

JUER HUTONG NEW COURTYARD HOUSING IN BEIJING A REVIEW FROM THE RESIDENTS' PERSPECTIVE

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Abstract

Set within the theoretical framework of cultural sustainability, this in-depth case study examines the Juer Hutong new courtyard housing prototype built in the inner city of Beijing, China, whose phase one was completed in 1990 and phase two in 1994. Juer Hutong (Chrysanthemum Lane) is located in the area of the celebrated Nanluogu Xiang (Gong and Drum Lane South), in proximity to the historic Drum and Bell Towers. It was a typically decayed traditional courtyard house neighborhood that urgently needed remodeling. After a decade of research and design led by Professor Wu Liangyong, and a group of students at the School of Architecture of Tsinghua/ Qinghua University, phase one of the project has won six awards, including the 1992 World Habitat Award. However, its proposed phases three and four were suspended from construction. This study elucidates the residents' views of the completed two phases and offers four lessons and two new courtyard garden house design models for discussion and future practice.

Keywords: *Courtyard housing; cultural sustainability; architectural culture; Juer Hutong; Beijing; China*

FOUR PILLARS OF SUSTAINABLE DEVELOPMENT

Scholars admit that sustainable development consists of four pillars: environmental responsibility, economic viability, social equity, and cultural vitality. The root of the word 'sustainability' is from the Latin *sustinere* (*tenere*, to hold; *sus*, up). Dictionaries provide more than 10 meanings for 'sustain,' the main ones being to 'maintain,' 'support,' or 'endure' (Dictionary.com, 2016; Onions, 1964, 2095).

Since the 1980s, sustainability has been used more in the sense of human sustainability on planet earth, resulting in the most widely quoted definition of sustainable development, that of the Brundtland report *Our Common Future* (1987) published by the United Nations World Commission on Environment and Development: "sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 8). Since then, the concept has evolved and was presented in the Rio Declaration on Environment and Development, also known as the Rio Earth Summit (UNCED, 1992), that states, "the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" (UNCED, 1992, article 3).

However, the U.N. definition is not universally accepted and has undergone various interpretations (EurActiv, 2004; International Institute for Sustainable Development, 2016; Kates, Parris, and Leiserowitz, 2005). The 2005 World Summit acknowledges that sustainability requires the reconciliation of environmental, social, and economic demands known as the 'three pillars': environmental responsibility, economic viability, and social equity (Bell, 2003; OECD, 2001; United Nations General Assembly, 2005). The United Cities and Local Governments (2006a, 2006b, 2006c, 2006d, 2009, 2010) share the view that culture is the fourth pillar of sustainable development, a notion popularized by Jon Hawkes' book *The Fourth Pillar of Sustainability*:

Culture's Essential Role in Public Planning (2001) to square the sustainability triangle. Sustainability has now been commonly recognized as having four pillars, including cultural vitality.

Writers, such as Darlow (1996) and Wheelwright (2000), have observed that sustainable development is largely a cultural task since it seeks a change in attitudes and lifestyles. Judy Spokes, the executive officer of Cultural Development Networks, asserts that “culture is both overarching and underpinning” (Hawkes, 2001, 3). As such, Brand (2005, 76-81) and Nurse (2006, 36-38) argue that culture should be placed at the front and center of the sustainability framework and fully incorporated into the other three pillars because it is a basis for questioning the implication and practice of sustainable development at its heart. Creative City Network of Canada (2005, 1) likewise contends that “culture is a core dimension of vibrant and sustainable communities” because the character of a place is inseparable from its traditions and culture as they are lived and expressed in the activities and social life of the community; this quality of a city is one of its most salient features for making it a desirable place to live, work, study, or visit.

COURTYARD HOUSING CONTRIBUTING TO CULTURAL SUSTAINABILITY

Cultural sustainability is the theoretical framework of the study because it considers architecture as a cultural artifact and evaluates both archi-cultural and socio-cultural aspects of courtyard housing in China. This study defines cultural sustainability as the adaptation and transmission of the beneficial parts in a nation's material (tangible) and immaterial/ spiritual (intangible) culture that are conducive to the development of their present and future generations. It encompasses such notions as cultural vitality, cultural diversity, and cultural activities (Zhang, 2013, 17, 31).

The Chinese have lived in the courtyard type of houses for several thousand years. The earliest courtyard house unearthed by archeologists so far was built during the Middle Neolithic period, represented by the Yangshao culture (5,000-3,000 BCE) (Liu, 2002). The ancient Chinese favored this housing form because enclosing walls helped maximize household privacy and protection from wind, noise, dust, and other threats; and the courtyard offered light, air, and views, as well as acting as a family activity space when weather permitted. A traditional Chinese courtyard house would normally host an extended family of three or four generations (Knapp, 2005; Ma, 1999; Zhang, 2013, 2015a).

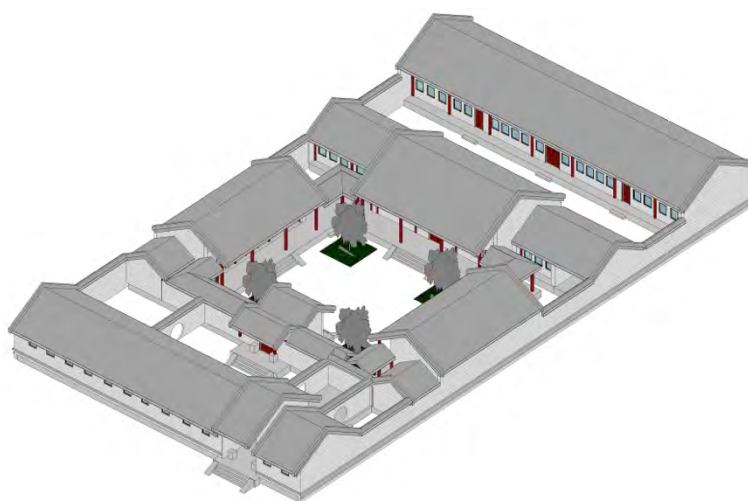


Figure 1. A typical Beijing *siheyuan* traditionally housed an extend family (Source: Author).

Classical courtyard houses of Beijing, known in Mandarin as *siheyuan* (Figure 1), had been the City's primary architectural form since the antiquity, because this housing form is in harmony with Chinese philosophy and cosmology (Chan and Xiong, 2007; Knapp, 2005; Ma, 1999; Xu, 1998; Zhang, 2011, 2013, 2015a, and 2015c). However, due to manifold factors, *siheyuan* have undergone gradual decay and massive demolition in the 1990s. To preserve this cultural heritage, the Beijing municipal government experimented with *two* new courtyard housing projects in the inner city. One was constructed at Juer Hutong (菊儿胡同 "Chrysanthemum Lane"), and the other at Nanchizi (南池子 "South Pond") (Zhang, 2013, *forthcoming*). This article documents the findings from Juer Hutong residents' lived experiences of the new courtyard housing, which may offer valuable discussions and lessons for future housing design and development.

