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Incentives of Environmental Design and Management in Urban Neighborhoods

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1. Introduction

Historically, many planning policies have been implemented to protect urban residential environments, such as controls of land use change, regulations of green space, and protection of landscapes. The importance of effective environmental management has been recognized not only for its ability to enhance a sense of community identity, but also for creating added value in residential areas (Adams & Leedy, 1987; de Haas et al., 1999; Jim, 2004; Murtagh, 1997).

Since the period of Reform and Opening in the late 1970s, China has been transforming from a planned economy to a market economy. With rapid development for over 30 years in urban areas, the quality of life of city-dwellers has greatly improved and the need for desirable and high-profile residential environments has increased accordingly. In the process of large-scale urban development, many new issues have surfaced, such as the sharp change of urban landscapes and the dilapidation of old neighborhoods. For instance, during the period of the welfare-housing system, most people lived in gated housing blocks maintained and managed by their work units. In 1998, the system of allocating free housing to employees through their work units was abolished, and it shifted to the allocation of housing subsidies. Many residential blocks were commercialized and new inhabitants moved in. As work units no longer had any management responsibilities, the environments of many areas have suffered tremendously. The expanding gaps between new and old residential areas have significantly reduced the overall quality of urban environments and have resulted in more and more social problems. Therefore, it is critical to introduce a new market-based system of environmental management of residential areas, the benefits of which must be clarified.

2. Aims and method

This chapter attempts to explore the critical determinants of environmental management and clarify the benefits of environmental management using a micro-economic approach.

Many studies have been conducted in this field. For example, Lichfield (1988), Carter & Bramley (2002), Coeterier (2002), and İpekoğlu (2006) analyzed the value of preserving historic sites and traditional houses from the perspectives of urban forms and culture. Gómez-Sal (2003) compared the effects of different environmental management policies

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using a landscape assessment system for residential areas consisting of ecological, economic, and social indices. Prato (2000) presented a model for evaluating landscape management schemes where a variety of ecological, economic, and policymaking attributes were considered. Groat (1984) investigated public opinions toward the contextual fit of urban space, providing the basis for planning and design rules for urban development.

In China, a great number of community-based evaluation systems of residential environment have been presented in which indices of location, abundance of green space, infrastructure and public facilities, housing price, and the social and economic attributes of residents are commonly included (Xie, 1997; Ning & Cha, 1999; Hua, 1999; Li & Ye, 1999; Chen et al., 2000; Li & Li, 2006; Wang et al., 2002; Wu et al., 2003; Zhang et al., 2004). However, these studies have not emphasized the quality of environmental management. Although sanitation, security, and landscape management in residential areas are thought to be important factors of environmental quality (Wu et al., 1995), quantitative studies on the economic value of environmental management are scarce.

This study is based on a site survey and an investigation of the previously-owned housing market in Beijing. First, we conducted a site survey in the sample area and studied the main determinants of environmental management in residential blocks using a factor analysis method. Then, a hedonic regression approach was adopted to estimate the benefit of environmental management from an analysis of housing prices.

