteristic variables also show high correlation. Topography shows very low correlation, with a value of - 0.068.

	ln_price	use_com	size(㎡)	subway	lnMD_seg	lnChoice_seg	use_office	use_multi	district_3	surrounding	shape	IntegrationHH	Intensity
ln_price	1	0.690328	0.489319	-0.40873	-0.67415	0.805686	0.352484	0.135342	0.501803	0.758193	-0.06786	0.721183	0.703034
use_com	0.690328	1	0.396448	-0.26228	-0.46197	0.551152	-0.08389	-0.15869	0.429841	0.58722	-0.04149	0.496055	0.481787
size(㎡)	0.489319	0.396448	1	-0.12069	-0.39175	0.405946	0.157644	-0.09588	0.195469	0.449506	-0.19294	0.396044	0.386344
subway	-0.40873	-0.26228	-0.12069	1	0.152437	-0.36087	-0.10933	0.063237	-0.32971	-0.19004	-0.05839	-0.22735	-0.22004
lnMD_seg	-0.67415	-0.46197	-0.39175	0.152437	1	-0.85419	-0.28852	-0.26915	-0.29804	-0.65541	-0.00579	-0.89543	-0.89862
lnChoice	0.805686	0.551152	0.405946	-0.36087	-0.85419	1	0.303011	0.231505	0.323656	0.718305	0.017306	0.834868	0.830541
use_office	0.352484	-0.08389	0.157644	-0.10933	-0.28852	0.303011	1	-0.07721	0.051741	0.285714	-0.13457	0.268972	0.260195
use_multi	0.135342	-0.15869	-0.09588	0.063237	-0.26915	0.231505	-0.07721	1	-0.08401	0.540495	0.140748	0.299238	0.30476
district_3	0.501803	0.429841	0.195469	-0.32971	-0.29804	0.323656	0.051741	-0.08401	1	0.266872	-0.05836	0.266912	0.260384
surrounding	0.758193	0.58722	0.449506	-0.19004	-0.65541	0.718305	0.285714	0.540495	0.266872	1	-0.02944	0.698534	0.688273
shape	-0.06786	-0.04149	-0.19294	-0.05839	-0.00579	0.017306	-0.13457	0.140748	-0.05836	-0.02944	1	0.069813	0.076665
IntegrationHH	0.721183	0.496055	0.396044	-0.22735	-0.89543	0.834868	0.268972	0.299238	0.266912	0.698534	0.069813	1	0.998924
Intensity	0.703034	0.481787	0.386344	-0.22004	-0.89862	0.830541	0.260195	0.30476	0.260384	0.688273	0.076665	0.998924	1

Table 4
Classification of indices of spatial configuration analysis

model	R	R^2	Adjusted R^2	Std.Error of the Estimate	Change Statistics					Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig.F Change	
1	0.805686	0.64913	0.645621	0.153345	0.64913	185.0058	1	100	1.78E-24	
2	0.858045	0.736242	0.730914	0.133623	0.087112	32.69697	1	99	1.14E-07	
3	0.885295	0.783747	0.777127	0.121608	0.047505	21.52779	1	98	1.08E-05	
4	0.899268	0.808682	0.800793	0.114971	0.024936	12.64267	1	97	0.000585	
5	0.909513	0.827214	0.818215	0.109828	0.018531	10.29606	1	96	0.001813	
6	0.915598	0.838319	0.828108	0.106798	0.011105	6.525143	1	95	0.012226	
7	0.919931	0.846274	0.834826	0.10469	0.007955	4.864102	1	94	0.029859	2.143796481

a. Predictors in the Model: (Constant), lnChoice
b. Predictors in the Model: (Constant), lnChoice, use_com
c. Predictors in the Model: (Constant), lnChoice, use_com, use_office
d. Predictors in the Model: (Constant), lnChoice, use_com, use_office, district
e. Predictors in the Model: (Constant), lnChoice, use_com, use_office, district, use_multi
f. Predictors in the Model: (Constant), lnChoice, use_com, use_office, district, use_multi, size㎡
g. Predictors in the Model: (Constant), lnChoice, use_com, use_office, district, use_multi, size㎡, subway
h. dependent variable: ln_price

Table 5
Stepwise regression using all 10 indices

Then we perform stepwise multiple linear regression with the same variables (Table 5).

As a result, 6 variables which show high correlation are singled out and are analyzed in 6 steps. ln(choice) is singled out the first, having the highest correlation with land price. It can be observed that indices picked from segment analysis, which is more reactive to corresponding land, are more illustrative than those picked from simple axial map. After substitution of all 6 variables, the model displays high coefficient of determination value of 0.828, but there exists multicolinearism among variables. Then, in each category the variables with the highest correlation are singled out. Choice represents spatial configurational characteristic index and use status represents land use characteristic index. Land use, which was expected to show high correlation with land price, had lower correlation than use status did. This is because use status targets individual lands, whereas use district is a concept of "district," making it difficult to interpret.

4.2 On the basis of land use, the most influential factor in land price determination, each index's effect on land price is analyzed.

- Land use variable(use status)
- Land use variable(use status)＋physical characteristic variable(size)
- Land use variable(use status)＋physical characteristic variable(topography)
- Land use variable(use status)＋spatial configurational characteristic variable(ln(choice))
- Land use variable(use status)＋subway accessibility

Using the coefficient of determination obtained by substituting use status as the only variable, each variable's effect on land price is compared. The results are shown on the following table.

	variable	R^2	(A)-R^2
1	use status	0.471(A)	0
2	use status + size	0.522	0.051
3	use status + topograph	0.468	-0.003
4	use status + in(choice)	0.731	0.26
5	use status + subway accessibility	0.523	0.052

Table 6
Comparison among each variable's correlation with land price

Our analysis shows that instead of analyzing given land characteristic variables, additional use of ln(choice) shows better explanation on land price, when compared to coefficient of determination of land use, 0.471. 73% of land price can be explained by land use and spatial configuration variables, and this value is close to that of previous official land price determinant variables.

