How can existing ‘six-storey’ apartment buildings from circa 1980 - 1990 be redeveloped as a new mixed-use residential model in China?

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Research Question

How can existing ‘six-storey’ apartment buildings from circa 1980 - 1990 be redeveloped as a new mixed-use residential model in China?
Abstract

The housing industry sits in a significant position in both the Chinese economy and in national life.

Residents are leaving their six-storey apartments for high-rise apartments just as years ago they left courtyard houses and moved into six-storey apartments. These common residential buildings, which date from before the 1990s are faced with demolition across China just as years ago traditional houses disappeared. Contemporary Chinese architects are talking about the revival of Chinese culture, a culture that is based on family and homes. The house as such is a carrier of living history and culture.

The evidence now suggests that the internet does not isolate people from community, but may well enhance community. However, in a developing society, citizens living in the same community no longer know each other and seem even less likely to communicate with neighbours in the same block. It is the contemporary habitat that has lead to the loss of a traditional harmonious social life. These new Chinese residential superblocks with high-rise apartments are not replacing traditional living structures and creating closer neighbour relationships. Communal spaces of quality which fit contemporary communities are urgently needed.


This project proposes a modern living model in China to be based on Chinese culture and the look at reusing the six-storey apartment communities built in the 1980s and 1990s. The idea is to introduce a spacial system of communal life, which would enhance a sense of belonging and create a better living environment incorporating a colourful social life for Chinese urban residents.
1.0 Introduction

1.1 Definition

Collective housing includes multi-storey buildings and high-rises. Apartments, flats, townhouses and housing complexes are all defined as collective housing. One of the most influential modern examples is Le Corbusier's *Unité d'Habitation* in Marseille (1952).

Insulae in ancient Rome are the earliest recorded example of apartment buildings. During the 1930 CIAM\(^3\) meeting, Walter Gropius suggested that 10 to 12 storey apartments would be a biologically-correct contemporary housing model for Germany, which would also work to stop urban sprawl.\(^4\)

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\(^3\) Congrès Internationaux de l'Architecture Moderne.

\(^4\) Jeffry M. Diefendorf, “From Germany to America: Walter Gropius and Martin Wagner on Skyscrapers and the Planning of Healthy Cities”, *German Historical Institute Bulletin* Supplement no. 2 (2005), 33.
1.2 Chinese Collective Housing History

In the 1910-40s, due to a growing population, many Chinese residential houses were subdivided into blocks, which were occupied by multi families. By the 1950s however, China was facing an unprecedented housing shortage. The per-capita living space in many cities was less than 4 square metres. In common with many Asian countries, China constructed enormous numbers of apartments. A big change took place in Chinese residential history, the rise of collective housing. China did not have this kind of residential building until the 20th century.

In the 1950s China was governed by a centrally planned economic system learned from the Soviet Union. A danwei or a work unit is a place of employment in China. Workers were bound to their work unit for life. This acted as the first step on a multi-tiered hierarchical ladder, linking each individual with the central Communist Party infrastructure. It was a product of a centrally planned economy. As a fundamental cell in the centrally planned operation system, danwei have relatively independent political, economical and social functions.

In terms of the architecture, the yuan or, courtyard in English, is a traditional Chinese residential architectural form. It contains the meaning of "family" in terms of a spiritual perception and is an enclosed space. As a space prototype, the yuan holds an irreplaceable position in Chinese architectural theory, and is exemplified in the Forbidden City and Beijing city planning.

In the early 1950s, several community theories contributed to the birth of the Chinese danwei dayuan. The first generation of Chinese architects who came back from America introduced Clarence Perry’s concept of the ‘Neighbourhood Unit’ to China.

[7] Except for Fujian Tulou of the 12th century which does not quite match with the definition of collective housing as there is only one family living in each of Tulous.
[9] The meaning of family will be described in the following chapter.
Russian advisors then brought the idea of the Superblock Schema\(^{[11]}\) and a living model called a ‘Microdistrict\(^{[12]}\)’. Having learned from the Soviet Union, the Chinese established a Chinese-style, urban, collective-living compound: the danwei dayuan\(^{[13]}\). Dayuan means “huge courtyard” and these covered a large area and were encircled by walls containing a few gated entrances. This term means ‘gated communities’ in English.

In the late 1960s, the old Asian urban villages experienced a physical decline, with increasing rates of poverty and crime.\(^{[14]}\) Politicians decided slum-demolition was a simple solution to the problem. This kind of community spread throughout China until the 1990s.

The Danwei Dayuan, which resembles a mini-city, is similar in form to the ancient Chinese walled city\(^{[15]}\). They are planned structures that include offices and factories as well as residential areas, and they offer communal services such as kindergartens, clinics, eateries and grocery shops as well as many other kinds of urban service facilities. Residents living in danwei dayuan are not only connected by work but through the feeling of being in a big family, which leads to a sense of belonging. They have cultivated a collectivist spirit in socialist cities.\(^{[16]}\) Interestingly, because of the similarity of danwei dayuan to primitive tribes, some scholars have even referred to them

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\(^{[12]}\) http://en.wikipedia.org/wiki/Microdistrict, s.v., “Microdistrict”.

\(^{[13]}\) Danwei Dayuan is a Chinese word group. Apartments in it are not like the superblock schema which has many westward windows.

\(^{[14]}\) MVRDV, *Vertical Village*, 74.


\(^{[16]}\) Qiao, “History Flux of Beijing Unit”.
as danwei tribes.\footnote{Zhu, One of China’s Cross-century Urban Architecture Theory.} Danwei dayuan became a kind of yuan culture of 20th century the Chinese history. “The work unit was once so essential to daily life in urban China that people would say that one could be without a job, but not without a danwei,” \footnote{Xiaobo Lu and Elizabeth J. Perry, Danwei: The Changing Chinese Workplace in Historical and Comparative Perspective, (Armonk NY: M.E. Sharpe, 1997), 3.}

The implement of the Four Modernizations\footnote{They are agriculture, industry, national defense, and science and technology.} in 1978 marked the beginning of the demise of the danwei.\footnote{Hartog, Shanghai New Towns, 314.} As more and more people left their danwei to take new jobs elsewhere, the concept of danwei gradually weakened as the concept of modern individuality arose\footnote{Ibid.}. This meant that an opening up of previously introverted spaces for wider social use and a merging of the boundaries of communal spaces began to occur. Since the late 1970s, a new kind of gated community has become the dominant housing type of the middle class.\footnote{MVRDV, Vertical Village.} Much of the infrastructure and many of the facilities in the enclosed danwei dayuan started to open up to the public. Parts of the solid enclosures were turned to commercial uses; these premises later formed into commercial strips which then created the boundaries of the modern high-rise compounds. \footnote{Dieter Hassenpflug, Urban Code of China, (Birkhauser, Basel, 2010), 77.}

At the same time, the idea of the spatial connections between work and residences did not disappear from people’s memory, but instead became an invisible connection in their lives. By this means, the weakened concept of danwei meant the model for living and the types of buildings did not immediately change. According to the Jinan Yearbook, many new six-storey apartments were built from 1979 to 1991 in Jinan as a new kind of gated community. They housed severable apartment groups in one big block, which were owned by different danwei but had shared communal facilities. In 1988, 19,590,000 m\textsuperscript{2} of residential spaces were built.\footnote{"山东省情网, 济南年鉴库—1989—房产业—住宅建设, Shandong infobase, s.v., residential redevelopment, 2012," (Accessed August 3, 2013), http://sd.infobase.gov.cn/bin/mse.exe?searchword=&K=d1&A=1&rec=113&run=13} This type of collective housing still occupis a large area in Jinan city.