The Juer Hutong new courtyard housing occupies a land area of 8.28 hectares (Wu, 1999, 114) in inner Beijing's Eastern District (Figures 2 and 3). It was a housing renewal experiment in a dilapidated traditional courtyard house neighborhood called *Nanluogu Xiang* ("Gong and Drum Lane South"). *Nanluogu Xiang* is a small lane near the Bell and Drum Towers recently evolved into a commercial street filled with exotic shops, bars, and restaurants (Figure 4), which have attracted foreigners working in Beijing to live nearby, to enjoy a lively night life (Davey, 2000).



Figure 2. Map of Beijing showing the case study location of Juer Hutong new courtyard housing (A3), in proximity to the Drum and Bell Towers of Beijing (Source: http://www.orangesmile.com/common/img_city_maps/beijing-map-4.jpg, 2015).



Figure 3. Map of the Juer Hutong community (Source: Author).



Figure 4. *Nanluogu Xiang* ("Gong and Drum Lane South") neighborhood gate (Source: Author).

Juer Hutong (438 m long and 6 m wide) intersects with *Nanluogu Xiang* to the east; it was formerly home to Ronglu, a governor during the Qing dynasty (1644-1911). It was a typically decayed area that urgently needed remodeling, with a terrain of 80-100 cm below the street level due to road reconstructions. The courtyards were filled with improvised extensions and two-third of the households could not receive sunlight. However, nearly 800 people lived there with an average floor space of only 7.8 sqm per person. There was one water tap in each courtyard, one sewer exit, and a public toilet 100 m away (Wu, 1991c).

Since 1978, Professor Wu Liangyong and his students at the Institute of Architectural and Urban Studies of Tsinghua/ Qinghua University spent a decade researching "organic renewal" for historic cities, and designed Juer Hutong new courtyard housing, or "quasi-courtyard housing" (Figure 5). Phase one (4 courtyards with 46 units) was completed in 1990 and phase two (11 courtyards with 164 units) in 1994. A flexible courtyard system was adopted to fit in between the houses in good condition and those whose owners were unwilling to participate in the project.

This prototype has ‘borrowed’ the composition principles of large mansions in Suzhou’s vernacular architecture and applied it to Beijing by having 2-3-4-storey walk-up apartments grouped along the horizontal and vertical circulation lines, with a series of courtyards developed from the south to north, and a row of courtyards from the east to west, forming a basic residential block to satisfy the demand of multi-household residence.

The integration of housing with the site is thus maintained due to the compatibility between the old and the new courtyard systems in the City (Figure 6), meanwhile, the old trees and the *Hutong* have also been preserved. The infrastructure and the physical living condition have been improved by providing each unit with privacy and spaces for utilities (kitchen, bathroom, balcony, and terrace) that did not exist in traditional courtyard houses, at the same time achieving a relatively high density and plot ratio (Table 1) (Wu, 1991a, 1991b, 1991c, 1991d, and 1999).

The Juer Hutong new courtyard housing was the first of its kind built on existing traditional courtyard houses site and was an official task supported by the Beijing municipal government at the time. Its phase one has won six awards, including the 1992 *World Habitat Award* (Wu, 1999). Phases three and four were designed but construction was suspended due to the rising land value, the loss of government subsidies, and the developer’s concern about a lack of profit.¹ The problem lies in funding issues beyond the scope of architecture (Chen Zhijie, Professor of Tsinghua/ Qinghua University, interview, 2007; Liu Wenjie, Project Manager, interview, 2008).

The Juer Hutong project was intended to have one-third (or 33 percent) returning residents to maintain the original community structure (Liu Wenjie, Project Manager, interview, 2008; Wu, 1991c, 1999). However, when its phase one was completed in 1990, only 25 percent of the original households could afford to return (Wu, 1999; Table 1), although the 2007 field survey finding indicated merely 10 percent (Chen Zhijie, Professor of Tsinghua/ Qinghua University and Resident at Juer Hutong, interview, 2007).



Figure 5. Aerial view of the Juer Hutong new courtyard housing (Source: Information Center, previously Resources Center, School of Architecture, Tsinghua/ Qinghua University).

¹ The Beijing municipal government requires that for a housing regeneration project, at least 1/3 of the original residents have to be re-accommodated on site, but this regulation will not be profitable enough for developers (Chen Zhijie, interview, 2007).

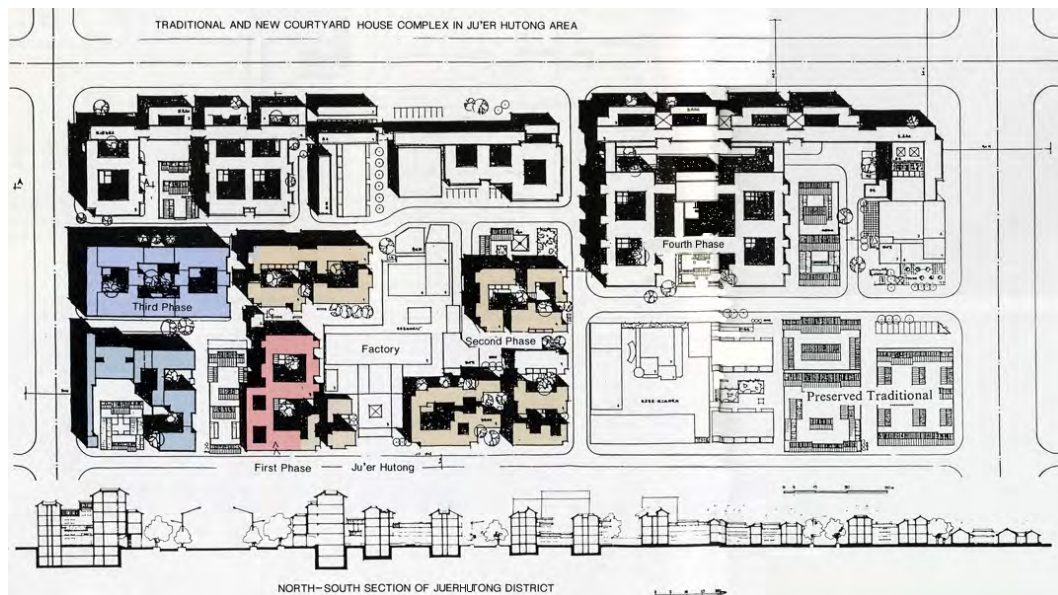


Figure 6. Plan of the Juer Hutong new courtyard housing four phases and preserved traditional courtyard houses (Source: Information Center, previously Resources Center, School of Architecture, Tsinghua University).

Table 1. Comparison of before and after Juer Hutong phases one and two experiments (Source: Calculations by the author based on Wu, 1999, 218-219).