3. Data

3.1 Study area

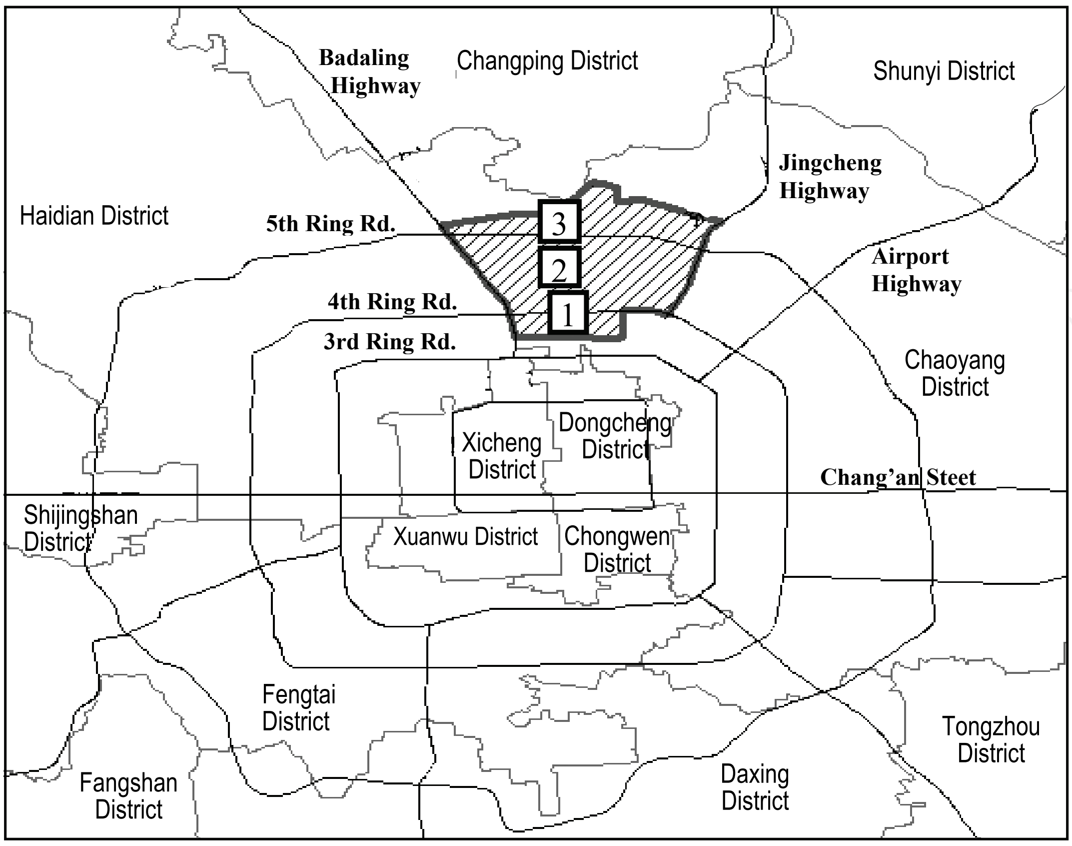
A basic assumption underlying the hedonic regression approach is that the valuations of environmental products are homogeneous in the study area. Therefore, the scope of the study area should be appropriately confined; otherwise, it is possible for the estimates to be affected by the differentiation of submarkets. Accordingly, the study area is limited to the Asian Sports Village and Olympic areas in Beijing (the shaded areas in Fig. 1).

Beijing has a typical mono-centric structure. There are five ring roads around the Forbidden City and several radical highways that form the main framework of the developed areas. The study area lies across the northern Fourth and Fifth Ring Roads, occupying about 25 km^2. It is next to highways in the east and west, and borders a river in the north and an arterial road in the south. The area is located around the Asian Sports Village (built for the 1992 Asian Olympic Games), the Olympic Green Center, and National Forest Park (constructed for the 2008 Olympic Games). There are a variety of residential compounds in this area, e.g., old neighborhoods built in the 1970s and 1980s, large communities constructed in the early 1990s, and new commercial housing blocks developed since 2000.

3.2 Site survey of residential blocks

We randomly chose 63 residential blocks and conducted a site survey, focusing on their environmental design and management situations. The characteristics of the blocks were captured from five perspectives: 'building design', 'planning', 'management', 'community', and 'surrounding relationship'. The survey involves 39 indices with scores of '+1', '0', and '-1'. Table 1 lists the content of the survey and the standard of scoring.

The survey was conducted in May, 2007. To ensure objectivity in the survey, a detailed manual was prepared, with concrete descriptions of the scoring standard and sample pictures for reference. In addition, the property fee levels of each residential block were investigated.