From the 1980s, the real estate industry made great progress, as there was with a steady increase in the demand for housing that went hand-in-hand with an increase in incomes. The housing industry acquired a significant role in the Chinese national economy.

\begin{table}[ht]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
Living Community & Pattern & Functions & Streets & Sense of belonging & Boundary \\
\hline
Danwei Dayuan & Axisymmetric, communal-facility-centric & All working, social & Simple & Good & wall \\
& & & & & \\
New Gated Community & Communal-facility/ garden-centric & Simple living & Flexible & Bad & Retail & wall \\
& & & & & \\
High-rise Compound & Garden-centric & Simple living & Flexible & Lost & Commercial strip \\
& & & & & \\
\hline
\end{tabular}
\caption{Danwei Dayuan V.S. New Gated Community circa 1980-1990 V.S. High-rise Compound}
\end{table}
In 2005, more than 72.8% \(^{[25]}\) of the housing stock in China was privately owned, following the housing commercialization renovation in 1998. In the 21st century however, the rise of new 30-storey high-rise communities\(^{[26]}\) and residential compounds with gardens in the centre has brought about a greater threat to Chinese architectural history.\(^{[27]}\)

According to a report in 2010, homes built in Shanghai before 1999 will be dismantled to make way for new developments during the next two decades, which means that more than half of existing residential structures will be demolished. As what related official director explained, dwellings built before 1949 have long passed their 50 years’ lifespan; some of those built between 1949 and 1979 were not well constructed, and those built between 1979 and 1999 cannot meet the demands of modern living. Construction waste currently comprises 30 to 40 percent of the total volume of urban waste. The erection of a 10,000-square-meter building typically creates 500 to 600 tons of waste and the demolition of a similar sized building creates 7,000 to 12,000 tons.\(^{[28]}\)

This is not only about sustainability. The life of the old multi-storey apartments

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\(^{[26]}\) This modern residential compound is called xiaoxu.

\(^{[27]}\) MVRDV, Vertical Village, 74-76.

the living model they enabled is coming to an end. The culture of collectivism has been lost and the residents miss the old sense of community. In the modern community, there are few communal facilities, leading to weaker interior connections between inhabitants. The newer communities are trying to hold to the idea of Yuan, with a garden in the central area. However, residents live far from playgrounds and few children have been able to use not many kids the gardens like a real playground. What is more, a majority of the adults who live in the community do not even use the gardens either and the elders prefer apartments on the lower levels. What architects can do is create successful communal spaces so as to solve this social problem, one that is constantly arising in collective housing programmes.

1.2.1 Moving to High-rise Buildings

In China, residents moved out from six-storey apartments are able to buy multiple apartments for their families. In 2012, there 20,000 residents were moved to new housing. 1,488,400m² of urban residential buildings were demolished and 3,580,500 m² of new ones rebuilt at the same time.[29]

In this way, the inhabitants are investing in the housing market and aiming to progress to a better living environment. Developers treat high-rise projects as profitable businesses (while the old apartments occupy relatively developed areas). The government has to meet the people’s needs with a better looking city. The old apartments lacked modern facilities, service systems and other infrastructure. As the original residents moved out and people from other places settled in, the composition of new neighbourhoods became increasingly mixed in nature. A dislike of the conditions in the existing old villages accelerated the escape of the middle classes into modern tower and block housing. With the high-rises, the developers could build more units in a limited area, making huge profits in a short time. Investments by such developers led to rapid economic growth with a consequent increase in GDP, which is one of the aims of government. This seems to be even more evident in the central city area, where the power of the city is flaunted. On the other hand, the increasing number of homebuyers has also increased expanded the demand for housing, resulting in rising property prices and the creation of even more investors. This far more active real estate market has created a large number of high-rise apartment development.

There are many reasons that the original inhabitants have moved from their former homes, but the pace of societal development and an increase in people’s income is where it began.

1.3 The Diseconomy of Population-overdensity in Chinese Cities

\[ \text{Density} = \frac{\text{Population}}{\text{Area}} \]

Overcrowding in urban areas has become a significant issue in China and also the main factor of slowing the economy due to traffic jams and overlong waiting times.

China is the most populous country in the world. As more and more people have come to work and settle in the city urbanization has reached 51%. The average density of urban Jinan [CN] is similar to that of Auckland [NZ], yet the difference between collective housing and individual housing means the Jinan central area density is ten times the average. Multi-storey apartments and high-rise collectives either already built or under construction are the major reason for urban over-density. Super-wide roads have been built, but still there is increasing traffic pressure. Buses come every ten minutes, but people are still packed in like sardines on the way to work. In 2009, the cost of traffic jams in Beijing, Guangzhou and Shanghai (three cities which have built high-rise apartments very fast) in 2009 has been calculated at over 100 billion RMB (approximately 19.6 billion NZD).[30] The more compact the apartments become, the worse these conditions will be. This means that the developers of new 30-storey (or even more) residential high-rises containing small units can make a huge amount of money. Looking back to the ratio of separate houses in Japan or even America was similar to the ratio of collective housing in China, which was more than 90%.[31] In 2009, the density of Shanghai was twice that of the most populous city in the world, Tokyo.[32] Yet, collective housing still seems to be the most workable solution for the time. What kind of collective housing we should have and what the most sustainable approach looks like is still controversial.


[31] Ibid.

[32] Ibid.

Fig.7 A Chinese Traffic Jam
Overall Density (2010):

AUCKLAND METRO × 1.06 = JINAN METRO

DATA: wikipedia; JINAN URBAN PLANNING OFFICE

POPULATION (2010)

AUCKLAND METRO × 3.2 = JINAN METRO

Overall Density (2010):

AUCKLAND METRO × 1.06 = JINAN METRO

DATA: wikipedia; JINAN URBAN PLANNING OFFICE
As Jane Jacobs has written, city neighbourhoods are “mundane organs of self-government”. Communities are like small societies and big families; their residents are familiar with each other and organize their lives in their communities together. However, contemporary citizens living in the same community no longer know each other and seem even less likely to communicate with neighbours in the same block.

As social life is one of the most important parts of the family living programme, creating a lively shared space with communal facilities will have a significant influence on a collective housing project. In giving consideration that, this project will focus on the communal spaces where residents have activities either inside or outside the collective housing block. There are connections between each of the units in an entire apartment building, as well as from each of the buildings to the community and the city.

The project takes those six-storey apartments blocks as a new living model in Jinan, as they are based on Chinese culture and offer a redevelopment of the existing fabric contained in the buildings from circa 1980 to 1990. The continued development of 30-storey high-rises does not appeal as a good residential model for the future. A space system of communal use will be developed to reactivate the old community and connect it to the modern city.

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2.0 Project outline & Scope

As Jane Jacobs has written, city neighbourhoods are “mundane organs of self-government”. Communities are like small societies and big families; their residents are familiar with each other and organize their lives in their communities together. However, contemporary citizens living in the same community no longer know each other and seem even less likely to communicate with neighbours in the same block.

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2.1 Quality of Life

“We need to ask the question: can we still reinvent or reconstruct the lifestyle, not only the building or a pot or a cup of the old time, for the contemporary world.”

----- Yung Ho Chang

As Maslow has suggested, beyond safety and physiological needs, it is important to have love and belonging in our lives. The sense of belonging, which has been lost in contemporary China, is an important issue to Chinese residential architecture as it has a powerful effect on the quality of life.

In the 21st century, Chinese residents are faced with both a transition in housing for survival to housing for living and a change from danwei distribution to individual commercialization in the housing market. With the rapid development of China, more and more residents are starting to seek out quality living. To take the housing development history from abroad as a reference, the Chinese government needs to put forward the ideas of diversity, flexibility, adaptability and convertibility as a guide to relatively friendly living and sustainable residential design.

Throughout history, meeting other people has been the most important function and attraction of the city. As recently as the mid-twentieth century the American philosopher and education reformer, John Dewey, emphasized the social environment when explaining human nature itself: “Everything which is distinctly human is learned… to learn to be human is to develop through the give-and-take of communi-

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Fig. 9 Maslow’s Hierarchy of Needs

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Fig. 10 The importance of Public Space Quality
cation an effective sense of being an individually distinctive member of a community.”

A community must always retain face-to-face communication.