	Before	After	Notes
Land use	11,450 sqm	11,450 sqm	
Floor area	6,785 sqm	15,543 sqm	
Floor-area ratio	0.56	1.53	
Number of floors	1	3.22	2.98 above ground
Number of households	245	210	
Average floor area per person	9.68	23.5	
Average floor area per household	26 sqm	69 sqm	
Population density (persons/ha)	590	573	Calculation includes road area
Plot ratio	1:2.73	1:1.32	
Return rate of original households		25% (61 households)	This number contradicts the author's 2007 field survey that it was 10%

METHODOLOGY

The Juer Hutong new courtyard housing prototype was the author's first case selection for her doctoral study (2006-2012) because her master's research (1994) investigated this case by conducting Heliodon² experiments using architectural simulation models at 1:500 scale, in a lab at Oxford Brookes University (Zhang, 2006, 2011). To obtain a better understanding of the project's human dimension, the author felt it necessary to obtain views from the residents because housing is ultimately built for the people, and the two studies findings may strengthen future courtyard housing design and development (Zhang, 2013).

This in-depth and detailed case study has applied 'combined strategies' (Groat and Wang, 2002) or a 'mixed method' (Creswell, 2002) where both qualitative and quantitative data collection and analysis have been carried out to explore the complexity of the issues and to acquire sensitivity about the context, process, and causations. The architectural culture study as a branch of social sciences and humanities may be enhanced by the implementation of a greater number of good case studies (Flyvbjerg, 2006). Moreover, the research took on the six approaches to vernacular architecture as outlined in Oliver (1997): architectural, historical, aesthetic, spatial, anthropological, and behavioral. Data collection included onsite surveys, interviews, observations, drawings, and photos, among others.

The fieldwork at Juer Hutong was conducted in November 2007. The author/ researcher was permitted to hand out and collect the surveys by the gate. This location enabled her to both observe activities in the courtyards and talk to passers-by for one whole week until all questionnaires were accounted for. Juer Hutong yielded 56 survey questionnaires (16 from foreign residents). The 37 respondents who provided contact information enabled the researcher to later carry out semi-structured interviews with 17 residents (four with foreign residents) by phone and via email in 2008; and two interviews with architects, one of whom was the Project Manager, Liu Wenjie,³ and the other, Wu Chen, son of Professor Wu Liangyong.

To put the interviewees at ease and encourage them to talk freely on sensitive issues, no tape-recording was used. Notes taken during telephone interviews were transcribed on the same day and translated into English by the researcher. On average, each telephone interview lasted about 28 minutes, with the longest spanning 60 minutes, and the shortest 5 minutes. The following three tables show the demographic composition, education levels, and occupations of the sample population (Tables 2-4).

Table 2. Composition of residents in the study area (Source: Author).

Residents Information		Beijing Juer Hutong New Courtyard Housing Residents (n=56)
Age (average)		43
Gender	Male	43%
	Female	50%
	Not known	7%
Marital status	Single	32%
	Married	45%
	Divorced/Widowed	13%
Years of residency (average)		8
Household size (average)		2.75

² Heliodon: A mechanical device, used in architecture, for demonstrating the sun's motion relative to a building (Science Fair Project Dictionary, 2005).

³ Liu Wenjie was a Master of Architecture student at Tsinghua/Qinghua University (1988-1991) when the Juer Hutong phase one experiment was implemented. He worked for the China National Real Estate Development Group Corporation at the time of the interview (2008).

Table 3. Education level of residents in the study area (Source: Author).

Education Level	Beijing Juer Hutong New Courtyard Housing Residents (n=56)
1. Primary School	5%
2. Junior Middle School	7%
3. Senior Middle School	7%
4. College Certificate	0%
5. College Diploma	14%
6. Associate Degree	16%
7. Bachelors Degree	32%
8. Masters Degree	14%
9. Doctoral Degree	0%

Table 4. Occupations of residents in the study area (Source: Author).

Occupation	Beijing Juer Hutong New Courtyard Housing Residents (n=56)
1. Legislators, senior officials and managers	4%
2. Professionals	21%
3. Technicians and associate professionals	14%
4. Clerks	5%
5. Service workers and shop and market sales workers	7%
6. Skilled agricultural and fishery workers	0%
7. Craft and related trades workers	2%
8. Plant and machine operators and assemblers	13%
9. Elementary occupations (e.g., street vendors, domestic helpers, cleaners and launderers, building caretakers, window and related cleaners, messengers, porters, doorkeepers, garbage collectors, etc)	0%
10. Armed forces	0%
11. Other	30%

The following sections discuss findings of the study in relation to several key areas of concern: form and environmental quality, space and construction quality, social cohesion, and cultural activities.

FORM AND ENVIRONMENTAL QUALITY

The Juer Hutong new courtyard housing was designed so that the new insertion would take into account the old scale of the city to create harmony between the two. For its exterior colors, the designers used colors common in southern China: white walls, black-tiled roofs, and light-brown gables to symbolize wood. Although traditional wall colors in Beijing are grey and red, grey would seem depressing in the small housing while red would look too strong. Hence, the designers chose white as a neutral and bright color for the exterior concrete walls (Liu Wenjie, Project Manager, interview, 2008).

The new courtyard housing design has incorporated the gradual privacy from semi-public (alleys, paths, and courtyards) (Figure 7) to semi-private (stairwells and corridors) (Figure 8) to private (apartments) (Figure 9) that offers territorial surveillance if trespassers enter the semi-public space (Liu Wenjie, Project Manager, interview, 2008).

When asked “how does the form (such as exterior appearance, gate location, sunlight, ventilation, roof design, etc.) of the new courtyard housing help or hinder your daily/ cultural activities?”, three of 17 interviewed residents commented positively that the new courtyard form is good, irregular, and attractive; they also found the structure nice, staggered, intricate, and unique. Since not all the original residents moved away at once, the design was carried out piecemeal, resulting in such “staggered and intricate” shapes. One resident praises the design:

The exterior appearance is good. As a first group of original residents, I was deeply attracted by its Minzhou cultural characteristics exhibited: white walls and black-tiled roofs... Juer Hutong new courtyard housing represents a unique architectural model by combining historic Beijing hutong and siheyuan culture with southern Chinese vernacular architecture. It has straddled local cultural traditions to maintain Chinese cultural roots.

The new, classical-style street lighting is also assessed by a resident:

The newly installed street lamps look classical and more elegant than the old ones, but they are too low – about 2 m high that can easily be vandalized by children, which has happened before. It may take a long time for the City to come to replace a bulb if that happens.



Figure 7. Juer Hutong new courtyard (Source: Author).



Figure 8. Shared stairwell in a Juer Hutong new courtyard decorated with traditional red lanterns (Source: Author).