1 Asian Sports Village, 2 Olympic Green, 3 National Forest Park

Fig. 1. Location of sample area in Beijing

Group	Item	Content	Scoring standard
Building design (6)	Elevation design	Color, ratio, roof, silhouette, etc.	+1: good; 0: average; -1: poor
	Architectural style	Creativity, cultural meaning	+1: good; 0: average; -1: poor
	Exterior	Decoration materials	+1: good; 0: average; -1: poor
	Building management	Safeguards and monitoring systems	+1: complete; 0: simple; -1: none
	Ground plane design	Design of hall and entrance, connection with path and garden	+1: good; 0: average; -1: poor
	Barrier-free	Barrier-free design	+1: yes; 0: no
Planning (14)	Harmony of buildings	harmonious form, color, etc.	+1: good; 0: average; -1: poor
	Mixing building ages	Similar age, quality, etc.	+1: good; 0: average; -1: poor
	Mixing land use	Amount of industries and commercial use incompatible to residential use	+1: none; 0: some; -1: many
	Road system	Systematic and smooth	+1: good; 0: average; -1: poor
	Road quality	Pavement, sewage system, lighting, etc.	+1: good; 0: average; -1: poor
	Open space	Size and quality of public open space	+1: good; 0: average; -1: poor
	Central park	Size of central park	+1: good; 0: average; -1: poor
	Waterscape	Special design of waterscape	+1: yes; 0: no
	Garden	Garden design of public green space	+1: good; 0: average; -1: poor
	Details	Detail design of public space	+1: good; 0: average; -1: poor

Group	Item	Content	Scoring standard
	Sight focus	Sight focus design	+1: good; 0: average; -1: poor
	Facilities of public space	Variety and quality of public furniture and facilities	+1: good; 0: average; -1: poor
	Partitions and walls	Design of partitions and walls	+1: good; 0: average; -1: poor
	Electricity poles/lines	Style and layout design of electricity poles/lines	+1: underground; 0: tidy and above ground; -1: disorderly and above ground
Management (11)	Security	Entrance guard and monitoring	+1: strict and formal; 0: average; -1: poor
	Instructions and signs	Block maps, traffic signs, parking instructions, etc.	+1: good; 0: average; -1: poor
	Car parking	Management of car parking	+1: good; 0: average; -1: poor
	Bicycle parking	Management of bicycle parking	+1: good; 0: average; -1: poor
	Environmental sanitation	Garbage collection and sweeping	+1: very clean; 0: average; -1: dirty
	Maintenance of green areas	Maintenance of public green areas	+1: good; 0: average; -1: poor
	Maintenance of building appearance	Erosion, fading, peeling, etc.	+1: none; 0: some; -1: heavy
	Pasting and graffiti	Scribbles, doodles, stickers	+1: none; 0: some; -1: many
	Peddlers	Management of peddlers in the block	+1: good; 0: average: -1: poor
	Maintenance of public facilities	Fitness facilities, dustbins, etc.	+1: good; 0: average; -1: poor
	Informal structures	Shelters and informal buildings on balconies, etc.	+1: none; 0: some; -1: many
Community (2)	Information exchange	Community bulletin board	+1: good; 0: average; -1: poor
	Community atmosphere	Atmosphere of coexistence and communication	+1: good; 0: average; -1: poor
Surrounding relationship (6)	Neighboring service facilities	Continuity of shopping and service facilities, etc.	+1: integrated; 0: some; -1: separated
	Surrounding transportation	Influence of noise and pollution	+1: none; 0: some; -1: severe
	Surrounding building forms	Conformity in building height, style, etc.	+1: good; 0: average; -1: poor
	Surrounding road system	Integration of road system with surrounding blocks	+1: good; 0: average; -1: poor
	Openness to surrounding areas	Style of walls, gates, fences of the block	+1: open block; 0: semi-open; -1: completely closed
	Grade difference of blocks	difference in the quality of adjacent residential blocks	+1: little; 0: some; -1: large

Table 1. Survey items on the environmental design and management of residential blocks

4. Critical determinants of environmental management

4.1 Factor analysis

Among the data obtained from the site survey, the scores between different indices and those between different levels of the same index are not linear. In addition, many indices are correlated. To obtain the critical factors of environmental management, the 39 indices have to be summarized. With the method of factor analysis, seven principal components with eigenvalues above 1 were composed, accounting for 78% of the variance of the 39 indices. After rotating the eigenvector matrix, seven factors were drawn (Table 2). According to their correlations with the original indices, we defined them as: (1) planning and design; (2) contextual fit; (3) property management; (4) conformity of urban design; (5) completeness of facilities; (6) surrounding influence; and (7) mixture of composition.