On the other hand, topography, the previous land price determinant variable, did not have high correlation with official land price. When size index is substituted, coefficient of determination increases by 5.1%. In the case of topography, however, the value decreased by 0.3%. From this result, it can be assumed that land price and topography have very low correlation.

Similarly, station influence area variable also had little influence on land price. Although its coefficient of determination increased by 5.2%, a value close to that of topography, the value was rather negligible when compared to spatial configuration.

4.3 Comparison with preexisting official land price determinant method
A regression analysis was performed, using land characteristic variable, which is the preexisting land price determination index.

The result shows that 77.4% of current official land price can be explained, using land characteristic variable.

When the regression equation using land price determinant variable is analyzed with spatial configuration variable, coefficient of determination increased by 5.3%, with total value of 82.7. It can be observed that the regression equation produces higher coefficient of determination when spatial configuration variables substitute preexisting variables.

4.4 Official land price - spatial configurational characteristic variable(choice, mean depth, global integration, intensity)

Let us examine the correlation between official land price and variables by performing multiple linear regression between official land price and spatial configurational characteristic variables.

The correlation analysis shows that ln(choice) displays the highest value of correlation, followed by integration, intensity, and mean depth. In multiple linear regression all values except ln(choice) were neglected. Even though only simple spatial configuration analysis values were substituted, land price and ln(choice) exerted a high correlation value of R^2=0.646. This value is 0.075 higher than the that of land price, which had the highest value among land characteristic variables. Thus, ln(choice) is the index with the highest correlation with land price.

model	R	R^2	Adjusted R^2	Std.Error of the Estimate	Change Statistics					
					R^2 Change	F Change	df1	df2	Sig.F Change	
1	0.806	0.649	0.646	0.153345	0.649	185.006	1	100	0.000	2.082
a. dependent variable: ln_price										

Table 7
Official land price - spatial configurational characteristic variable

5. Conclusion and limitation of study

In this study, we have analyzed the correlation between spatial configurational characteristic variables and land price of Seocho-gu area in Seoul, South Korea, together with land characteristic variables. In addition, the effects of subway accessibility on land price in subway station influence area was also examined.

After a total of 10 variables were analyzed through 6 steps of stepwise regression, spatial configuration characteristic (ln(choice)), land use status(commerce, business, multi-purpose apartment complex), land use district, size, and subway accessibility were selected as key variables which influence land price determination. Choice - one of spatial configurational characteristic variables - was observed to have the highest correlation with land price. Land use status showed the second highest correlation, whereas topography had very little influence on land price.

In case the spatial configuration variable was combined into the preexisting land price determinant model, the coefficient of determination increased by 5.3%, resulting in a value as high as 82.7%. It is also found to be able to explain the 64.6% of the variation of land price in simple linear regression. We expect building land price determinant model based on spatial configuration to increase the model's explanatory power for land price.

In this study, we have analyzed the correlation between spatial configurational characteristic variables and land price, together with land characteristic variables, and proved that spatial configuration has greater influence on land price than land characteristic variables. By considering spatial configuration variables with land characteristic variables together, we have introduced a new possibility of a more detailed and accurate land price determination model. Furthermore, for now we are able to predict land price according to changes in spatial configuration and land use after the completion of Jangjae Tunnel, using the regression equations obtained from this study.

Since the scope of this study was limited to the downtown area, variables such as farmland, forests and fields, and harmful facilities did not play a major role. Also, the study was focused only on a single station influence area so that it is necessary to expand spatial scope in further studies. Although official land price is a dependent variable, it was considered as a momentary variable that does not take into account time-series variation. If we add time-series analysis on previous official land price - along with the forecast on the changes in spatial configuration in the future - to our study, we will be able to establish a more accurate land price determinant model. Moreover, at the time of completion of Jangjae Tunnel the suitability of the regression equations obtained from this study will have to be examined.

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References

Kim, Y.O., 2003. A Study on the Relationship between Properties of Spatial Configuration and Patterns of Space Use using Space Syntax. Korea Planners Association v.38 n.4:7-17.

kim, H.S., Lim J.H., Song H.S, 1998, A Study on the Situation of the Land Use and the Factor of Determining the Land-Price in CBD, Architectural institute of Korea v.14 n.11: 259-268

Chae, M.O., 1998, Spatial Deistribution of Land prices and Its Determinants in Seoul, Korea Planners Association v.33 n.3:95-115.

Min, W.G., 2006, A Study of a Land Special Quality Effect on Posted Land Price, Residention Environment Institute of Korea, v.4 n.1:99-114.

Kim, G.G., Hwang, J.W., 2007, Analysis on Land Price Determinants of the Downtown Area using Stepwise Regression Analysis, Korea Planners Association : 1459-1473

Lim H.S, Kim Y.O, Ban Y.W, 2002, A Study on the Relationship Between Spatial Configuration and Land Price. Architectural institute of Korea v.18 n.7: 133-141.

Moon J.M, 2004, A Study on the Locational Characteristics of Facilities Considering Spatial Configuration, Master diss., Sejong University,

Seok H.J, Lee M.H, 2008, Analyses of CBD Land-Use Characteristics Based on the Space Syntax, Architectural institute of Korea v.24 n.5: 211-230

Bill Hillier, 1996, Space is the Machine, Cambridge

Bill Hillier, 1984, The Social Logic of Space, Cambridge