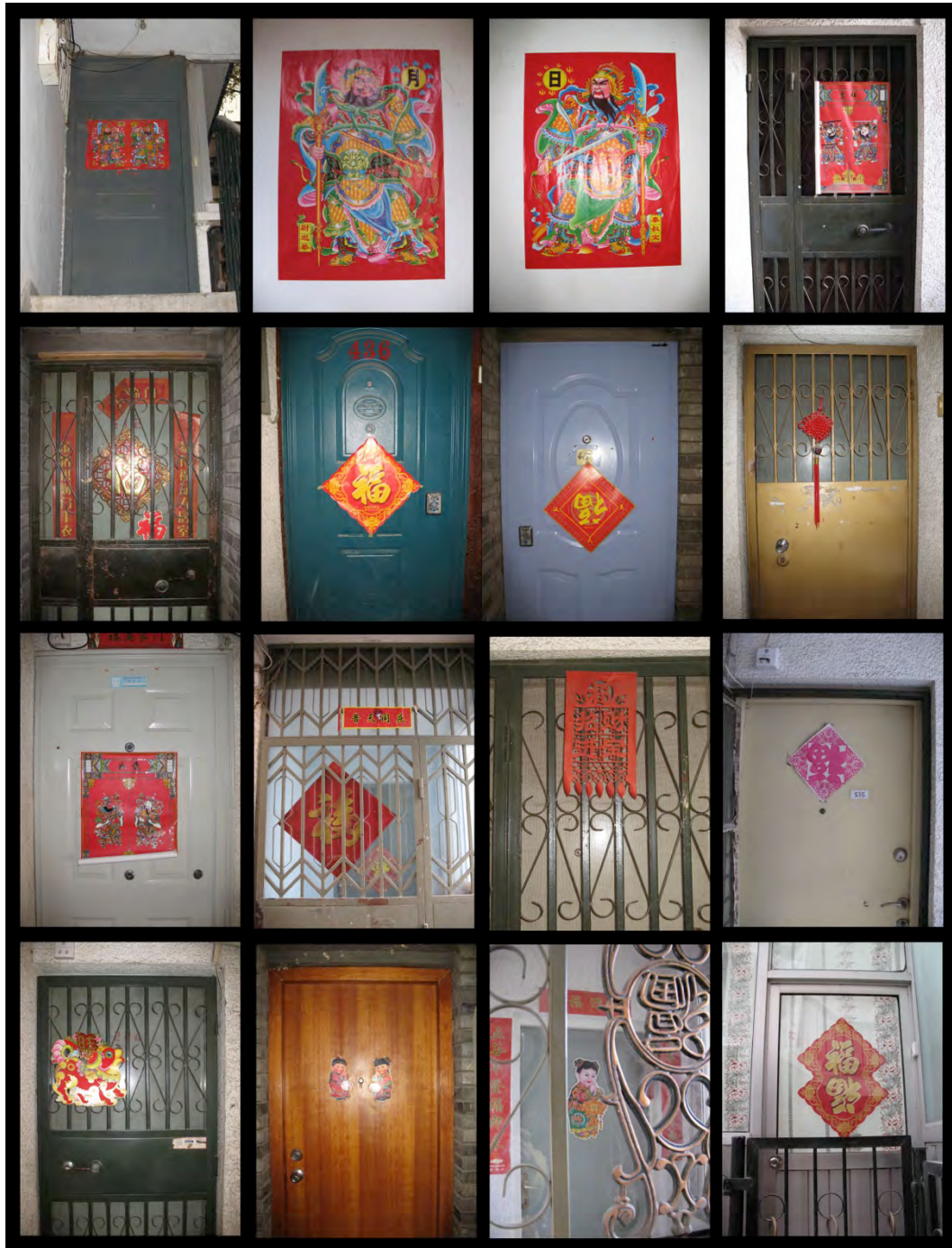


Figure 9. Apartment doors decorated with 福 ("good fortune") or its inverted form, door gods, or paired lucky dolls, Juer Hutong new courtyard housing (Source: Author)

The other 14 (of 17) interviewed residents did not comment on the exterior appearance, but have addressed other issues related to the form (gate location, sunlight, ventilation, roof design, etc.) via an open-ended question. During the week of handing out and collecting survey questionnaires, the author observed four groups of visitors taking great interest in the exterior appearance of the housing; one said that Juer Hutong was listed in her Guidebook as an attraction site of Beijing.

However, five of 17 interviewed residents frowned on the new courtyards' numerous passageways that result in much wasted spaces and lost household belongings, with bicycles in particular, when all the doors are unlocked. Although there is a second gate, it cannot be locked because foreign residents tend to come home after midnight, and some with visitors. A resident argued that while the courtyard should be accessible in all directions, some doorways were deliberately sealed up by residents and did not function as gateways. This result complies with the survey conducted by Tsinghua/ Qinghua University in 1992 that 89 percent (n=31) of its participants found it necessary to lock the courtyard gate at night (Wu, 1999, 169).

Two of 17 interviewed residents were satisfied with their windows on all four sides (east, west, south, and north) providing plenty of light, all of which could be opened to give full ventilation. However, three residents mentioned that only rooms directly next to the courtyard have good natural air circulation while other rooms do not ventilate well. Some units receive sunlight only after 3 pm and the windows on the setbacks of the façade have poor sunlight (Figure 7). Residents also complained that 2nd-floor balconies block sunlight to windows on the 1st/ ground/ main floor. The north-facing balconies are unsuitable for Beijing's climate. The units without balconies are inconvenient for the residents.

One resident revealed that although his apartment faces south, it does not get much sunlight; while design regulations require that sunlight should reach 1.5 hours on Winter Solstice (December 21-22), the apartment has clearly not met this criterion. Five residents also complained that the 1st and 2nd floors have poor sunlight, especially for north-facing windows on the 1st floor, due to a close distance between the buildings. Many windows have also installed security grills that resulted in further reduced sunlight. Two residents pointed out that the units in the east and west wings are not as enjoyable as those in the south and north wings because west-facing windows bring in hot air in the summer and cold air in the winter, with their observations similar to common speculations in China and *Feng Shui* ("Wind and Water") theory.

The new courtyards have varied sizes. Phase one has built a pair of larger courtyards of 13 m × 15 m, each shared by about 15 families in 3-storey apartment buildings (Figure 10), and a pair of side yards (*kua yuan*) of 6.5 m × 7.5 m, each shared by about 4 families in 2-storey apartment buildings. Two of 17 interviewed residents commented favorably that the new courtyard is good, easy to access, and fresh and green in the summer with many plants. The new courtyard is larger than a traditional one, but also intimately hidden and reserved only for the residents. The children can freely run around and play there, as if on the street, but without the dangers of traffic, cars, and strangers who may harm them.

However, three of 17 interviewed residents criticized the larger courtyards for being too small, and the (11 m) distance between buildings in phase two for being too close. As one resident describes:

Our private courtyard is about 4-5 sqm with a tree in it, but it fences off sunlight. As the courtyard faces east, sunlight time is very short in the winter, and is only suitable for growing plants that do not need much sun, such as ivy, but overall, the sunlight is insufficient.

This finding conforms to Zhang's (1994) Heliodon experiments on Juer Hutong simulation models, as well as that of Liang and Zong (2005). Professor Wu Liangyong (1999, 124) explained that to raise the floor-area ratio, the courtyard size had to be reduced to result in a far from ideal form. Thus, density and plot ratio have negatively impacted on the courtyard design.