“The quality of a community is seen in its ability to combine two seemingly competing characteristics: density and individuality.” Communities are supposed to be public and collective as well as to be able to have individual freedom and identity which expressed through flexibility and diversity. The Vertical Village puts forward 11 broad principles: Informality, Human-scale, Individuality, Flexibility, Identity, Diversity, Evolution, Collectivity, Density, Public Awareness, and Critical Mass. With the discovery of self-awareness, everything calls for personalized services and this individualization is treated as an advanced quality of for point in this list.

According to Jan Gehl, in pictures of bustling street scenes from around 1900, nearly everyone is present because they have to be, regardless of whether quality is provided or not. However, when we look at the present day, an obvious change in the volume and character of public lives stands out. With the developing of society, everything points to the quality issues. Quality of the living spaces became a master factor of lively or lifeless in a public space.

[35] MVRDV, Vertical Village, 64.
[36] Haas ed., New Urbanism and Beyond, 106
2.2 Reuse of Buildings

“Factors such as planning, architectural design, historical preservation, adaptive reuse of old buildings, urban rehabilitation, city renewal and reconstruction, utilisation of underground facilities, etc., should be integrated into a dynamic circulation system. This is a system for a better architecture in the modern times. It is also an exemplification of the sustainable approach in urban planning and architecture design.”

------- UIA 1999 Beijing Charter[37]

There are three main reasons for embarking on a reuse project.[38] One is to reduce the impact of construction on our environment, including through the recycling of materials. Another is to bring benefits to the project that match the benefits available from government policies. The last reason is that of reputation and social reasons.

Let us consider reuse from a social aspect first. Culture is developed through a continuum of time, as well as through architecture[39]. “It is hard to see a great building that has been completed by the same person who began it.”[40] Buildings are productions of various political, economical, social environments at a particular place within different times. Buildings learn from their occupants[41] and this is an inseparable bonding. It is normal for a building to be changed due to a change in circumstances.

First we shape out buildings, then they shape us. ---- Churchill, 1943[42]

Buildings are part of human history, the carriers of culture and of the memory of places. Just like the rings of a tree, the built structure remembers living habits and processes, contains information about historic vicissitudes and forms the material basis of collective memory.[43]

Adaptive reuse is the conversion of existing vacant or underutilized buildings into new residential and live/work spaces.[44] There are generally five aspects to reusing the building: reuse foundation and retaining structures; reuse building structure; reusing the building structure; reusing the building envelope; reusing the enclosure, interiors and external works, and reusing the mechanical and electrical services of the building.[45] It has been a topic since the 19th century in Europe. For example, in the UK, the refurbishment market has been a steadily growing since the 1970s and

[40] From Leon Battista Alberti.
The refurbishment activity represented 42% of total construction output by the mid-1990s. However, it is still fresh in China. In China, around 40% of building land is created every year by the demolition of older developments.

In 2004, it was reported that China used 55 percent and 36 percent respectively of that year's world concrete and steel production. As recycling concrete is still a problem in the current construction world and concrete structures occupied a dominant position in the Chinese construction market, demolished construction waste is becoming a real problem. The government should have policies to provide funding according to the cost of construction to encourage more reuse programmes.


3.0 Methodology

We start with a core question in order to get reliable answers, then we begin to research and eventually, get some answers while arriving at further questions. Next we try to create architectural solutions (answers) to those questions and to set up a design model which responds to the core question. Questions, however, keep coming up during the whole design process, so we keep researching to support our design and use the questions to guide our design. Research provides answers to some of the design puzzles, but on the other side, design can also prove the research. Finally, our design presents answers to the core question.

In terms of this project, I followed the diagram on the right.
4.0 Existing Knowledge

4.1 Chinese social spaces

4.1.1 Family
   With the progress in human society, traditional houses were no longer simply shelters from the elements. They started to assume increasingly varied and important social functions. Houses became not only constrained by the natural environment, but also strongly impacted by institutions, ideologies, and customs. The Chinese term for family is composed of two characters --- jia for room and ting for courtyard. Husband, wife and children form a basic unit of production and life. They need both indoor space (room) and outdoor space (courtyard), hence the construction of the word family.

4.1.2 Siheyuan
   The courtyard in siheyuan is the origin concept of yuan which is one of the most important Chinese spacial model. A siheyuan house is the most common residential housing throughout ancient China. Siheyuan literally means a courtyard surrounded by four buildings but, the number of courtyards shows the wealth and prosperity of

[49] Ibid.
a family. These were occupied by one big family, which is similar to the Tulou model.

Most of the siheyuan consists of both inner and outer yards, the former being for family members. The master room in the siheyuan is situated in the north of the compound and faces south. Both the master room and wing rooms face onto a central courtyard with front porches and verandas, these are linked through in such a way that inhabitants can either walk or sit around the yard to enjoy a poetic gardening space. Gardens in a courtyard contain plants and rocks, providing an ideal space for an open-air playground as well as an outdoor extension for every living room. The verandas around it divide the courtyard into various sized spaces which are porous to one another, making voids and solids and revealing the contrast of shadows. The Chinese favoured the courtyard for these reasons.

The layout, structure and size of the traditional siheyuan house reflects the hierarchy of the ancient society. It was important for a family to allocate main rooms facing south to elders, wing rooms to juniors and rooms opposite the main ones to servants. Servants were rarely admitted into the inner courtyard. Side alleys were designed for women, children and servants, to prevent them making noise around the main function rooms, interrupting important ceremonies.

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[50] Ibid.
4.1.3 Dense Streets

Before 1949, Chinese cities were divided into millions of private fields, such as the Forbidden City and the siheyuan houses. Between each of these private fields, linear spaces were formed by gated enclosures that connected one field to another. These were known as dense streets or hutong when they occurred in residential area. They are high-density small scale streets.

In the early Beijing, there was no open square or central plaza for the residents in one district to congregate in. However, dense streets and nodes along the way offered the communal urban spaces for the public. This was where most communal activities happened.

These nodes include street intersections, the front spaces of commercial, religious and other public structures, and the spaces around gates, bridges and river banks. This is similar to the concept of urban porosity that Walter Benjamin described in his Reflections. He observed porous architecture in which “building and action interpenetrate in the courtyards, arcades and stairways…to become a theatre of new unforeseen constellations….”[52] He further described porosity as “an inexhaustible law of the life” in this Naples city. The linear spaces constitute a network of urban node spaces. All events of commercial and social encounters and interactions were accommodated in the field of street networks.[53] Such public spaces act as foci for Chinese social life.

At a spatial level, Chinese urban civic life was based on a web of lines and nodes, whereas that in Europe was based on the core of an agora.[54]

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[54] Ibid., 52.
Fig. 15 Beijing, Dashilan

Fig. 16 Beijing, Hutong

Fig. 17 A net-work of open urban space of Beijing: Capital city and outer city
4.2 Contemporary Chinese Debate

4.2.1 Wang Shu

The report ‘Possibilities of ‘Chinese-Style Housing’: A Dialogue between Wang Shu and his Students’, offered a good debate for my project. The report also talked about the misunderstanding in current Chinese architecture, which provides a good guide for residential design. “It is especially dangerous that the social system and manufacturing, that seems too mature to be questioned or changed, are virtually not well-done, which results in a shift of the focus to the aspects of style, form and a neglecting of the hidden subversive and critical power contained the involved relations between the human race and the society.”[55]

Some architects have indicated that an obvious difference between antique architecture and modern architecture is that people in society are all used to participating in the manufacturing of tools and dwellings, through which they could have real experiences of materials and manufacture. The ‘Si Wu Notes’ by Wang Shu tell us to focus on the essence of architecture, which is for people. Chinese people have their own culture which should result in Chinese style living spaces. As Lin Yutang said, it is a garden belongs to a house, a room among the garden, a courtyard inside of the room, a tree grows in the courtyard, a sky beyond the tree, and a moon on the sky.[55]

This reveals the Chinese living elements and atmosphere.