4.2 Classification of residential blocks by environmental type

The scores of each residential block were computed on the seven dimensions. Then, a cluster analysis was conducted with the factor scores. As a result, the 63 residential blocks were classified into 6 types. Their respective features are shown in Table 3. The average levels of property management fees were also given. It was found that the property management fee of type 1 is the lowest (1.05RMB/m^2 per month), followed by types 3, 2, 5, 4. The average fee of the 6th type is the highest (3.74RMB/m^2 per month). Quality of environmental management is correlated to property management fees: the fees are higher in residential blocks with better environments.

Factors	1	2	3	4	5	6	7
	Planning & design	contextual fit	property management	conformity of urban design	completeness of facilities	surrounding influences	mixture of composition
Elevation design	0.409	-0.006	0.536	-0.576	-0.180	-0.155	0.153
Architectural style	0.803	-0.077	0.263	-0.372	-0.036	-0.108	-0.011
Exterior	0.797	-0.002	0.256	-0.220	-0.178	0.085	0.005
Building management	0.633	-0.011	0.534	-0.238	0.047	0.110	0.278
Ground plane design	0.772	0.132	0.435	-0.239	0.165	-0.100	-0.059
Barrier-free	0.755	0.237	0.196	-0.328	0.115	-0.085	-0.029
Harmony of buildings	0.164	0.040	0.364	-0.734	0.006	-0.184	-0.217
Mixing building ages	0.187	0.152	0.294	-0.202	-0.006	-0.202	-0.765
Mixing land use	0.012	0.050	0.730	-0.309	0.308	-0.263	-0.093
Road system	0.208	-0.255	0.382	-0.371	0.029	-0.179	-0.503
Road quality	0.697	0.050	0.511	-0.036	-0.070	-0.092	-0.132
Open space	0.001	-0.188	0.676	-0.066	0.263	-0.192	-0.226
Central park	0.116	-0.432	0.075	-0.104	0.673	0.217	-0.026
Waterscape	0.299	0.088	-0.074	-0.378	0.392	0.010	-0.102
Garden	0.794	-0.202	0.193	0.081	0.287	-0.107	-0.193
Details	0.788	-0.320	0.040	-0.076	0.058	-0.201	-0.111
Sight focus	0.814	-0.186	-0.089	-0.047	0.197	0.034	-0.091

Factors	1 Planning & design	2 contextual fit	3 property management	4 conformity of urban design	5 completeness of facilities	6 surrounding influences	7 mixture of composition
Facilities of public space	0.369	-0.323	0.235	-0.001	0.661	0.229	-0.008
Partitions and walls	0.748	-0.219	0.149	0.030	-0.133	-0.300	-0.140
Electric poles/lines	0.634	-0.496	0.345	-0.091	-0.045	0.113	-0.072
Security	0.734	-0.015	0.460	-0.208	-0.021	-0.057	-0.105
Instructions and signs	0.738	-0.292	0.345	0.085	0.056	0.231	-0.268
Car parking	0.332	0.061	0.705	-0.242	-0.224	-0.041	-0.224
Bicycle parking	0.597	-0.147	0.615	-0.112	0.271	-0.061	0.031
Environmental sanitation	0.383	-0.514	0.560	0.178	0.058	-0.090	-0.316
Maintenance of green areas	0.615	-0.385	0.409	0.087	0.053	0.128	-0.110
Maintenance of building appearance	0.459	-0.168	0.677	-0.222	0.006	0.195	-0.130
Pasting and graffiti	0.433	-0.032	0.520	-0.291	-0.046	0.164	-0.507
Peddlers	0.211	0.149	0.867	-0.196	-0.051	-0.003	-0.082
Maintenance of public facilities	0.288	0.031	0.817	-0.060	0.044	0.052	-0.037
Informal structures	0.238	-0.190	0.777	-0.099	0.063	0.045	-0.109
Information exchange	0.285	-0.383	0.403	0.222	0.349	0.199	-0.235
Community atmosphere	-0.223	-0.117	0.056	0.164	0.767	-0.288	0.095
Neighboring service facilities	0.259	-0.813	0.180	-0.005	0.074	-0.128	0.105
Surrounding transportation	0.247	-0.056	0.066	-0.175	-0.026	-0.759	-0.171
Surrounding building forms	-0.032	-0.395	0.166	-0.776	0.063	-0.104	-0.193
Surrounding road system	0.122	-0.881	-0.138	-0.170	0.116	-0.008	0.041
Openness to surrounding areas	0.398	-0.177	0.295	-0.616	-0.130	0.125	0.000
Grade difference of blocks	-0.056	-0.849	-0.082	-0.122	0.247	0.013	-0.038