To achieve the same amount of sunlight as in a classical Beijing *siheyuan*, the ratio of building height to courtyard width must be at least 1:3 (Zhang, 1994, 2006, 2011, and 2013). This would mean a minimum courtyard width of 18 m if the surrounding buildings are 6 m high. The Juer Hutong project clearly did not meet this criterion and residents could not make adequate use of the small courtyards provided.

One of 17 interviewed residents revealed that her roof terrace has leaked in the rain for over 10 years, but it cannot be fixed because it is a design flaw. Another resident said that her roof is only

pitched on one side, with a big, deep hollow like a swimming pool, although aesthetic but impractical, as a few tree leaves can block the drainage when it rains. Moreover, all the rooms on the roof level are hot in the summer.

Two residents have enclosed their private yards, balconies, and roof terraces to increase living space (Figure 11). A Residents Committee member recalled that when Professor Wu Liangyong regularly visited Juer Hutong a few years ago, he was disappointed by the balcony enclosures, building extensions, and so on, because these additions have altered the original design and made the housing look disorderly.



Figure 10. A new courtyard at Juer Hutong (Source: Author).



Figure 11. Although the roof-level enclosure adds interior space, it creates visual disorder, Juer Hutong new courtyard housing (Source: Author).

SPACE AND CONSTRUCTION QUALITY

The Juer Hutong new courtyard housing spatial design complied with China's Building Standards in the late 1980s, so the apartments in phase one are generally small, ranging from 40-60 sqm, the biggest unit is 120 sqm in phase two, with more than half at 80-90 sqm. The concept of "hall" (*ting*) was a "cross hall" (*guo ting*) at the time, but not the "living room" (*ke ting*) as commonly understood today (Liu Wenjie, Project Manager, interview, 2008).

When asked "how does the space (interior and exterior) of the new courtyard housing help or hinder your daily/ cultural activities?", three of 17 interviewed residents observed that some units spatial design is irrational since each unit has a different layout except those in the north and south corners. Five residents noted that the units of 40-60 sqm are too small with 5-6 doors leading to the hall (Figures 12 and 13), but no living room in some units, making it difficult to arrange furniture.

The bedrooms are tiny, since one has to sit on the bed as soon as entering the room. The 2-sqm kitchen is too small for a fridge and the 2-sqm bathroom is too cramped for taking a shower or installing a washing machine (4/17 respondents). Rooms facing the small side yards (*kua yuan*) are shaded all year round, humid, and uncomfortable (3/17).

Nevertheless, the Juer Hutong new courtyard housing did fulfill residents' basic living requirements at the time, although it may no longer suffice. Current living requirement in inner Beijing is that each unit must be 100-180 sqm, which far exceeds the standards back then (Liu Wenjie, Project Manager, interview, 2008; Wu Chen, Architect, son of Professor Wu Liangyong, interview, 2008).

The survey results showed that most Juer Hutong residents preferred to live on the 4th floor (71 percent; n=56), followed by the 3rd floor (43 percent), 2nd floor (29 percent), and 1st floor (21 percent). This finding contradicts the author's three-case study in inner Beijing that residents mainly preferred the 1st (53 percent; n=167) and 2nd (24 percent) floors, and had less preference for the 3rd floor (16 percent); beyond that level, their preference radically dropped (3 percent) (Zhang, 2013, 219). This discrepancy is likely because the close building distances at Juer Hutong have resulted in "the lower the floors, the poorer the sunlight".

The 2.5m-high ceiling at Juer Hutong creates a feeling of constraint while 2.8m- to 3m-high would have been better (4/17 respondents). The floor is too thin as even a tiny pin drop on the 2nd floor can be heard on the 1st floor. Such noise affects residents' health, especially those with heart disease. Some duplex apartments on the 3rd and 4th floors have staircases located right in the middle of the hallway, causing both a waste of space and awkwardness for arranging furniture. The stairs are steep, which can be dangerous for both children and the elderly. Besides, the duplex apartment bedrooms are upstairs without a bathroom, which is inconvenient at night (4/17).

The basic facilities at Juer Hutong new courtyard housing are either crude or missing. Unaesthetic and unsafe pipes are exposed in each unit. Although hot water comes from underground, four of 17 interviewed residents complained that their heating system is neither functional nor repairable due to a backwater design flaw. The rooms can get frigid in the winter, especially the north-facing ones.

Moreover, there is no space for installing an energy-efficient solar heater (2/17 respondents). Due to their narrow diameters, the 1st-floor kitchen and bathroom pipes often get blocked, with backed-up sewage and annoying sounds of water running in the pipes (3/17). With no gas pipes installed in these buildings, residents have to refill gas tanks on a regular basis.

One of 17 interviewed residents noted cracks on the exterior walls that cause the interiors to be cold in the winter. Some units also have poor soundproofing. A resident complained that they could hear almost everything the next-door neighbor is up to. While weak sound barriers compromise music practices, mobile/ cell phone signals can be undetectable. Liang and Zong

(2005) also found that Juer Hutong's substandard construction quality has rendered it to rapid decline.

The property management and maintenance is inadequate. Although the Residents Committee assumes some of its maintenance jobs, it is far from enough. As Juer Hutong was redeveloped at the time (1989) when there was no such thing as "property management" or "maintenance fees", it was not a problem then. Right after completion, homeowners paid a property fund deposited to a bank account. However, this fund is prohibited from withdrawals because there are no official property management services. In the beginning, the cost for repairing leaking roofs came from the maintenance fund, but as many other shortfalls such as the garage being occupied by private individuals, are overlooked, the property management exists only nominally, with neither maintenance fees collection nor services for residents.



Figure 12. One side of a hall with two doors leading to it, Juer Hutong new courtyard housing (Source: Author).

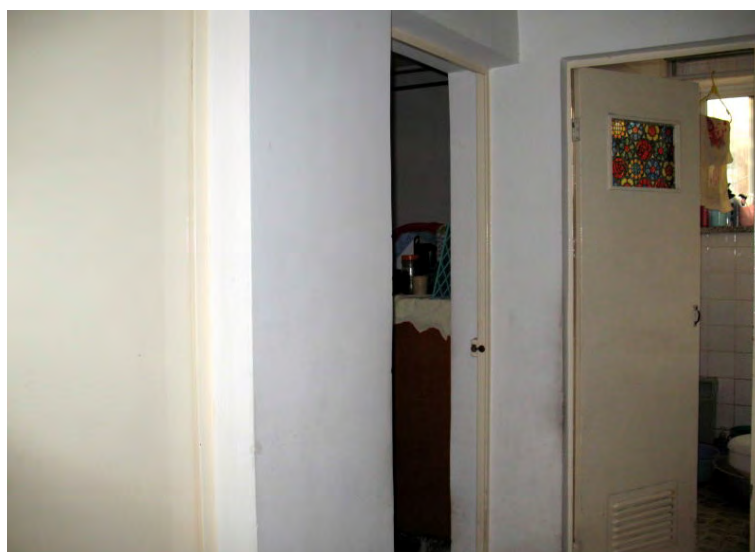


Figure 13. The other side of the hall with three doors leading to it, Juer Hutong new courtyard housing (Source: Author).