In Wang Shu’s Hangzhou Apartments, the Chinese living space is organized by vertical transportation and corridors in the middle of every two floors and is also shown as sunny living rooms, which are connected directly to balcony spaces.

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4.2.2 CSI Housing system[56]

The CSI residential building refers to Chinese Skeleton Infill housing, a building for changes. It is a sustainable solution for future residential programmes. It is based on the Netherlands SAR theory and an Open Building theory with a reference to Japanese KSI house and some European and American residential development experience.[57]

It has simpler and more stable structure in a longer life span; it puts the service system together and creates a freedom in floor plan and elevation renovation for different generations or family sizes. The flexibility of the space makes it easier to reuse when combined with other functions. There is a successful KSI experimental case in Japan, the Next 21 apartment, which was built in 1999. This consists of 18 units in a six-storey apartment buildings. The building elements here are divided into two groups: long-life elements that provide the communal structure, such as columns, beams and floors; and short-life elements in private areas including partition walls, building services and equipment, These can be adjusted without disturbing the overall integrity of the system.

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[56] China Skeleton Infill dwelling system.
4.2.3  Linked Hybrid & Steven Holl

It is located at the East Xiba River Rd in Beijing in 2008 and designed by the Steven Holl Architects. Its influence area is Beijing Municipality, which has a population of 17,000,000 and the density of the area is 1,011 inhab/km². There are 58.8% living area and 29% parking area in this 220,000 m² residential complex.

The main idea of Linked Hybrid is to create a porous urban space which comes from the traditional Chinese social space. Holl noticed that, in contemporary Beijing, superblock occupies most of the urban spaces. The transformation of dense urban grids to 600m*600m dimension block lead to many problems. Especially for a larger urban projects made up of several buildings like Linked Hybrid, Porosity becomes essential. In order to bring the Chinese social lifestyle back to modern society, he designed The public Sky-loop and the Base-loop are functioning as social condensers in a special experience of city life to both residents and visitors.[58] The link on the air bridged eight towers ranging from twelve to twenty-one stories is fulfilled with commercial, educational, recreational and many other communal facilities. The micro open passages with small scale shops on the ground floor activated the urban space surrounded. This mixed-use residential complex creates “a city within a city” through a three dimensional connections from community to city.[59]

On the other hand, this new vertical urban sector aspires to individuation in urban living which is opposite to the standardized and repetitive collective housing in Chinese residential history. Hundreds of different apartment layouts in a huge variety of types are designed in the Linked Hybrid.

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[58] Holl, Urbanisms, 137
[59] Ibid., 22
Fig. 22: Link Hybrid Bridges Plan & Photo
History of Collective Housing in the 20th Century

4.3.1 Le Corbusier & Unité d’Habitation of Marseille

Le Corbusier abandoned class-based stratification and assigned housing according to family size, not economic position, in La Ville Radieuse, which was published in 1935. The rise of collective housing largely started after his contribution.

For a number of years French officials had been unsuccessful in dealing with the squalor of the growing Parisian slums and Le Corbusier sought efficient ways to house large numbers of people in response to the urban housing crisis. With the idea of improving the living quality of the lower class, his Immeubles Villas (1922) offered an architectural solution of building large blocks of cell-like individual apartments on top of each other, with plans similar to normal houses including living rooms, bedrooms, a kitchen, and garden terraces. Its double-corridor with maisonettes is similar to that used in the Narkomfin Building (1930) in Moscow, which had a big influence on the Unité d’Habitation of Marseille.

In 1952 Corbusier built one of his most influential buildings: the Unité d’Habitation of Marseille. In describing this project, Corbusier noted: “the building is just like an urban quarter in that it contains a shopping centre in its core, about mid-way up”. Following on this idea, Unité was designed with special parking and a vertical and horizontal circulation system which connected with retail and storage spaces. There are 337 apartments as well as some communal spaces, such as an 18 room hotel, a restaurant, some shops, a medical centre, a crèche and a kindergarten and other communal facilities arranged in the 18 storey block. This was not only because the building stood in a rural area, it could also be seen as an example of the new idea of the living system. The final spatial sequence in Unité is a landscaped roof terrace, which provides an open-air playground for children as well as being an exhibition centre. Inside the block there are some alternate-accessed corridors, which were first built in the Moisei Ginzburg and Ignaty Milinis’ buildings, such as the Ministry of Finance and the Narkomfin Building. These corridors go through the long axis of, generally, every third floor which have double-balconied ‘paired-units’. There are also single-level units which could be studios, set for various sizes of families. This building had a deep influence on the development of the housing complex and it is still occupied today, mainly by upper middle-class professionals.
4.3.2 Narkomfin Building

Moisei Ginzburg, a Soviet delegate to the CIAM, described collective housing as giving architecture the possibility to influence social behaviour by breaking with tradition and creating socially equal spaces.\(^{[68]}\) His work also emphasised communal uses and the socialization of the household, just like the Narkomfin Building, which was designed with a ‘social condenser’ that includes both individual and social spheres, and was conceived with the capability of modifying social behaviour by expanding spaces into collective use.\(^{[69]}\)

In spite of that, the split-level unit designs, type F, were the most popular maisonettes. They shared many features with the Unité d’Habitation of Marseille, and continue to reappear in contemporary housing design.\(^{[70]}\)

4.3.3 Pruitt-Igoe

In the 1930s the first mass-produced housing was introduced to Asian countries, which was seen as the arrival of Asian Modernism.\(^{[71]}\) Buildings at that time were often designed by invited architects with little understanding of local culture and context\(^{[72]}\) like the Pruitt-Igoe (1954). The Pruitt-Igoe was created under the U.S. Housing Act of 1949, which made funds directly available to cities for slum clearance, urban re-development, and public housing.\(^{[73]}\) When it was designed in 1951, the project won design awards from the American Institute of Architects\(^{[74]}\) which assessed the project as being an exemplar for future low cost housing projects\(^{[75]}\). However, it was soon considered uninhabitable by its residents.

Yamasaki was meant to design a public housing programme that emphasised a social and communal system similar to the previous collective houses, but it epitomized the ills of public housing.\(^{[76]}\) There were galleries up in the air on every third

\(^{[68]}\) Per, 10 Stories of Collective Housing, 73.

\(^{[69]}\) Ibid.

\(^{[70]}\) French, Key Urban Housing of the Twentieth Century, 52.


\(^{[72]}\) Ibid.


floor, similar to what had been designed in the Unité d’Habitation, but this building failed. The failure of the Pruitt-Igoe is mainly described as a social problem caused by the isolated building system, including a lack of connection between the buildings and their surroundings. Parents living in the building could not supervise children at the playground, the facilities were inadequate, and the building’s segregation inhibited natural social flows and disrupted the resident’s established social relationships, allowing crime and vandalism to flourish.\(^{[77]}\) In early 1972, just sixteen years after the initial flurry of accolades, the complex was demolished, which was considered by Charles Jencks to be the death of modern architecture\(^{[78]}\).

\(^{[77]}\) Taylor, Fallacies of Master Planning.

\(^{[78]}\) Eggener, ed., American Architectural History, 352
4.3.4 Participation

Architecture is too important to be left to only architects. The participation of inhabitants is an important part in a building’s life. Chinese always have a habit of redeveloping their own spaces, additional parts can be seen everywhere added on to residential buildings, such as balconies and roof tops.

This is also happening around the world such as in Co-operative Housing in Japan. In 1975, Japanese architects began to invite the residents in the community to create different units for particular families as part of the design workshop.

In 1968 in Brussels, students in the Catholic University involved in the Lucien Kroll architecture group designed the buildings in their social zone together.

ZUP Perseigne is a renovation of the 1960s’ welfare apartments in a zone for urban priorities in Normandy. Inhabitants’ involvement in the refreshing of the building has made it into a place that people love to stay in. The complex but harmonious elevation was a combination of various balconies and windows within different styles. This is one way of making collective housing, combining plenty of desirable elements from different places.

