Residents' Evaluation of Apartment Community Spaces with Longitudinal Approach

Tae Kyung Lee, Hye Gyoung Kang, and Jeong Tai Kim

Abstract—The purpose of this study is to investigate the evolution in the use and demands for community spaces of apartment complexes based on empirical resident assessment. To this end, four apartment complexes in Busan of South Korea were selected and their residents were each surveyed twice over 10 years. The first survey was conducted in 2001 and the second in 2011. The survey results were then compared to analyze use, satisfaction and demands with respect to community spaces. The analysis included frequency analysis and variance analysis aided by SPSS WIN 18. The results are followings. Firstly, some community spaces of apartments changed in their usage function. And problems arose in management and safety aspects, such as deterioration, breakdown and noise. Secondly, the use of community space in 2011was reported significantly lower than 2001. Lastly, residents desired greater access to exercise facilities and to green spaces to better enrich their lives. This study will serve as a basis for future design of sustainable community spaces in apartment complexes.

Index Terms—Change of use and need, community space, residents' evaluation, sustainable communities of apartment complex.

I. INTRODUCTION

Apartments were first introduced to Korea in the early 1960s to solve the housing shortage in urban areas. Since then, they have become the most common form of urban housing. An apartment complex is a form of residence that includes both private and public areas, simultaneously guaranteeing residents the privacy of their individual housing units and the comforts of their community lives.

A community space is defined as one which supports the public lives of the residents. These are areas where residents can build bonds with neighbors, develop their sense of belonging, and enjoy different activities and social interactions. In modern times, many people lack the opportunity for such activities. Thus community spaces are important in helping the resident community to unify and to improve its quality of life.

To date, Korea has focused on developing high-rise high-density apartments to maximize on economy of scale. These apartments have tended to overemphasize the development of housing units at the expense of barely meeting the minimum legal requirements for community spaces. As a result, many apartment complexes are poorly equipped with shared and outdoor spaces, and so struggle to meet residents' demands for leisure or social activities within the complex. This has become a hotly debated topic in the realm of housing development.

As quality of life has improved and public demands for a healthy living environment have grown, more people have become interested in the concept of a sustainable community, one which provides greater access to community spaces and greater development of community bonds.

Sustainable development has become a universal initiative in housing development after the publishing of *The Brundtland Report: Our Common Future* in 1987, and after the proclamation of the *Habitat Agenda* in 1996. Sustainable development is usually discussed in environmental, social and economic dimensions, which the topic of community space often being raised during discussions on social sustainability. Socially sustainable housing development is understood to be housing which includes public spaces where residents can develop bonds within the community to improve their social lives and overall quality of life. Community design creates sustainable living places which meet the basic needs of the residents and further enrich their lives.

Therefore, in order to maintain sustainable community designs of apartment complexes, it is critical to secure community spaces that meet the demands of residential life.

Previous studies have found that community spaces play a critical role in the improvement of residential housing satisfaction [1]-[3]. Providing public facilities and spaces within a community helps residents build bonds with their neighbors and affection for the neighborhood [4]-[6]. A wide range of efforts has been made on this front, including a study to investigate resident demands for community spaces [7]-[9], a concept study for sustainable community design [10]-[14], and a study exploring the creation of community spaces as a form of sustainable community design [15]-[18].

As such, previous studies have largely focused on the use of and demands for community spaces, and on the guidelines or frameworks for the design of community spaces. However, these studies have failed to address changes in the use of community spaces from a sustainable design perspective.

Thus, this study is designed to look at the evolution in the use and purpose of established community spaces in apartment complexes.

This study will serve as a basis for future design of sustainable community spaces in apartment complexes, particularly in the renovation of old and deteriorating complexes.

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II. THE PURPOSE AND METHODOLOGY OF STUDY

A. Purpose of Study

The purpose of this study is to investigate the use of and demands for community spaces of apartment complexes based on empirical resident assessment. To this end, four apartment complexes were selected and their residents were each surveyed twice over 10 years. The first survey was conducted in 2001 and the second in 2011. The survey results were then compared to analyze use, changes in use, satisfaction and demands with respect to community spaces.