Table 2. Factor analysis of evaluation indices

Type	Features	Property management fee (RMB/m² per month)	Sample size
1	• Old multi-story and high-density residential blocks • Dull planning and design, consisting mostly of 6-story row buildings • Lack of basic management, with significantly worse environment than surrounding residential areas • Mature communities with a pleasant living atmosphere	1.05	8
2	• Middle-density and large scale residential blocks mainly developed in the early 1990s • Satisfactory property management	1.44	5
3	• Middle-density blocks mixed with buildings of various types and ages • Unharmonious environment with intensively mixed building types and land use • Average property management quality • Big difference with surrounding residential areas	1.24	21
4	• Middle- and high-density new commercial housing blocks • High-quality planning and design • Good environmental management system	2.38	20
5	• Middle-density residential blocks mostly developed around the year 2000 • Formal property management • Good sense of community	1.95	1
6	• High-end and small-scale new blocks • Highly closed, entrance permission strictly controlled • Superior environment • Lack of community atmosphere	3.74	8

Table 3. Types of residential blocks with environmental characteristics

5. Economic values of environmental management

5.1 A hedonic approach

Many studies have focused on the economic value of residential environments, defined as the willingness of residents to pay for the improvement of their residential environments. In practice, this is often examined using a contingent valuation approach (Willis & Garrod, 1993; Tyrvainen & Vaananen, 1998) or by identifying the implicit prices of environments using a hedonic regression approach (McLeod, 1984; Tyrvainen, 1997; Geoghegan, 1997; Tyrvainen & Miettinen, 2000).

Here, a hedonic approach is adopted to examine the impact of residential environments on housing prices. By assumption, the quality of residential environments may affect the prices of houses. In a well-functioning market, this effect is fully capitalized in market prices. Utility-maximizing households will purchase houses so that their willingness to pay for a marginal increase in the residential environment equals its marginal price, i.e. its hedonic price. In equilibrium, the hedonic price can be interpreted as the willingness of a household to pay for the residential environment (Cheshire and Mills, 1999; Boardman et al., 2001).

Therefore, the marginal effect of residential environments can be obtained by regression on the market prices of housing, which implies the benefit and cost to households.

5.2 Variable of environmental management

The categorical variable of environmental management type of residential blocks shown in Table 3 was used as the indicator of environmental management. Although the factor scores of the residential blocks constitute a more straightforward indicator of environmental quality, they are constrained by property management fees. In order to maximize their utility, households will choose an equilibrium point between satisfactory environmental management and an appropriate property management fee. Because the variable of environmental management type already takes the property management fee into account, it is more suitable for the hedonic regression analysis.

5.3 Hedonic housing price model

In practice, the supply of new commercial housing is less than the demand. To avoid sample bias caused by an incomplete market, the previously-owned housing market was taken as the sample. Through Beijing Housing Information Network, a search for previously-owned housing for sale within the 63 residential blocks in May 2006 yielded 460 matches. After confirming the lowest prices and concrete conditions of each listing with real estate agencies by phone, a final sample of 279 valid items was obtained.