5.0 Design Process

5.0.1 Concept outline

Le Corbusier said that the sphere of architecture embraces every detail of household furnishing, the street as well as the house, and a wider world still beyond both.[80] This architecture project is divided into two parts, an old building, but with connections to its context. I have tried to make the connections between each of the units to an entire apartment building, as well as from each of the buildings to the community and the city.

The design process of the project follows the hierarchy of different communal spaces, from city scale to community scale, urban block scale, apartment building scale, to units and details scale. This is the general sequence of the spatial system of communal life. Communal facilities include a gym, workshop, library, health centre, some retail, a market, bank, cafe, laundry, bar, residents committee space, a pavilion, art centre, greenhouse, and other commercial and cultural facilities.

[80] Le Corbusier and David Jenkins, Unite d’habitation Marseilles, (London: Phaidon Press, 1993), 4
5.1 City Scale

5.1.1 Jinan

Jinan is located at northern latitude 36°40’ and is east of Greenwich at 116°57’. It is in the north-western part of Shandong province about 400 kilometres south of the national capital of Beijing.

Jinan has a subtropical monsoon climate with four well-defined seasons. It is dry and nearly rainless in spring, hot and rainy in summer, crisp in autumn, and cold and dry with little snow in winter. It has around 136-157 days of winter and 105-120 days in summer in a year, which makes the spring and autumn into short transitions between winters and summers. The summer solstice sun angle at noon is 76°46’, the winter solstice is 29°54’.

Jinan’s metropolitan density is 1,300 per km² with a population of 4,335,900 over a 3,257 km² area.[81] The average living area is 30.30 m² per capita.

Jinan is a state-listed historical and cultural city, which has been inhabited for more than 4000 years. The modern-day name, “Jinan” literally means “south of the Ji Water” which refers to the old Ji River that disappeared in 1852 when the Yellow River took over its bed.

Jinan is a city of springs. Half city half springs (the Daming Lake) is the proverb for Daming Lake, which is in the northern half of the ancient inner city, and describes its

position in the walled Jinan city. The ancient walled city is seated between the Yellow River that gather springs in the north and the Mount Tai foothills which collect water in the south, with springs coming out of the ground everywhere. It is the custom for citizens in Jinan to play in the springs as one may find springs wherever he pick up a floor tile in the inner and outer city. In the old times people sat around the water together to drink, sing poems and play games, called Qushuiliushang.

Fig.28 The game of Qushuiliushang
Springs

Fig. 29 The form of springs
The old city & Site

*Reproduced from Google Map, Accessed 20 March 2013  
Northern Changsheng Community

Streets & Stream
5.2 Community Scale

5.2.1 Northern Changsheng Community

The Changsheng Community is located at the ancient outer city and east of the Daming Lake, and includes both a northern part and a southern part. North of the community is train station and railways. In one hundred years ago, around 1910 to the 1920s, the present-day Northern Changsheng Community area was a lake with streams flowing from it, but gradually, after the 1930s, it became a dry low-lying area. According to the Yearbook of Jinan, this community became a pond again after a super-storm in 1987. The deepest area of the pond was two meters. In March 1988, the government started to redevelop this area as a new community with communal facilities and filled in the lake and streams. At the end of 2012, some parts of the community had already been demolished and some of them are facing with demolishing now.

The Northern Changsheng Community has three boundaries, north 1km for Minghu East Road, west 550 m for Heihuquan North Street and south 900 m for Dongguan Street. It used to have gated city walls with a moat at its north and west boundaries and a lake in the middle with spring streams passing through, but now there is only a canal left that connects to the Daming Lake Park. The springs used to springs that used to form a strip linking the entire inner and outer cities have disappeared. The north boundary became a main road in Jinan as well as to the west. The last southern boundary is also the north boundary of the Southern Changsheng Community. It was a famous commercial road in the old times and is still very busy with small commodities, snack foods and the entrances to the free market streets that are located in the Southern Changsheng Community.

The new gated community consists of several different apartment groups owned by several different danwei with some office buildings at the south boundary and a primary school, a coal factory, a transfer station, a clinic, and a central park in the middle, with a kindergarten close to it. Retail and other commercial activities have developed from the enclosure of different urban blocks in the community.

The apartments inside were planned to lie paralleled with each other and are mostly located facing the sun, to collect the sunshine, which is based on the theory of yin & yang. There are three subdivided types: single-loaded block; double-loaded block; units block. The last is the most common one in China seen in China since the 1980s. In this community, apartments are all unit-flats. The majority of the flats are four to six storeys, though a few are up to seven storeys. There are commonly, or sometimes

[82] Changsheng means prosperous.
three to four apartments on a level, served by one staircase. Around apartment buildings are always some single storey storage spaces. These storage spaces occupy the potential public space between apartment blocks. They easily become uncared for spaces collecting rubbish and rats and can attract illegal additions.

In recent years, some new added mixed-use 20-storey around (because of the height limitation in this area) apartments became a modern residential compound seat near the northern boundary and occupied some parts of the old community. More and more 30-storey high-rise communities are being built in the Jinan urban area.

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Fig. 30 Existing apartment courtyard
Community 500m Circles
The most accessible zone and potential popular area

Minghu East Road

Community Streets

Moat Heihuquan North Street

Dongguan Street
Commercial strip and offices
The most accessible zone and potential popular area

- Police Station
- Cosmetic Hospital
- Park
- Moat
- Park
- Residential Dwellings
- Primary School
- Central Park
- Clinic
- Sanitary Station
- Coal Factory
- Kindergarten
- Residential Dwellings
- Water transfer station
- New Residential Complex
- New Residential Complex
- New Residential Complex
- New Residential Complex
- New Residential Complex
- Commercial strip
- Hotel
- Residential Dwellings
- Daming Lake Park

Community Facilities
5.2.2 Questionnaire of existing residents

As this project is focusing on people's life of quality in this community, it is important to have a understanding of the communal context of the community which means a research of current community inhabitants. In order to know the constitution of current residents and their needs and comments on the community life, I started a questionnaire in the existing community in January, 2013. And the result is summarized as followed.

There are on average 2.69 peoples in one family, with 60 years and over inhabitants among most of them. There are many families who have been living here for more than ten years, but at the same time there are also flats tenanted by new migrants, who have been here around five years. Most of the families do not want to move out. The seniors said they liked to stay with neighbours but this old community has some problems as well. Some residents who lived in a one staircase for four units block felt like they were cramped. They were also looking for a better quality of living but most people staying here lack money to move out or to leave and return after demolition and rebuilding.

People complained about the traffic problems, especially regarding parking along the streets in the community. Families living here seldom have private cars, neither do their relatives. On weekends and holidays and especially at school finishing time on a weekday afternoon, people can hardly move through the streets in the community, as there are always are a lot of cars parked and the booths and retail spaces are occupied at the same time.

The inhabitants would like to improve the existing service systems as they are retiring with a few of the residents. People who live further a bit far away from the moat green strip would prefer to have more green spaces among each of the blocks and along the street. They also pointed out that the central triangular garden is not really working as it is always shaded and surrounded by walls and traffic. In addition, a better communal environment, which means providing places that are sunny in winter but shaded in summer for people to get together and walk around. The elders, who have to cross the extremely busy Dongguan Street for the free market, complained about the quality of the free market space as well. It becomes hard to walk on after rain.

5.2.3 The idea of community planning

This starts from a context scale connection to Jinan culture. The main idea that drives the project is to refresh the historical stream area as a connection between both northern and southern Changsheng Community.