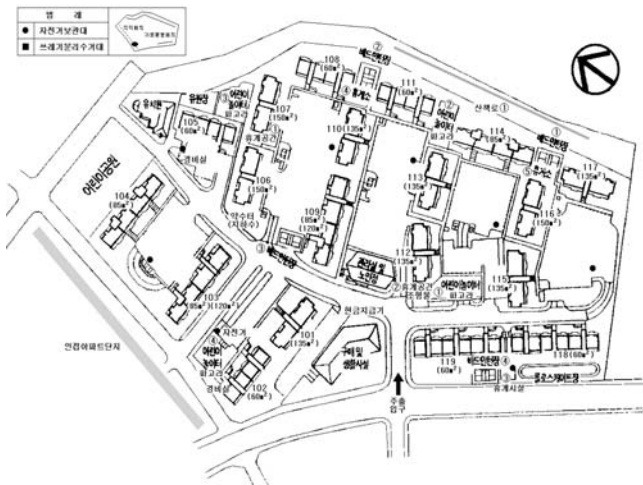Fig. 1. A Apartment building layout.

Fig. 2. B Apartment building layout.

B. Research Method

The 4 research subjects were apartment complexes located in Haeundae New Town, Busan of South korea. Factors considered for the selection included the total number of households, and the types and forms of community spaces provided in the complexes. Further field research and surveys followed. The former was conducted to understand how the community spaces were being used. The survey questionnaire included questions on resident demographics, satisfaction with and use of community spaces, and demands/desires for further community spaces (including demands for new facilities). Satisfaction, use and demands were measured on a 5-point scale: 5: very satisfied/very frequently used/highly needed, 4: satisfied/frequently used/needed, 3: moderately satisfied/moderately used/moderately needed, 2: dissatisfied/rarely used/hardly

needed, and 1: very dissatisfied/not used at all/not needed at all.

The survey was answered by residents of the 4 subject complexes, and was conducted once in 2001 and once again in 2011 (10 years apart). The first survey was conducted in August 2001, from which 521 questionnaires were used for analysis. The second survey was conducted in May 2011, from which 447 questionnaires were used for analysis.

The analysis included frequency analysis, crossover analysis, and variance analysis, aided by SPSS WIN 18.

III. OVERVIEW AND CHARACTERISTICS OF SUBJECTS

A. Characteristics of Subject Apartments

The subjects consisted of 4 apartment complexes located in Haeundae New Town, Busan of South Korea. Each complex began to accept residents after May 1996 and, at the time of research, accommodated 500 to 2,000 households. These complexes provided welfare facilities no smaller than the legally-required scale (see Table I, Fig.1- Fig.12).

The profile of the subject complexes is as follows: they began to accommodate residents sometime between March 1996 to October 1998, their building-to-land ratios are approximately 17.0%, their floor area ratios are between 250.0% and 260.0%, and they consist of high-rise high-density buildings of 20 stories or higher. The building arrangement patterns differ by complex, but are mostly in the crossply and/or courtyard arrangement as guided by urban planning policy.
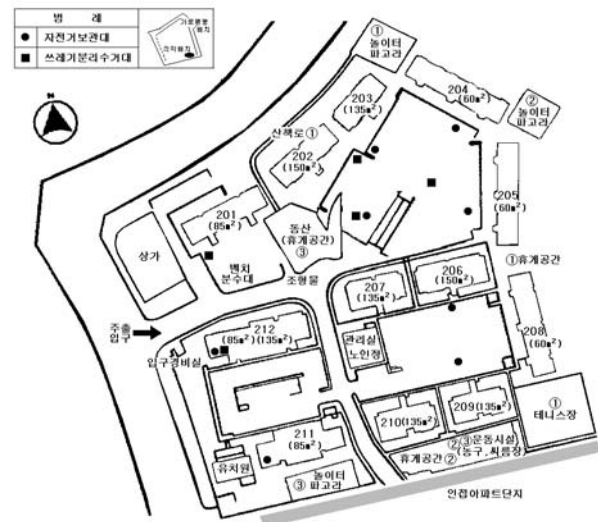

Fig. 3. C Apartment building layout.