The data included price (provided by real estate agencies), housing size, room type, building type, direction (the direction of main rooms), building age, interior finishing level, floors, etc. Detailed information on the location and land use of the residential blocks was collected from urban real estate statistics and GIS data, including the floor-to-area ratio, green coverage ratio, household density, and the distance to the nearest subway station, school, hospital, and to the boundary of Olympic facilities (including Asian Sports Village, Olympic Green Center, and National Forest Park).

A simple linear model was established:

$$P / indoorS = a_0 + \sum_{i=1}^{m} a_i \times x_i + \varepsilon \quad (1)$$

where *P/indoorS* is the indoor size-based unit price of apartments, a_0 is a constant term, x_i (for i=1 to m) indicates the i-th attribute, a_i is the coefficient to be estimated, and ε is an error term. For the clarity of interpretation, the specification of the simple linear form was preferred and it was proven to be satisfactory compared with other forms, such as the logarithm model and semi-logarithm model. Table 4 gives the results of the stepwise regression.

To improve the model, the assumptions of independent variables were carefully studied, and some of the variables were transformed. For example, *building age* was transformed to *ln(building age)*, assuming that its effect on the unit price decreases as the buildings age. To capture the non-linear effect on the unit prices, the variables *housing size*, *building scale*, and *household density* were transformed to categorical forms. The coefficient of $1/indoorS$ reveals the costs of kitchen and toilet facilities, which are stable regardless of house size. Housing size S was transformed to discrete variables in order to identify the nonlinear effect of housing size on unit price.

Term	Estimate	Std Error	t Ratio	Prob>|t|	Interpretation
Intercept	12.423	0.662	18.77	0.000	
Building type[row-type]	-0.317	0.082	-3.89	0.000	Row-type, -0.317; tower type, +0.317
Direction{W&E-NW&S&NE&SW&SE}	-0.173	0.101	-1.71	0.089	W and E, -0.173
Direction{NW&S&NE&SW-SE}	-0.160	0.115	-1.39	0.165	NW, -0.185
Direction{NW-S&NE&SW}	-0.199	0.196	-1.01	0.312	NE, -0.205
Direction{S&NE-SW}	0.003	0.117	0.02	0.980	SE, +0.332
Direction{S-NE}	0.419	0.134	3.14	0.002	SW, +0.209
					S, +0.63
Environmental management{3&1&6-5&2&4}	-0.531	0.069	-7.66	0.000	Type {1,3,6}, -0.531
Environmental management{5&2-4}	-0.336	0.131	-2.56	0.011	Type {2, 5}, +0.195
					Type {4}, +0.867
Green coverage ratio	0.029	0.008	3.79	0.000	+1% of green space in block, +0.029
Distance to school	-1.005	0.480	-2.09	0.037	Distance from block center to nearest school +1km, -1.005
ln(building age)	-0.843	0.147	-5.72	0.000	Building age (year) increase by *e* times, -0.843
1/indoors	57.407	26.797	2.14	0.033	1/(indoor size (m^2)) +1, +57.407
S{(0,80)-[80,190)}	0.068	0.259	0.26	0.793	*S*<50, -0.311
S{(0,60)-[60&80)}	0.053	0.154	0.34	0.732	*S*€[50-60), +0.554
S{(0,50)-[50,60)}	-0.433	0.214	-2.02	0.044	*S*€ [60-80), +0.015
S{[80,190)-[190,220)}	0.731	0.344	2.13	0.034	*S*€ [80-190), +0.610
					S≥190, -0.731
Distance to subway station	-0.393	0.041	-9.51	0.000	Distance from block center to nearest subway station +1km, -0.393
Distance to Olympic park	-0.747	0.080	-9.31	0.000	Distance from block center to Asian Sports Village, Olympic Green, or National Forest Park +1km, -0.747
Building scale {>300}	-1.012	0.247	-4.10	0.000	Average building scale in block >300 units, -1.012; ≤300 units, +1.012
Household density {≥120}	0.342	0.143	2.39	0.018	Household density of block ≥120 units/ha, +0.342; <120, -0.342