However, if all the residents at Juer Hutong were asked again to submit maintenance fees, they would undoubtedly be unwilling to pay, rendering it difficult for the Residents Committee to collect. The only service available is from the Environmental Protection Group that employs ground sweepers and garbage collectors each day. Meanwhile, the Residents Committee is planning to establish a “Homeowners Association” to solve some public maintenance issues (Chair of Residents Committee, interview, 2008).

Due to a lack of maintenance and management, three of 17 interviewed residents complained that the courtyards have lost their functions. For over 10 years, nobody has taken care of the courtyards; although the trees still stand, nobody maintains them. At one time, there were plants, flowers, and grass in the courtyards, but they all died because no one watered them. Later, grass in the courtyards was replaced with patio stones. This finding is consistent with that of Liu Wenjie (1992). However, Architect Wu Chen contended that the architect should not be blamed for poor property management because it is not a design issue.

Parking design at Juer Hutong was restricted by China’s economic conditions in the late 1980s because there were few private cars and no parking design standards at the time. The designers did not anticipate such a rapid development of ownership of private cars in China (Liu Wenjie, Project Manager, interview, 2008). From the residents’ perspective, the shortage of parking spaces at Juer Hutong has affected the housing’s overall function.

As the local government sublets the basement to non-residents, they nightly park their tricycles used for collecting recyclable materials or garbage in the *Hutong*, making it look messy and untidy. This finding conforms to that of Liang and Zong (2005). When cars run on both sides of the *Hutong*, walking becomes dangerous for the elderly who are left with no courtyard for sitting or walking, especially when an increasing number of cars in the area was seen in 2005-2007 (5/17 respondents). One resident in Courtyard A (*Jia Yuan*) cynically commented: “fortunately the courtyard gate is narrow or cars would drive in.”

As some patio stones outside the courtyard gate are tilted under the weight of cars (Figure 14), some elderly people have tripped and fallen a few times. At the time of the survey (2007), the road of Juer Hutong was being reconstructed, but gas pipes were still uninstalled. Whenever the City installs new service pipes, the *Hutong* grade level is raised higher than the courtyard level (Figure 15), forcing rainwater to flow back into the courtyards, which is slippery for residents to walk on (Residents Committee members, interview, 2007).



Figure 14. Private cars parked at a gate of Juer Hutong new courtyard housing (Source: Author).



Figure 15. The road of Juer Hutong after reconstruction is higher than the courtyard level, forcing rainwater to flow back into the yards (Source: Author).

SOCIAL COHESION

The Juer Hutong new courtyard housing survey results indicate that 57 percent (n=56) of the respondents are homeowners who still live there. The Heating Supply Manager affirmed that there are 207 units, of which 40 belong to three organizations; 80-90 (43 percent) are rented out. Two residents revealed that due to socio-economic differences, only old neighbors socialize with one another, but rarely with new neighbors in the courtyards. Professor Chen Zhijie of Tsinghua/ Qinghua University who lives at Juer Hutong observed that personality affects social relations. He says:

My apartment has an enclosed private courtyard with no interaction with other neighbors. There is no difference with other apartment buildings. Neighbors whom we did not know are still strangers; we only have contacts with old neighbors. This has much more to do with personality than whether the stairwell is enclosed or not.

Nonetheless, the survey shows that the presence of the courtyard facilitates social interaction. In answering the question, "which space helps your relationship with other families in the courtyard housing?", 70 percent (n=56) of the respondents chose "courtyard" followed by "public corridor" (23 percent).

During subsequent interviews, three of 17 interviewed residents reported favorably that their communal courtyards increase neighbors' likelihood of personal encounters, and that their homes cultivate social relations more than other housing forms. They also found that their collective home gives a sense of "traditional courtyard house", and that the neighbors have better chances to meet as soon as they come out to chat in the courtyards, especially in the summer when they can sit and enjoy the cool air. The neighbors may help each other when in need, while their apartments can offer them privacy. With a full sense of "human touch", the neighborly relations are perceived to be harmonious (7/17 respondents).

This finding confirms that of Tsinghua/ Qinghua University in 1992 that 60 percent of 31 households said that they knew their neighbors primarily through encountering them in the courtyards and that they enjoyed stronger social relations around two larger courtyards than do residents with two small courtyards in the phase one experiment (Wu, 1999, 169-170). However, Tsinghua/ Qinghua University researchers interviewed five residents 15 years later and found that nearly all the original residents had sold or sublet their units to urban elites or foreigners. Gentrification has gradually occurred due to market pressure and transiency of residents. The

new courtyards seldom facilitate neighborly communications because of the changes in social structure and the insufficient sunlight in the small yards discourages residents to linger (Liang and Zong, 2005). Thus, courtyard size may impact on social relations.

Some residents use the bigger communal courtyards for holding parties at night or on weekends with music. An unpleasant incident occurred when a chef who worked for a hotel in Beijing invited a group of friends to a barbecue on his roof terrace. A neighbor reported the noise and smoke to the police, but the police let the cookout continue because the meat was already in the cooking process and it would have been a waste to throw it away. Since then, no one has barbecued on roof terraces because the smoke and flames disturb other residents. A resident stated that it is inappropriate to have social activities in residential courtyards because the noise infringes on other people's rest; neighbors have different schedules for retiring and rising, so respect, tolerance, and reciprocity are important qualities for maintaining harmonious social relationships in the communal courtyards.

Soon after Juer Hutong new courtyard housing phase one was occupied, the Residents Committee organized singing and entertaining activities in the communal courtyards. But no one leads these pastimes now, even if they may rehearse perfunctorily for such events as a singing contest for the 2008 Beijing Olympics, or other political activities. The only planned social activity for the elderly is a singing group every Wednesday afternoon in the public activity room at the Community Center. Two residents have proposed plenty of exercise equipment, a ground for ball games, a swimming pool, and other such facilities. Still, several residents managed to exercise at a district Sports Center where they found skating, yoga, and other fitness programs.

As Juer Hutong new courtyard housing phase one experiment won the 1992 *World Habitat Award*, many foreigners like to live there for its reputation, proximity to cultural streets (*Gulou Dong Dajie*, *Nanluogu Xiang*) and ancient relics (Bell and Drum Towers), and for learning local customs through Chinese neighbors. Thus, Juer Hutong is nicknamed "United Nations"; about 40 of 207 units (20 percent) were rented to foreigners, with 16 of them participating in the survey.

Several foreign residents commented that this new courtyard housing facilitates social interactions among neighbors more than a "modern" Western-style apartment building because of its form. The neighbors frequently come across each other in the courtyards, see one another on balconies or roof terraces, and subsequently make friends. Nevertheless, the courtyards do not have benches or chairs. An American resident observed:

The courtyard and stairwells are where social interactions happen as I frequently meet people there. If it is a weekend or an evening, people are often outside and occasionally chatty. On occasions, the courtyard structure has allowed me to have social gatherings larger than what my apartment can hold.