TABLE I: THE CHARACTERISTICS OF RESPONDENTS

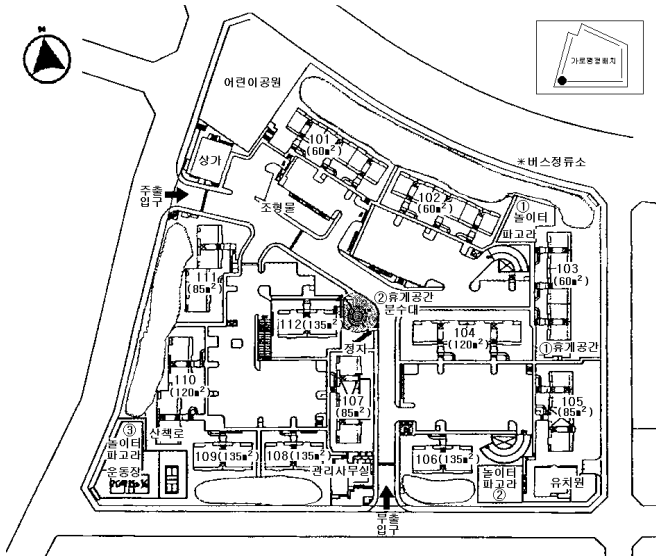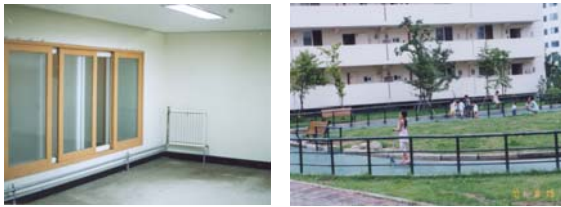| Items	Apartment A	Apartment B	Apartment C	Apartment D
Occupation	October, 1996.	October, 1996.	March, 1996.	October, 1998.
Number of Households	24 Buildings 24 Storeys 1852 Households	19 Buildings 24 Storeys 1358 Households	12 Buildings 23 Storeys 956 Households	12 Buildings 27 Storeys 1002 Households

Fig. 4. D Apartment building layout.

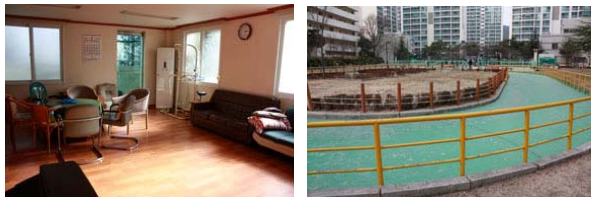Fig. 5. A Apartment in 2001(left: multipurpose room, right: outdoor exercise space).

Fig. 6. A Apartment in 2011(left: multipurpose room, right: outdoor exercise space).

Fig. 7. B Apartment in 2001(left: multipurpose room, right: playground).
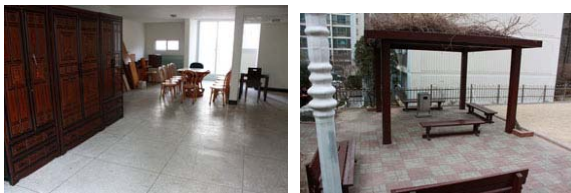

Fig. 8. B Apartment in 2011(left: multipurpose room, right: rest space).

Fig. 9. C Apartment in 2001(left: multipurpose room, right: rest space).

Fig. 10. C Apartment in 2011(left: multipurpose room, right: walkway).

Fig. 11. D Apartment in 2001(left: multipurpose space, right: outdoor exercise space).

Fig. 12. D Apartment in 2011(left: multipurpose space, right: outdoor exercise space).

B. Characteristics of Respondents

To understand the general demographics of the respondents, the survey included questions on age, educational background, job, family size, family lifecycle, monthly income, house size, home ownership, and resident period(Table II).

1) 1st-survey respondents

Based on the survey data gathered, wives were 39 years old on average with 58.7% in their 30s and 35.7% in their 40s, while husbands were 42 years old on average with 46.1% in their 40s and 43.8% in their 30s. Both wives and husbands were found to be highly educated: 96.1% of the wives were college graduates or higher, and 87.2% of husbands were college graduates or higher.

In terms of employment, 88.5% of wives were full-time housewives. 49.0% of the husbands were office workers, 22.5% were self-employed and 14.7% were professionals.