R^2=0.629, Adj. R^2=0.601

Table 4. Regression model on unit price* (thousand RMB/m^2)

The model in Table 4 has 12 independent variables, all being significant. They accounted for 62.9% of the total variance of housing prices. Multi-collinearity tests showed that the 12 variables had no strong correlations. Regression tests that randomly neglected different variables demonstrated that the estimates and significance levels of the remaining variables were stable. These tests implied that the estimates of Table 4 were accurate.

The coefficients of the 12 variables give the marginal *prices* of each variable. Significant structural attributes of housing price include *building type*, *direction*, and *ln(building age)*. The effects of location variables on housing prices were strong, including *distance to school*, *distance to subway station*, and *distance to Olympic park*. *green coverage ratio* had a positive effect on housing prices. In addition, the negative coefficients of *building scale* and *household density* revealed the cost of dwelling density.

An important finding is that *environmental management had* a significant effect on prices. Among the six types, type 4 was valued the highest (867 RMB/m^2 above average), followed by types 2 and 5 (both 195 RMB/m^2 above average). In contrast, the values of types 1, 3, and 6 were much lower (531 RMB/m^2 below average).

Looking at Table 3, the results can be interpreted. Blocks belonging to type 4 were developed in recent years with up-to-date concepts of environmental design and management; Types 2 and 5 were built earlier but were maintained well through good management. Blocks belonging to types 1 and 3 were unfavorable due to management deficiencies. Type 6 blocks had superior environments, but residents' willingness-to-pay was low because the property management fees were excessively high. This fact suggests that high environmental quality of residential blocks is desirable only if the management fee is reasonable.

6. Discussion of the results

6.1 Critical factors of residential environments

Table 2 reveals that the principal factors of residential environments in residential blocks are: (1) planning and design; (2) contextual fit; (3) property management; (4) conformity of urban design; (5) completeness of facilities; (6) surrounding influences; and (7) mixture of composition. Planning and design, contextual fit, and property management are the most important factors of environmental quality.

The important indices related to the planning and design of residential buildings are: Architectural style; Exterior; Ground plane design; Barrier-free design of buildings; Garden; Detail; Partitions and walls; and Instructions and signs. In a sense, these are the comprehensive planning and design concepts of modern residential blocks. In practice, these planning and design factors have often been neglected in older traditional residential blocks, leading to low environmental quality. In contrast, commercial housing developments from the late 1990s have emphasized these aspects.

Contextual fit is another important factor for judging the quality of residential environments. It reflects the problems associated with a lack of consideration of residential areas in their entirety, their non-proximity to and lack of correspondence with neighboring blocks, and a large contrast in landscapes and environmental grades. In practice, there are many newly developed residential blocks which are completely closed off from one another. Due to the need for these residential compounds to have individualized identities, the context of the area as a whole is totally neglected. At the same time, new urban poverty

areas are being formed because of the environmental deterioration of old neighborhoods. These issues must be addressed in the environmental management of urban areas.
The role of property management is important in residential blocks. Specifically, the key factors are: Regulations on incompatible land use; Management of car parking and peddlers; Maintenance of public facilities; and Control of informal buildings. Enhancing management of the above aspects will effectively improve the environments of residential compounds.