There are various active communal spaces still alive in the Northern Changsheng community, including the existing primary school and kindergarten, a clinic, privately owned retail and restaurants and other small mobile stands along the streets. The ground floor shops in mixed-use buildings around the north and south boundaries, and two gardens connecting to the moat green strip are also communal spaces. As shown on the graphic, the large white area means buildings, the red area shows where there are more activities for the inhabitants, meaning a relatively positive communal space, and the darker blue shows a negative area, meaning people hardly go there if they have other choices. Some of the big blue area has been demolished or is an area under construction, but most of the spaces between the apartment buildings are blue as well. The deeper the courtyard the darker the blue area is. The narrow courtyard spaces between the parallel apartment buildings do not quite work like meaningful courtyard spaces. What is more, the single floored storage buildings make the ‘courtyards’ even narrower, not to mention that cars are parked along the narrower courtyards. In a siheyuan, the meaning of yuan is translated as more than a gathering space and playground, it is also an extension of the inhabitants individual place. The courtyard is the common living environment that connects the family members together, bringing a sense of belonging. It should be a positive communal space of a high quality for the inhabitants activities and memories. The blue courtyards are not real yuan.
The Positive & Negative Area of the Community
Community Connection Drawing
The Stream as Main Route
Community Connection Drawing
The Stream as Main Route
5.2.4 Strategy
In order to figure those unsuccessful blue courtyards out, new activity areas will be introduced into this community so as to link all the existing active areas together and to integrate a new communal system.

According to the 500 metres pedestrian walking diagram, the area having accessibility across from north to east around the existing coal centre, schools and central park, shown in red, is the most reachable area in the Northern Changsheng community. With the development of the economy, the coal factory is barely in use and it has gradually become an obsolete artifact. A community centre is proposed in the old coal factory to be one of the two activators that can recharge the Northern Changsheng community.

Intense urban grids like hutongs will be rebuilt here to create a vital street life and a network of circulation, which will create security for all the inhabitants and through passengers. The endpoints of the positive areas are picked up here as connecting points to the new go-through system. People will gather from the different hierarchy of shared spaces, and communal facilities will be transferred into the core of the communal system, the recovered water route, which connects the entire community back to the Jinan urban space.

The block with a long gone water route has been selected as an experimental area to improve the influences that the communal system has on the residents.

5.3 Urban Block Scale
5.3.1 Selected Urban Block
The selected urban block belongs to two danwei and is located along a historical stream area, which lies to the west of the proposed community centre and the primary school, and east of the green moat park. This block has great views to both two of the green gardens and to be moat green lawn. Residents can see the highest tower in the park as well as the boats that travel around the canal on a relatively higher level. The selected block has four boundaries: north 160 metres for Caishinan Street, south 110 metres for 7 metres wide (including the pedestrian strip), Kuitan Street, west 280 metres for 9 metres wide along East Kuitanhou Street, and east 240 metres for a 4.5 metres wide along Double Dragon Street. Xialvshi Street and East Qinglong Street are both historical streets, which will become the main streets in the Northern Changsheng community. Privately owned barbershops, retail, a hotel, a clinic, restaurants, and a real estate store will be settled along the streets of the community boundary walls. In this block, single storey storage buildings will form a boundary between two different danwei owners, to be built on top of the historical stream. Each of the apartments, their storage bungalows and walls will be integrated into an enclosure along with an apartment courtyard. The bungalows then become barriers in the middle of the block, isolating the inhabitants in both, and causing detours for passengers, thus creating darker blue places on map.
Urban Block Location
& Site Photos
5.3.2 The idea of communal spaces and pathways

As this area forms one single piece, the go through idea comes from the common human behaviour of exploring shortcuts. The concept is to guide residents from the different apartment courtyards to meet people and find out the historic springs route as parts of their daily journeys. This will draw people back to the memory of Jinan and use architecture as a method to record and tell about history including the participation of the future generations.

All the routes, translated as pathways in architectural form, cross the existing fabric, thus creating communal spaces with different functions and facilities, which will finally meet at a communal core, the spring stream area. This then provides the cohesive power for the entire group of buildings. When we look back to the danwei dayuan, it is the communal spaces that people shared together that gave coherence to individuals as part of bigger families. A gym, water workshop, library, art centre, health care, green house, retail, residents committee space, architecture workshop, and so on, have been placed as new anchors to infuse energy into existing active communal spaces.

There are four types of pathways: the main one is the historical springs route; another is the green landscape route; the third one is a social meeting route, and the last one is the go-through route. The main route is the most powerful route that sets the tone for the others, as it absorbs people from other routes. The social route (yel-
Design Process

low) is here designed as the traditional Chinese linear space which is the comfortable social and meeting place. The green route is designed for landscape, as a play-ground and as a shortcut to the moat park. The last route is just an interesting passage way. Different pathways cut through those building blocks and their courtyards in three dimensions. And passengers can have various walking experience related to their daily reasons, which means different architecture influences form along those pathways to the existing buildings.

Activities around the block will offer the potential of through routes in this area and the population living around them will get to decide how much they use them. People travelling from west to east are usually heading for commercial places or communal facilities such as the community centre, schools and clinic. On the other side, people travelling east to west are commonly looking for retail or an entrance to green spaces. Another important point regards crossing streets on the way to other places. Around this area, about 290 residents will come from the upper west side, 150 from south and 375 from the east (not including 150 from East of the East and 237 from further east). Because of the primary school, a relatively inactivate area will come to life behind the classroom building. Inside this area, there are approximately 687 residents living in the north parts of the block and 833 in the south. The centre area in this block will now feature, which is the area connecting through the garden entrance to the community centre.
Pathway & Buildings Concept Drawing
Pathway Concept Model
Shortcuts Across Selected Urban Block
Connections between nodes and streets outside the urban block
Design Process

From West to East

Community Centre
Street Intersection

Commercial Nodes
Kindergarten

School Entrance

From East to West

Park Entrance
Street Intersection

Commercial Nodes

Shortcuts Across Selected Urban Block

From West to East

Park Entrance
Street Intersection

From East to West

Park Entrance
Commercial Nodes
Summary of Urban Block Site Analysis

View, Popular Zone, Population and Pathway potential directions
The Process of pathways in Urban Block
Reasons and Directions

Purple for go through
Orange for social
Green for Landscape
Black for Stream

Key Pathway
Assistant Pathway
Central Popular Zone
Main Route

*Numbers of pathways is effected by population of residents in a specific direction.
The Process Model of pathways in Urban Block

Purple for go through
Orange for social
Green for Landscape
Black for Stream
5.3.3 The final pathways

In considering those six main directions, the views and several suitable starting points, the first pathways have been designed with multiple routes that will travel across different levels, including the roof gardens. The thinking behind this idea is the need to simplify the complex pathways.

Pathways are mainly on two levels, the second level and the level beneath the roof floors. Some of the routes have become landscapes on the ground floor, creating green routes and go-through routes, which connect to the surrounding streets as part of the urban grids. The second level is the main route, which gives visitors a clear sense of direction to the top of the stream. On the fifth and sixth level and sometimes on the roof, there will be room for jogging and general observation. This will creates a loop to avoid urban dead ends. There are also some gathering places designed as nodes along the routes where people can enjoy the views. Those pathways will connect to all of the apartments and they also share a vertical transporting system, with apartment blocks are parts of the communal system.

One central apartment block is selected here as an example of showing how the specific influences that those pathways bring to existing buildings and how the lives in the six-story buildings are being reorganized as part of the new communal system.
5.4 Building Scale

5.4.1 Selected building block

This apartment is located at the intersection of the main water route and the west-east shortcut, which mostly belongs to the green landscape route and connects to the community centre. It has great views through to the moat and the garden next to the Daming Lake Park. The east end of the building is an important corner in the entire area, which will carry most of the people who pass through. This would benefit commercial activities and learning extensions. Considering that, the art centre will be upstairs, with exhibition spaces downstairs and a free quality weekend market area as part of the block in order to enhance the sense of the intersection. The existing retail at the west corner, which will connect to the block, is kept as part of the commercial activity. As Chinese modern urban open spaces change with the growth towards a market economy[87], a relatively open landscape space will be built to meet people’s needs. And the ground floor courtyard, all the existing elements such as bungalows, walls, and the ground floor courtyards belonging to this building are reconstructed as parts of the landscape. Parts of the walls in front and storage bungalows around have been demolished, with the materials being reused to build steps and other facilities.