Family lifecycle was determined based on the age of the first child: 38.0% were elementary school aged, and 30.0% were middle or high school aged. As for the family size, 61.5% of the households comprised of 4 or more members. In terms of monthly income, 42.3% fell in the bracket of 2 million to 3 million won, and 31.6% in the bracket of less than 2 million. As for the house ownership and size, 77.6% owned the houses, and 41.3% lived in 85m^2-120m^2 apartments, followed by 50m^2-60m^2 (37.0%) and 135m^2 or greater (21.7%).

2) 2nd-survey respondents

Respondents of the second survey were found to be, on leverage, older than those of the first survey: wives were 46 years old on average with 39.4% in their 50s or older, 33.1%

in their 40s and 27.5% in their 30s, while husbands were 49 years old on average with 49.9% in their 50s or older, 31.3% in their 40s and 18.8% in their 30s.

They were also highly educated: 73.7% of the wives were college graduates or higher and 84.8% husbands were college graduates or higher.

In terms of jobs, 71.6% wives were full-time housewives, whereas 41.8% of the husbands were office workers, 22.6% were self-employed and 22.3% were professionals.

Again, family lifecycle was determined by the age of the first child: 44.1% were adults, 18.8% were middle or high school aged, 22.3% were infants/preschool aged (including newly-wed couples with no child) and 14.8% were elementary school aged. As for the family size, 58.9% of the households had 4 or more members. In terms of monthly income, 31.7% fell in the bracket of less than 3 million won, followed by 4 million or more 47.9% and 3 million to 4 million 20.4%.

As for the house ownership and size, 79.9% owned the houses, and 30.6% lived in 50m^2-60m^2 apartments, 35.8% in 85m^2-120m^2, and 33.6% in 135m^2 or greater.

TABLE II: THE CHARACTERISTICS OF RESPONDENTS

Item	Details	1st-Survey	2nd-Survey
Age of wives	30s or under	306(58.7)	123(27.5)
	40s	186(35.7)	148(33.1)
	50s or over	29(5.6)	176(39.4)
	Total	521(100.0)	447(100.0)
Education level of wives	College graduate or over	255(70.6)	309(73.7)
	High school graduate or under	106(29.4)	110(26.3)
	Total	361(100.0)	419(100.0)
Occupation of wives	Full-time housewife	461(88.5)	283(71.6)
	Employed	60(11.5)	112(28.4)
	Total	521(100.0)	395(100.0)
Age of husbands	30s or under	227(43.8)	84(18.8)
	40s	240(46.1)	140(31.3)
	50s or over	53(10.2)	223(49.9)
	Total	521(100.0)	447(100.0)
Education level of husbands	College graduate or over	402(87.2)	347(84.8)
	High school graduate or under	59(12.8)	62(15.2)
	Total	461(100.0)	409(100.0)
Occupation of husband's	Office worker	224(49.0)	161(41.8)
	Self-employed	103(22.5)	87(22.6)
	Production worker	37(8.1)	11(2.9)
	Professional	67(14.7)	86(22.3)
	Etc.	26(5.7)	40(10.4)
	Total	457(100.0)	385(100.0)
Size of family (person)	2 or under	28(5.8)	62(14.4)
	3	111(23.2)	115(26.7)
	4	293(61.2)	215(49.9)
	5 or over	47(9.8)	39(9.0)
	Total	479(100.0)	431(100.0)
Family life cycle	Pre-School	71(15.4)	96(22.3)
	Primary	175(38.0)	64(14.8)
	Secondary	138)30.0)	81(18.8)
	Adulthood	76(16.5)	190(44.1)
	Total	460(100.0)	431(100.0)
Average	Under 200	130(31.6)	-

	monthly income (ten thousand won)	201-300	174(42.3)	129(31.7)
		301-400	407(26.0)	83(20.4)
		400 and over	-	195(47.9)
		Total	411(100.0)	407(100.0)
	Housing size (area for exclusive use)	50㎡-60㎡	193(37.0)	137(30.6)
		85㎡-120㎡	215(41.3)	160(35.8)
		135㎡-160㎡	113(21.7)	150(33.6)
		Total	90(100.0)	447(100.0)
	Residence period in their apartments	2 years or under	118(24.0)	97(22.6)
		3-4 years	187(38.1)	112(26.1)
		5-6 years or more	186(37.9)	220(51.3)
		Total	491(100.0)	429(100.0)