Thus, the new, communal courtyards appear to have positively supported social interaction and relations with foreign neighbors.

Whereas other Chinese residents seldom communicate with their foreign neighbors, except with those who can speak some Chinese, and where both groups will just say "hi" when seeing each other in the courtyard. When they need to pay bills, some foreign residents will ask their Chinese neighbors about maintenance issues in the absence of property management.

An Italian-French resident indicated that the new communal courtyard is not as conducive to social interaction as a traditional one because too many households are sharing it. He contends:

I don't think my courtyard is particularly designed for socialization. A good friend lives a few doors away in a traditional courtyard in Juer Hutong with only four families, and her interaction with neighbors is much better. I usually talk with only one lady who always collects garbage outside and is the "guard" of both the courtyard and Beijing's memory. But there are too many people and too many buildings within the new courtyard to facilitate any real social connections.

These comments suggest that high population density may have negatively impacted on the use of the new communal courtyards.

Many foreign residents enjoy night life in the area that their Chinese neighbors cannot get used to. For example, some foreign residents only come home at 2-3 o'clock at night. They wake up other residents when they climb the stairs as these buildings' public spaces have poor sound insulation.

Five of 17 interviewed residents stated that only foreign residents like to hold parties in the courtyards on weekends with mainly foreign guests, and that only Chinese residents who speak English or French well may be included. They light candles and play musical instruments that can be messy and noisy. An unpleasant incident occurred when a high-school student in a Chinese family was preparing for his term exams, but noise from a party was so loud that he could not concentrate on his studies and subsequently called the police. Although the party host apologized when the police came, the party resumed afterwards. Thus, mutual consideration and understanding is needed between Chinese and foreign neighbors.

In the eyes of some foreign residents, however, their Chinese neighbors are not very sociable because they rarely hold parties in the communal courtyards. In their view, communal courtyards are appropriate places for social activities. An American resident said, "My neighbors and I are cordial but not overly social. I have been invited once or twice to social events by them, both times by non-Chinese residents. My Chinese neighbors sometimes smile and say 'hi,' but rarely more." Thus, language barriers, differences in cultural backgrounds and lifestyles may affect the use of communal courtyards.

Four of 17 interviewed residents shared their positive experience of indoor-outdoor visual interaction in the communal courtyards. For example, a resident watched the children play shuttlecock or badminton in the courtyard and kept the door open all summer for fresh air and children's voices. Although each household is independent in their apartment, communal courtyards give neighbors visual connections so that they share a sense of belonging to the courtyard (3/17 respondents).

Another resident recounted that when her grandson was little, he played with five or six other children in the courtyard while some elderly people watched them either in the yard or through their windows at home. The children were noisy and would disturb other neighbors who wanted to rest. Now the children have grown up, they seldom play in the courtyard. Yet another resident revealed that some children use the courtyard for activities on weekends and some children from nearby neighborhoods will also play in the courtyard during summer vacations because their parents think it is the only open space available in the area that is safe, unlike the streets full of cars. However, these activities can also cause damage, such as once when children used the gate eaves as a basket ball net, they smashed them with the ball.

CULTURAL ACTIVITIES

Since 43 percent of the homeowners rented out their units, with renters mostly working or studying during the day, not many people, and certainly even fewer activities, are seen in the courtyards. The survey results further reveal that the residents' main focus at home is the television (55 percent; n=56), followed by the computer (48 percent), the dining table (25 percent), and lastly, their children (23 percent). This outcome discloses how modern technologies have changed lifestyles in Beijing today.

Six of 17 interviewed residents complained about a lack of public or recreational facilities, such as benches and seats, in the courtyards for cultural activities. If stone tables and stools were placed in the courtyards, elderly residents could sit, sip tea, or play games. Four of 17 interviewed residents also criticized that because their communal courtyards are small and cramped by erratically parked bicycles and amid hung laundry, they do not enjoy much sunshine in them and find it unpleasant to partake in any cultural activities. During the author's visit at 2-3

pm on a Thursday afternoon in September 2007, no one was using the courtyards except two to three elderly ladies sitting by a gate chatting and enjoying the sun.

A resident explained that his courtyard was originally 40 sqm where his family could raise fish in it. To solve the problem of small living space, he added a room in the courtyard, reducing it to 20 sqm, which can only be used for storing flowerpots, not for activities.

The provisions of balconies and roof terraces for upper-floor apartments have considerably reduced the pressure to use communal courtyards on the 1st/ ground/ main floor (Wu, 1999, 165-169). The residents indicated that the south-facing balconies receive such abundant sunshine that some balconies are equipped with an umbrella. Three of 17 interviewed residents mentioned that they often have breakfast and tea on their balconies in the summer; it is also a good place to read in summer days and evenings.

When asked “what traditional Chinese cultural festivals do you celebrate at home and how do you celebrate them?”, the most common survey answer is Spring Festival (or Chinese New Year: the first day of the first lunar month). A resident noted that more households let off firecrackers on their balconies in 2007-2008 than in the past. A Chinese resident recounted that once during Spring Festival, some foreign residents served a feast in the courtyard in very cold weather wearing thin clothes. They seemed to endure the cold well and like to join the festive atmosphere of the City.

Mid-Autumn Festival (or Moon Festival: the fifteenth day of the eighth lunar month) is the second most celebrated festival among the survey respondents. Twenty-one percent of the 17 interviewed residents spend the festival at home watching the full moon from their windows, while another 21 percent go boating in Beihai or Shichahai Lake District. Hardly anyone is in the courtyards that evening except several children at play. This interview result confirms the author’s observation on the Mid-Autumn Festival in 2007 (September 25) when two boys played in Courtyard A (*Jia Yuan*) from 6-7 pm (Figure 16), but no one sat in any of the courtyards.

An elderly resident noted that the new communal courtyards are unlike traditional extended-family courtyards where every family member would come out to enjoy the full moon. Another elderly resident revealed that he had just moved in 2 weeks previously with his family, and found that except for his two grandchildren who sometimes play in it, the communal courtyard is so strangely quiet during the day and even on the night of Mid-Autumn Festival. Thus, private ownership of a courtyard may enhance its usage for cultural festivities.

A resident who has lived at Juer Hutong new courtyard housing since its inception noted that no one holds a wedding ceremony in the courtyards, either. If a marriage occurred in the housing estate, the newlyweds would send wedding candies to neighbors after the ceremony. Thus, a traditional ceremony in the courtyard is almost a lost ritual, possibly because the courtyards are too small, and in most cases, not a private space anymore for intimate events as such.

As community/ city parks/ gardens are more usable than courtyards, the survey shows that they have become the most common sites for cultural activities (46 percent; n=56), followed by balcony/ roof terrace (27 percent). This finding is confirmed by the interviews. When asked where they partake in cultural activities, if not in courtyards, three of 17 interviewed residents walk or exercise regularly in Beihai and Jingshan parks in the morning where they can dance to music, an activity inappropriate in communal courtyards for fear of disturbing others.