Within this context, the next step is to understand the existing building itself and to have a look at the problems inside. The different hierarchies’ communal spaces will be imported into the block, which will be connected by the pathways as well as the Northern Changsheng community background.

The only communal space in the existing fabric.

Existing Apartment Standard Floor Plan

Design Process
5.4.2 Structure and Material

The *danwei dayuan* were around six storeys high (some of them were five or seven), and so were called the six-storey apartment, which refers to the *Khrushchyovka* in the Soviet. Those six-storey apartments were brick-concrete structures which are cheap, stable and easy to build, but they are limited in their ability to span spaces and do not have open facades.

The brick-concrete structure became well developed at that time. Eighty-five percent of the contemporary buildings were of this type. Bricks were used as the main material for load bearing walls and columns, while concrete took the role of beams, floors and roofs.\[88] The lifespan of these buildings is 50-70 years. This structural system became the most common one for multi-storey buildings in China until 2000. However, because of the limitation on construction, reinforced concrete and steel structures are becoming popular and reinforced concrete structures now occupy a dominant position in the Chinese construction market.

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\[88\] http://baike.baidu.com/view/302993.htm, s.v., 《砖混结构》 (Brick-concrete structure).
5.4.3 Reuse

This sustainable solution for contemporary existing brick-concrete structured fabrics comes with the same idea as the skeleton infill house. Most of the existing long-life span structures in concrete, such as floor plates and beams will be kept. Brick walls and columns that used to force limitations in the living spaces have been alternated with new steel skeleton, so as to create an infill structure for the reconstruction of floor plans and future functional changes. The new walls will only have the function of separation and protection. With the arriving of following generations and new residents, inhabitants will have a chance to participate in redeveloping their habitat and the floor areas they bought. People who bought two unit areas will be able to integrate them into one big flat, or subdivide a big one into separate studios. The flexibility of building a house inside an apartment will encourage peoples’ creativity. The participation of the population, no matter abstract or concrete, will aid the sense of belonging.

Materials from the existing fabric will be collected from the demolition and be re-used as parts of the storage wall and landscape. The brick paving pattern of the market ground and the landscaped pathways will be taken from the traditional courtyards to show the revival of Chinese culture.

Fig. 38 Brick Paving
Fig. 39 Brick Landscape Low Wall
5.4.4 The idea of communal spaces in a block

Many possibilities before were considered before a decision was made. How to get enough sunshine and communal spaces, with a hierarchy of privacy, while holding to a medium density and incurring limited less demolition was the main question to regarding reorganizing the circulation system within an existing block.

Three general methods of organization were considered: putting a corridor at the back to connect to the community pathway; having corridors in the middle and drawing residents to the pathway, creating units in groups with shared spaces as a connection to the pathway. Finally, the idea of family groups with both shared spaces and corridors at the back is proved to be the most suitable solution. This is the concept drawing of vertical family groups with shared spaces (in green) and public spaces (in purple) which connect to pathways.
5.4.5 Strategy

The communal space inside a block is a significant part in the whole communal system. It contains three strategies: the lighten corridors, the vertical courtyards, and the storage wall.

The initial requirement is to work with storage spaces, decaying bungalows and the northern balconies. The storage areas can be vertically arranged next to each family at the north side of each apartment. However, as Chinese families are asking for cross ventilation and lights, a lighter space should be created at the back between individual units and the solid storage spaces. In order to benefit from the traditional life style, a certain group of families will share a courtyard together within a wider enclosed space. However, as we have a limited southern sunny facade, a vertical family group will be put into the vertical housing. The Communal Hall is particularly designed here as a buffer between the residential area and the commercial area.
Mass & Strategies

Storage wall as a protection from northern winds

Glazing Envelope

Sunshine balcony

Garden view balcony

Main hall

Connections to community pathways

Southern Facade

Northern Facade

Windows on storage wall

Roof Garden

Skylight

Connections to community pathways

Roof slope to two deflection and gathering rainwater to feed the plants

Louvers for Garden view balcony

Louvers for Sunshine balcony

Additional steel structure

Glazing Envelope, Ventilation and circulation area

Design Process
5.4.5.1 Storage wall

The concept of the storage wall is to put the horizontal storage bungalows vertically, creating a better ground floor courtyard which will be accessible both to inhabitants living in this apartment building and people living around the block. This strategy is part of the communal system as it helps with the flexibility of the community.

The storage wall will hold memories from the past. It will bring the northern part of the apartment into a cultural space. It will also become a kind of new memory disk which will remember the coming inhabitants and their histories. Each of the families will have their own cabinets on the wall and they can also develop a wider range of uses, such as hanging bicycles or drawings and models on these walls. The storage wall could also be a huge exhibition display screen, either inside or outside. Residents could decorate it together when there are festivals. This would also help in the participation of residents. Architects will be aiming to create deep connections between habitat, inhabitants and the feeling of home.
Storage wall & Share Spaces Design Process
5.4.5.2 Lighten corridor

The light corridor is a sectional bright communal space through the north of the entire block. The idea of putting a light space at the back of the existing building as part of the communal system, which will create a transition space between the public pathways and private courtyards to each of the individual units.

The light corridor will be added between a storage wall on the north and the units to the south. It will start skylights at the top and continue with artificial light screens and windows from the north, which can light up the whole space until the bottom of the building block. The translucent artificial screens will be seated in front of the living rooms that next to the corridor to keep privacy. On the other hand, they will be discontinuously located at the middle of the light corridor and separate it into several porous spaces. Some niches will be dug into the storage wall and along the corridor that being as nodes of the linear space.

The demolition of floor plates and structure walls around the staircases and the addition of new steel skeletons will create a bigger interior space which would help with the idea of light corridor. Additional elevators (which reduce to one single lift to the east later on) occupied northern spaces of staircases are all glazed for light and transparency.

Fig.44 Lighten Corridor concept drawing
5.4.5.3 Vertical courtyards

The vertical courtyard is a double height space with an interlayer that can be directly shared by the inhabitants living around, generally 3 to 4 families. A vertical courtyard is a relatively private communal space, analogous to horizontal siheyuan. These courtyards hold created different groups with relatively close relationships, but could also be easily visited through the vertical transportation by others living in the same apartment block or visitors walking along pathways, (an analogy to hutongs).

Two types of vertical courtyards have been designed for this apartment. One is a sunny courtyard facing to the south, the other is a northern courtyard lit by artificial lights, a skylight, and light from the windows on the storage wall. There will be four courtyards in this apartment, three sunny ones and an artificial one. Plants will be part of the courtyard elements. In the sunny courtyard, landscape could be a sustainable cooling and shading solution for the hot summer while becoming a greenhouse in winter. In the artificial courtyards, there will be stable lighten spaces which can benefit for reading and exhibitions, landscaped artificial courtyard will create a comfortable cultural space all year round.

Fig.45 Vertical Courtyard concept drawing
5.5 Unit & Detail Scale

5.5.1 Existing Units & Space Sequences

In most instances, every floor plan in a single block is exactly the same, which means a uniform type of flats with stereotyped elevations. Forty-six flats are designed in this existing building, with around 124 inhabitants. Four pairs of flats are served by four staircases at the north in most parts, except for the two big rooms at the east ends on the fifth and six levels. In the west part of the building there are only four floors, while the units at the east ends of the fifth and six levels are 122.3 m². There is another addition, which is seated on top of the fourth floor, formerly the roof of the lower western part. The floor area of this unit arranges from 75 m² to 122 m² with an average of 90 m². Units with great views at the western ends are all 101.4 m².

Inside the units, similar to the Unité d’Habitation of Marseille, there are double-sided balcony spaces. Because of the climate in Jinan however, and the idea of expansion, the balconies on both sides are all covered and can be used as a part of the unit’s interior spaces. The kitchen would usually be situated on the north side of the unit, adjacent to the northern balcony, which will have cooking tables and storage places. Units usually have one bedroom at the north and two bedrooms on the southern side, leaving an enclosed, shaded, living room in the middle. The structural span of bedrooms will usually be around 3.3 m; 2.1 m for both kitchens and bathrooms. The service system is located at the south of the staircases, passing through the middle of the apartment.