IV. RESEARCH RESULT

A. Satisfaction with Community Space

The first survey found that residents were overall satisfied with the provided facilities, which included a children's playground, green spaces, walking/jogging paths, and garbage disposal facilities, etc. In the second survey, respondents were satisfied (with an average score of 3.0 or greater) with all the provided facilities but the community halls. When comparing the two survey results, significant differences were found in satisfaction with the children's playground, outdoor activity places, complex landmarks, green spaces, walking/jogging paths and garbage disposal facilities. The second survey revealed lower satisfaction with the children's playground and the garbage disposal facilities. This is attributable to deterioration in the aforementioned facilities, which thus failed to meet the evolving needs of the residents'. In contrast, green spaces and walking/jogging paths had been further developed and increased over time, thus delivering higher satisfaction in the second survey (Table III).

TABLE III: SATISFACTION WITH COMMUNITY SPACES

Items	1st-Survey	2nd-Survey	total	t- value
Meeting room	3.0(0.8)	2.9(0.7)	3.0(0.7)	1.6(n.s)
Elderly community center	3.0(0.7)	3.1(0.7)	3.0(0.7)	-1.6(n.s)
Daycare center	3.0(0.8)	3.0(0.6)	3.0(0.7)	0.1(n.s)
Children's playground	3.4(0.7)	3.1(0.6)	3.2(0.7)	6.3(***)
Outdoor exercise facilities	2.7(0.9)	3.0(0.7)	2.9(0.9)	-6.1(***)
Rest facilities	3.2(0.9)	3.2(0.6)	3.2(0.8)	-0.9(n.s)
Apartment's environmental sculpture	2.9(0.8)	3.2(0.8)	3.1(0.8)	-4.8(***)
Green space	3.2(0.8)	3.5(0.9)	3.4(0.9)	-4.7(***)
Walking/jogging paths	3.2(0.9)	3.4(0.8)	3.3(0.9)	-3.8(***)
Separate garbage collection facility	3.3(0.8)	3.2(0.8)	3.3(0.9)	3.5(**)

*** $p<.000$, **$p<.01$, n.s means no significant

B. Use of Community Space

Except for walking/jogging paths, all items discussed in the survey reported significantly lower usage in the second survey. In particular, senior centers, childcare facilities and outdoor activity areas which were highly utilized in the first survey, were found to be rarely utilized in the second. This may be because apartment complexes have failed to maintain such facilities or because more residents turned to local cultural centers to fulfill these needs.

Although the use of community spaces dramatically dropped, satisfaction was found to have increased in the second survey. This can be construed to mean that residents put greater value on community spaces and give positive evaluation for the fact that they have such facilities and spaces within the apartment complexes regardless of their utilization (Table IV).

TABLE IV: Use of Community Spaces

Items	1st-Survey	2nd-Survey	total	t- value
Meeting room	3.0(0.9)	1.7(1.0)	2.4(1.1)	19.4(***)
Elderly community center	4.4(0.9)	1.6(0.9)	3.0(1.7)	43.7(***)
Daycare center	4.0(1.1)	1.6(1.1)	2.9(1.6)	32.5(***)
Children's playground	3.2(1.1)	2.2(1.0)	2.7(1.1)	15.3(***)
Outdoor exercise facilities	3.9(1.0)	2.1(1.1)	3.0(1.4)	24.6(***)
Rest facilities	3.0(0.9)	2.3(1.0)	2.7(1.0)	10.6(***)
Apartment's environmental sculpture	3.3(0.8)	2.6(1.1)	3.0(1.0)	9.8(***)
Green space	2.9(0.8)	3.2(1.1)	3.0(1.0)	-5.4(***)
Walking/jogging paths	2.9(0.9)	2.8(1.2)	2.9(1.1)	1.4(n.s)
Separate garbage collection facility	2.3(0.9)	3.6(1.1)	2.9(1.2)	-18.6(***)

*** $p<.000$,   n.s means no significant

C. Demands for Community Spaces

In general, strong demands were found for more green spaces, walking/jogging paths, fitness facilities, indoor playgrounds, senior welfare facilities and garbage disposal facilities. This implies that residents desired greater access to exercise facilities and to green spaces to better enrich their lives. Demands for specific family members, such as children and senior citizens, were also prominent. In contrast, decreased demands were found only for guest rooms, business PC rooms, indoor/outdoor house-chore places and shared warehouses. Such functions may be no longer needed or may be housed by other facilities within the complex. Indeed, some of the facilities had already transformed into other functions.