Street gardens in Beijing are now important places for cultural activities as they are more public. On a Tuesday morning in early November 2007 and on the way to Juer Hutong from the Gulou (Drum Tower) subway station, the author observed two elderly men playing a game of chess on a wooden bench in the street garden along Beijing’s northern second ring road (Figure 17). On the way to the Andingmen (Peace Gate) subway station in the same evening, the author noted a group of (about 10) people singing old (perhaps 1950s’) songs and dancing together. On the Friday morning that week, the author saw a small group of elderly ladies chatting on wooden

stools in the street garden (Figure 18), while another group of elderly women practiced traditional dance (Figure 19).



Figure 16. Two boys playing in a communal courtyard on Mid-Autumn Festival, Juer Hutong new courtyard housing (Source: Author).



Figure 17. Two elderly men playing chess in a street garden near Juer Hutong new courtyard housing (Source: Author).



Figure 18. A small group of elderly ladies chatting in a street garden near Juer Hutong new courtyard housing (Source: Author).



Figure 19. A group of elderly women dancing in a street garden near Juer Hutong new courtyard housing (Source: Author).

FOUR LESSONS FROM THE REDEVELOPMENT

The research findings reveal that the Juer Hutong new courtyard-housing prototype is largely unsuccessful. During the author's fieldwork in Beijing in 2007, a professor of architecture at Tsinghua/ Qinghua University indicated that there had been talks about demolishing it and rebuilding a new one on site. The Nanchizi project, being the second of the two such experiments constructed in inner Beijing, is also mostly unsuccessful (Zhang, 2013, *forthcoming*).

Nevertheless, the two pioneering projects offer useful discussions for academics and valuable lessons for architects. The Juer Hutong case study results do not necessarily suggest that architectural conservation or regeneration is an inappropriate approach in another context nor that the courtyard concept is flawed. Generalization or summarization is often undesirable and incorrect with any case study (Flyvbjerg, 2006). Some difficulties are obviously related to China's political, economic, social, and constructional factors at the time, and the designers' inexperience with such undertakings, which have negatively impacted the courtyard housing forms and functions. Four lessons may be learned from the Juer Hutong redevelopment.

First, the courtyard form should maintain the original proportion as in classical Beijing *siheyuan*, as the smaller and much shaded new courtyards reduce their functions as meaningful outdoor spaces for residents' daily/ cultural activities.

Second, the interior space of new courtyard housing units should be designed with rational sizes and layouts, capable to accommodate residents' daily/ cultural activities, with their health and safety in mind.

Third, social interaction takes place more easily and often in communal courtyards than that in apartment buildings without a courtyard. If a communal courtyard is to be used for social gatherings/ parties, approvals should be obtained from the Community Center or Residents Committee.

Fourth, cultural activities and festivities can be conducted more freely in private courtyards and community/ city parks/ gardens than those in communal courtyards. Nevertheless, providing tables, stools, or benches in communal courtyards may encourage their usage for cultural activities/ festivities.

Since a house is a fairly permanent structure, once built, it cannot be changed easily to accommodate newer demands or higher standards. Therefore, housing designs should not be compromised for less than stable requirements in density, plot ratio, or floor-area ratio because while a population may fluctuate with time, a housing form may be less flexible. It is actually more environmental and economical to build for the long-term than to demolish and rebuild at a later time. Sustainability is thus viewed as more of a cultural task in changing our attitudes and approaches to rehabilitating old cities and planning new ones to enhance social and human development (Zhang, 2013, 2015c). The author has proposed two design models of new courtyard garden houses for ordinary citizens or middle-income families in Beijing or elsewhere, as illustrated in Figures 20-22.



Figure 20. Beijing new courtyard garden house compound based on a system of 60 m × 60 m standard block size, a communal courtyard of 26 m × 26 m shared by eight nuclear families, with each household enjoying a private garden at the back. Each housing unit measures 6 m × 10 m (total 180 sqm) with a semi-basement and 2 ½ storeys (Source: Design and cardboard model by the Author).

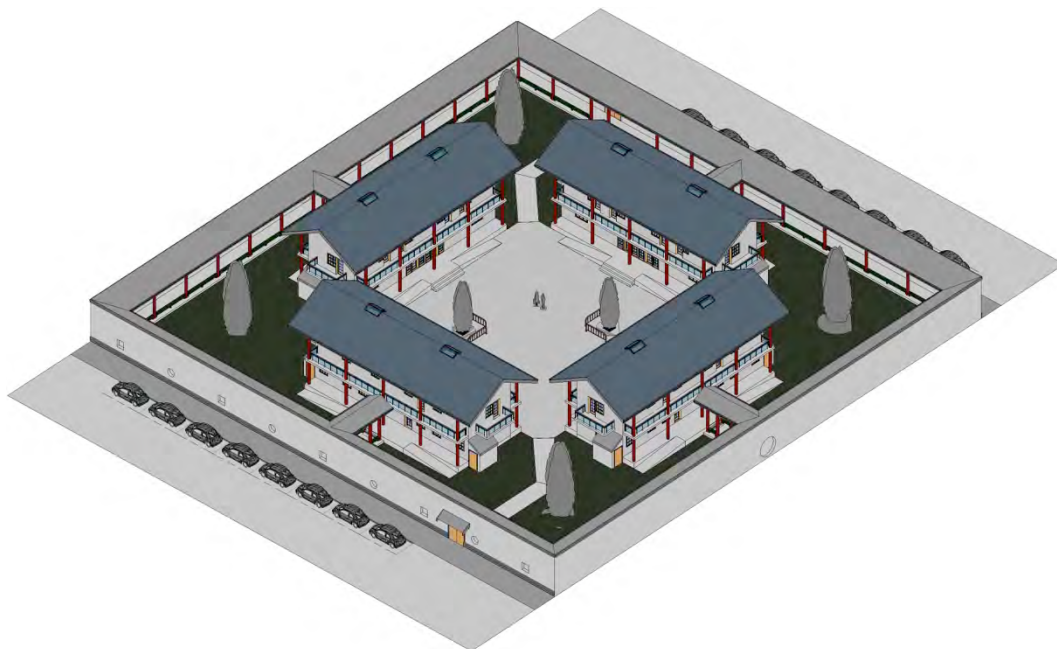


Figure 21. Beijing new courtyard garden house compound based on a system of 60 m × 60 m standard block size, a communal courtyard of 26 m × 26 m shared by eight nuclear families, with each household enjoying a private garden at the back. Each housing unit measures 6 m × 10 m (total 180 sqm) with a semi-basement and 2 ½ storeys (Source: Design and computer model by the Author).



Figure 22. Beijing new courtyard garden house compound based on a system of 78 m × 78 m standard block size, the communal courtyard is 26 m × 26 m shared by eight nuclear families, with each household enjoying a private garden of 12 m × 6 m at the front and the back. Each housing unit measures 10 m × 12 m (total 240 sqm) with a semi-basement (Source: Design and computer model by the Author).

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