Currently, the experience in a unit block is that one enters the a courtyard of a block first, then, choosing a staircase, one arrives at an entrance door and steps into a living room before reaching the bedroom or kitchen area. This is, to some extent, similar to the order in a traditional siheyuan house but has an essential difference in space; it has lost the original meaning of the courtyard and of linear spaces. There is almost no communication space in a building for residents to share and play within, not to mention areas that are sunny and bright with fresh air. Even the other two types of apartment can use the corridor as a connection and a publicly used space for the inhabitants on the same floor. In fact, people do put their cabinets and cooking spaces into the corridors, and, kids also make it into an interior public playground.
5.5.2 New Design Units

Nineteen units have been designed in the western part of this apartment, which have around 50 inhabitants. Compared with the previous apartment, there are 32 units here with around 86 inhabitants. This means that while the previous density was 30.3m²/inhab, the current density is 52.2m²/inhab.

Four different types of units have been designed in this block for different generations. Families who have grown up here can stay together within a relatively close distance. The studio are for single people or can be working offices for some families, the small units are for couples or elders, the standard unit is for standard families and the luxurious units are for bigger families or the rich. Due to the reduction in the urban family population, there are eight small sized units and eleven larger ones. There are two studios of 40 m², six small units between 55 m² and 85 m², seven standard units between 90 m² and 150 m², and another four luxurious units from 115 m² to 130 m². Some of the units in this apartment occupy two floors, including both standard and luxurious units. Most of the luxurious units remain on upper levels of the apartments, providing a bigger void space to allow the skylights lighten the corridors.
Final Building Ground Floor Plan

- Restaurant
- Units
- Law wall
- Pedestrian walkway
- BBQ Space
- Existing Apartment Block
Second Floor Plan & Spatial System of Communal Life

Artificial Translucent Light Screen

Vertical Transportation

Storage Wall

Lighten Corridor

Communal Hall

Communal Facilities

Pathways

Unit

Unit

Unit

Unit

Unit

Vertical Courtyards

Vertical Courtyards

Double Layered Facade

Stairs

Stairs

Stairs

Stairs

Lift
5.5.3 The Communal Hall

The buildings around the main pathways all corresponding to them in different ways. There is a communal hall in this apartment that is affected by the pathway system.

On the east side of the hall, there is a double height free market space on the ground floor, an art centre occupied the third and fourth floors and a gym sits at the fifth and sixth floors with a roof garden on top. On the west side of the hall, there are all the living units with courtyards and light corridors that connect to the plates within it.

The public social spaces, situated at the east ends, have been separated from the residential area by this hall, which means there is a transition from relatively private communal spaces to public communal spaces.

There is also a sectional change in the characteristics of the communal spaces, which are affected by pathways. The top and bottom spaces are relatively public, active areas in this block, while the middle one is quieter and more private. The pathway comes down from the roof garden on the fifth level of the apartment on the south and passes through the sixth floor of this block, where the entrance of the gym is. This means that when compared to the sixth level, the fifth level becomes a relatively private area as it contains the gym. The art centre is on the middle floors, as there are floor plates only on the third and sixth level that have direct connections to the east side of the block (except the roof and ground floors). There will be a good observation place to the art gallery for people standing on the third floor and the fourth to fifth floor corridors.

![Communal Hall Space Model](image)
5.5.4 The most private communal space --- living room

People often describe the city as a huge living room for citizens. The living room in each family home is the most private communal space for individuals. It is a space for family members to get together as well as to escape from the noise of society.

The living room and the yuan are always entwined with each other. The living room in each of the units is generally designed to connect to the artificial light screens, which have a visual extension to lighten corridors. Some of them can have windows that facing to either courtyards or the communal hall to create observation places for inhabitants and to involve them in a relatively social atmosphere, so to cultivate a more social future generation. At the same time however, it is also important to keep a distance from the public and to make the living room a private family space.

Fig. 48 Translucent light screen Examples

Fig. 47 Units & Corridor Sectional Drawing
5.5.5 The Double Layered Envelope

In a residential building, sunshine is considered to be a fundamental requirement. The south facade is an entire curtain wall, which references from the Aurora Place in Sydney. It has a naturally ventilated glazing system.

The participation of inhabitants is considered to be an important part of this programme. The double-layered envelope system is an elegant envelope with a colourful elevation inside, which the inhabitants could design and renovate themselves. There is about a 1.5m gap between these two layers, which is a space that used to hold all the balconies that residents covered to create interiors. Some of the existing floor plates are still there which can offer some small yards for those individual families, again creating the possibility of expanding their own private world.
5.6 Re-evaluation

As was mentioned in the project scope, the quality of the new living model gives inhabitants different a hierarchy of communal spaces to protect the private sphere and encourage a social public one. The spatial system of communal life here is trying to create a close neighbourhood relationship and a lively community that connected to city context.

This allows for a combination of density and individuality. It gives inhabitants the possibility of participation, which would involve them deeply in their living spaces, bringing a sense of belonging. The communal spaces connect to each other as a loop, just like the precedents of Linked Hybrid, creating a flowing dense urban grid compared to the way the city used to be.

This project continues the city memory and translates the traditional lifestyle into modern living spaces.
6.0 Conclusion

The Traditional and the Contemporary in Chinese Architecture

Contemporary architecture has a strong global presence. By following such globalizing trends Chinese architects have produced international-style architecture for the country which, to some extent, has lost the traditional Chinese architecture that brings people together in ideology and culture. This project is a redevelopment of an existing urban block circa 1980-1990s using a combination of native culture and modern skills. The aim of the study is to create a connection between tradition and contemporary architecture in a complex manner. Siheyuan and dense streets express the Chinese traditional social methods which has a relatively neighbour-friendly living environment. In the current Changsheng Community, the blocked urban courtyards create barriers between people living nearby. By introducing some beneficial points from traditions, such as the historical stream and vertical courtyards, and removing the storage sheds that occupied the courtyards, a fresh collective housing system with a more Chinese feeling results.

What Chinese Architects Can Do

Chinese architects have realized the importance to align Chinese architecture with local culture. This change shows the development of Chinese architecture and recognizes the change of living requirements. This project is useful beginning. However, the question of how to build up Chinese-style social spaces to create a more harmonious living environment is still a work in progress.

Unit apartment blocks which have almost no sharing spaces (except for staircases) are widespread in China for political and economic reasons. The demolition of old community and building blocks may cost less in the short term, but from a long-term perspective, a communal housing programme will not only benefit China socially, but also in economic and environmental aspects.
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9.0 Appendix

Insulae

Insulae means island, being recorded as the earliest example of apartment buildings, housed most of the urban citizens of ancient Rome (except for the wealthiest from the upper-middle class). It could accommodate over 40 people within only 330 sq ft in one isolated building. It was up to six or seven storeys high, in which, the ground level was normally for commercial and business use with living spaces upstairs, which continuous reappear in the modern housing complex. But this kind of housing was sometimes constructed at minimal expense for speculative purposes, resulting in poor construction.

Walter Gropius

In the 1930 CIAM[3] meeting, Walter Gropius suggested 10 to 12 storeys as an ideal height for apartments at least in Germany to stop what we now call urban sprawl. Gropius admits that the current desire for healthy, hygienic housing stresses light and air, which is best achieved through single-family housing with gardens. But allowing cities to spread out into distant suburbs made up of single-family homes necessitates long commutes to work, is a huge waste of time and an economic burden in terms of lost work time. Small dwellings are not the solution to urban problems. Instead, a properly designed high-rise, set in greenery with views of nature, can be “a biologically correct housing model for our times.”[4]

[2] Ibid.
Light Corridor Daytime
Light Corridor Nighttime
Building Model 1:200