Demands for most items increased in the second survey. This indicates that residents have a greater need for a more diverse range of facilities to improve quality of life. Thus, proactive measures should be taken to accommodate such changing demands (see Table V).

TABLE V: Needs of Community Spaces

Items	1st-Survey	2nd-Survey	total	t-value (sig.)
Apartment's sculpture	2.5(1.7)	3.2(0.9)	2.9(1.4)	-8.1 (***)
Square and minipark	2.7(1.6)	3.7(0.9)	3.2(1.4)	-11.9 (***)
Waterfront sace (pond, fountain etc.)	2.8(1.7)	3.6(0.9)	3.2(1.5)	-8.9 (***)
Rest facilities(bench, pergola)	2.9(1.8)	3.9(0.8)	3.4(1.5)	-11.1 (***)
Green space	3.0(1.8)	4.1(0.9)	3.5(1.5)	-12.8 (***)
Walkway	3.2(1.8)	4.1(0.9)	3.6(1.5)	-10.3 (***)
Club lounge(cafeteria)	2.8(1.2)	3.2(0.9)	3.0(1.1)	-5.7 (***)
Guest room	2.4(1.2)	2.7(1.0)	2.5(1.1)	-4.4 (***)
Business room(home office facilities)	2.5(1.2)	2.5(1.0)	2.5(1.1)	0.1 (n.s)
Multipurpose spaces (meeting, hobby)	3.2(1.2)	3.3(0.9)	3.2(1.1)	-2.1 (*)
Area for natural ecology learning	2.8(1.6)	3.4(1.0)	3.1(1.4)	-6.8 (***)
Fitness center	3.8(1.1)	3.8(0.9)	3.8(1.0)	-0.1 (n.s)
Outdoor exercise space	3.1(1.8)	3.7(0.9)	3.4(1.5)	-7.5 (***)
Outdoor children´s playground	2.8(1.7)	3.9(0.9)	3.3(1.5)	-12.5 (***)
Indoor children´s playground	3.4(1.2)	3.6(1.0)	3.5(1.1)	-1.7 (n.s)
Afterschool class	3.2(1.3)	3.4(0.9)	3.3(1.1)	-3.1 (**)
Youth welfare space	3.5(1.2)	3.4(0.9)	3.4(1.1)	1.6 (n.s)
Elderly welfare space	3.6(1.2)	3.7(0.9)	3.6(1.1)	-1.6 (n.s)
Indoor housework space	2.6(1.2)	3.2(1.1)	2.9(1.2)	-8.4 (***)
Outdoor housework space (large laundry etc.)	2.3(1.5)	3.1(1.0)	2.6(1.3)	-10.2 (***)
Warehouse (large stuff, seasonal stuff etc.)	2.6(1.3)	3.0(1.1)	2.8(1.2)	-5.1 (***)
Separate garbage collection space	3.6(1.3)	4.0(0.9)	3.7(1.1)	-5.3 (***)
Storage place for bicycle and stroller	3.1(1.8)	3.7(1.0)	3.4(1.5)	-7.5 (***)

*** $p<.000$, ** $p<.01$, * $p<.05$, n.s means no significant

V. Conclusion

This study is designed to develop greater understanding of changes in the use of and demands for apartment community

spaces. It thus intends to serve as a basis for future development of sustainable apartment complexes and suggests the following:

1) It is necessary to design community spaces that encourage resident participation and that accommodate evolving demands. Existing policy guidelines that focus only on the size of community facilities in accordance with the number of households should be modified so that apartment complexes must more flexibly develop community spaces to encompass resident needs and desires.

2) Measures should be developed to extend the scope of the community and to establish a network of unit communities, beyond a single siloed community for each apartment complex. As the survey results demonstrate, wider and greater demands are arising for community spaces. Given the limited land use within apartment complexes, this study recommends the development of a single community center shared amongst 3-4 neighboring apartment complexes.

3) It is also important to secure a specialized workforce which designs, operates and manages community spaces for healthy and sustainable apartment communities.

This study is based on the Korean apartment development and housing culture, but it should be noted that each country may have different understandings of community design for residents. This study is significance in that it proposed a direction to design community spaces for sustainable apartment communities by analyzing the constant and changing characteristics of community spaces.

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