6.2 Incentives of environmental management

The marginal prices of environmental management obtained from the linear regression model revealed the benefits of environmental management. According to Table 3, the values of the same kinds of houses can differ by up to 1359 RMB/m^2 (852+507) due to differences in environmental management alone.
It is highly valuable to know that appropriate environmental management can significantly increase the economic values of existing residential blocks. Residential blocks of environmental management types 1, 3, 2, and 5 might also enjoy this benefit by improving landscape design, maintaining greenery, providing suitable facilities, and improving sanitation, parking, and security in the compounds. These kinds of improvements are highly feasible for existing residential blocks. The clarification of the benefits generates the incentives for existing areas to adopt an effective environmental management system.
The result that the values of environmental management types 1, 3, and 6 are significantly lower than the values of other types is also noteworthy. A common feature of these blocks is that their environmental qualities are quite different from the surrounding areas: Types 1 and 3 are worse than the surrounding areas, while Type 6 is much better. The regression results imply that non-conforming landscapes and environments may reduce the value of residential blocks; that is, landscape and environmental gaps have a negative external effect on urban environments. Therefore, it is necessary to promote holistic urban planning and design.

6.3 Appropriate levels of property management fees

The variable of environmental management type was used with the hedonic regression model instead of the absolute quality of environments because the latter is constrained by property management fees. This strategy was proven to be correct by the regression results. In fact, the marginal price of residential blocks of environmental management type 6, where the environmental quality is the best and the property management fee is the highest, was 507RMB/m^2 lower than the average level.
A satisfactory residential block should not only have effective environmental management; its level of property management fees should also be reasonable. As shown in Table 3, the property management fees in residential blocks with environmental management types 2, 4, and 5 (where the benefits are higher than the average level) are 1.44 RMB/m^2, 2.38 RMB/m^2, and 1.95 RMB/m^2 per month, respectively. In the current market, it appears that the preferential level of property management fees should be 1.5-2.5 RMB/m^2 per month.

7. Conclusions

This chapter has explored the critical factors in the environmental management of urban residential areas and clarified the incentives related to urban environmental management policies. It was determined that planning and design, contextual fit, and property management are the most critical determinants of the environmental quality of residential blocks. The level of environmental management has a significant effect on housing prices, and their marginal prices have quantified the benefits brought by the improvement of environmental management.

Environmental management also involves many soft aspects which are crucial during the stages after planning and design. For existing residential areas, this point is extremely important. It suggests that it is possible to improve the values of properties by maintaining adequate levels of environmental management, thereby bringing substantial benefits to residents. In other words, environmental management provides an effective way to revitalize existing residential areas. It is therefore critically important to introduce new environmental management systems to save the older neighborhoods from dilapidation.

In the above analysis, we have also offered suggestions for promoting the contextual fit of urban areas through planning policies and guidelines for setting an appropriate standard of property management fees. Despite the fact that the study area is limited to Beijing, the main implications of this study should be applicable to many other similar urban areas, though the results of quantitative analysis may differ somewhat depending on the area.

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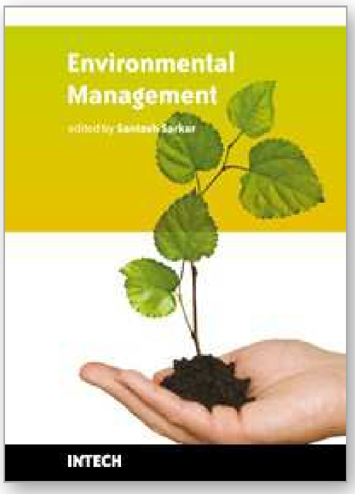

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There has been a steady increase in anthropogenic pressure over the past few years due to rapid industrialization, urbanization and population growth, causing frequent environmental hazards. Threats of global environmental change, such as climate change and sea level rise, will exacerbate such problems. Therefore, appropriate policies and measures are needed for management to address both local and global trends. The book 'Environmental Management' provides a comprehensive and authoritative account of sustainable environmental management of diverse ecotypes, from tropical to temperate. A variety of regional environmental issues with the respective remedial measures has been precisely illustrated. The book provides an excellent text which offers a versatile and in-depth account of management of wide perspectives, e.g. waste management, lake, coastal and water management, high mountain ecosystem as well as viticulture management. We hope that this publication will be a reference document to serve the needs of researchers of various disciplines, policy makers, planners and administrators as well as stakeholders to formulate strategies for sustainable management of emerging environmental issues.