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Gated Communities in China:
social sustainable residential unit

Thesis for the degree of Doctor of Philosophy

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Abstract

Since the 1978 economic reform, China has become one of the world's largest economies and has undergone an astonishing process of urbanization. This urban growth is a central element of China's national development strategy and is an on-going process. A significant part of this growth has been due to the massive rural-urban migration movement since the reduction of *hukou* (household registration system) control in the mid '80s and the relocation of citizens as a consequence of an intense process of demolition and reconstruction of existing residential communities. Hence, cities are growing at high speed to accommodate the enormous flow of people who are particularly moving towards the East Coast. This has resulted is the rapid emergence of large cities and megacities with a radical change in urban size and building typologies, where Chinese originating from completely different contexts live together in close proximity.

Thus, the question is how this amalgam of socio-economic, cultural and urban contextual changes is affecting the social quality of life of the citizens, particularly that of newcomers and the more disadvantaged groups. Is it possible for them to become socially integrated into this new social and urban reality? This research hypothesizes that citizens in this context, particularly migrants and those who have been relocated, need to be socially integrated into viable local contexts if they want to achieve the emotional and instrumental support required for a certain social quality of life. At the same time, the traditional organization of Chinese cities into walled spaces and gated residential communities is seen in this investigation as a great opportunity to provide citizens with a local context for bonding. Gated residential communities offer the possibility of humanizing the scale of megacities through a controllable and local context which can provide the social advantages of living in a small city, while also offering those of being in a megacity. Therefore, the general aim of this social study is to find out how gated community can favour the social relationships between neighbours through their urban form - focusing on building height, density and population size - to improve their social quality of life in large cities in China.

With this aim, field work in nine gated communities in Shanghai has been conducted for a twofold purpose. On the one hand, to clarify the current social bonds in gated communities and the concept of social quality of life considering the social standards of the Chinese population. On the other hand, to establish a comparison between the social network of communities with different values for the physical parameters investigated here. The findings show that bonding in these residential units is important so that citizens can be satisfied in a social sense and achieve social quality of life within their communities. Also, according to the results, building height and population size do actually have influence on bonding between residents while the density parameters studied here show no significant impact. Interesting results in relation to the influence of other design features of these communities are also provided. The outcomes of this investigation aim to facilitate the work of urban planners and

urban designers so that they may take speedy yet well-informed decisions on the rapid process of urbanization in China.

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Acronyms

SQOL: Social Quality of Life

PRC: People´s Republic of China

BC: building courtyard

X: xiaoqu

R: recognition by visual contact

TS: talking sporadically with a neighbour

TI: taking the initiative to socialize with a neighbour

A: amount of friends

SA: sharing activities

F: frequency of interaction

E: elderly (>60)

M: medium age (35-60)

Y: young (≤35)

CHAPTER 1

INTRODUCTION

1.1. Introduction

The structure of Chapter one to a great extent reflects the process of analysis followed in this investigation. Given the recent accelerated urban growth and the emergence of large cities and megacities in China, the primary aim of this research was to understand the impact of this new context on the social quality of life of Chinese culture, particularly taking into account urban density, building height, and population size. However, although the unit of analysis of this investigation is the residential gated community, the definition of this physical boundary - as well as the location of the field work – is arrived at from a top-down analysis. Similarly, the investigation aims to provide results which are useful not only for urban designers but also mainly at the urban planning level through the analysis of this residential unit.

First of all, therefore, a study at national scale of the migration flows towards specific urban areas is presented. This study makes it easier to understand the true magnitude of the past and future urbanization process in China and its distribution throughout the country. The analysis shows the strong rural-urban migration movement since the relaxation of controls in 1978 and the still exacerbated expected migratory process. Also, the current polarized concentration of urban population in the East Coast, particularly at specific points, is highlighted. This particular gathering of migrants in the East has encouraged the emergence of large cities in that area, where newcomers from very different origins and backgrounds live together with the local population in a new and completely different context. Such analysis guides us to the second part of the chapter where the impact of the metropolis on the social quality of life of city dwellers in comparison to rural environments, the social context of Chinese megacities and the social reality of its citizens in a new urban form is discussed. The impact of breaking existing bonds (kinship and place) by relocation, the co-existence of migrants with locals - who have some privileges over the former due to their *hukou*[1]-, and the changes in the origins and foundations for building new social relationships in this changing scenario are discussed. Finally, all the arguments explained throughout the chapter come together to establish the need to consider the citizen´s social quality of life – focusing on the requirements for emotional and instrumental support - in large cities and megacities as a patent necessity. By way of a solution, the residential gated community is highlighted as a great opportunity to humanize the daily life of these city dwellers and to

[1] [1] System of household registration in mainland China and Taiwan

facilitate their integration into the new context. To conclude, the purpose of the research and the objectives of this investigation are presented together with a brief summary of the following chapters of this thesis.

1.2. Chinese urbanization and the proliferation of large cities and megacities

Since the 1978 economic reform, China has become the second largest economy in the world after the United States of America. Over the last 35 years, the Chinese Gross Domestic Product (GDP) has grown exponentially, reaching a level exceeding half that of the US. However, the population in China is more than four times that of the United States, and therefore the Chinese GDP per capita still remains at a low level when considered on an international scale (Fig. 1-1) – ranked 93rd globally in 2010-2012 (IMF-International Monetary Fund, 2012). In this context, the aspirations of the Chinese government are to double the 2010 GDP per capita, in addition to urban and rural resident income, by 2020 (Perkowski, 2012; IMF, 2012) (Fig. 1-1). Such economic development, in industrialised nations, holds bidirectional causality with urbanization (Bai et al, 2012). Indeed, urban growth has been key for the socio-economic development of China in the last three decades particularly since the 1990s when the acceleration of urbanization has become a central element of China's national development strategy (Chang & Brada, 2006).

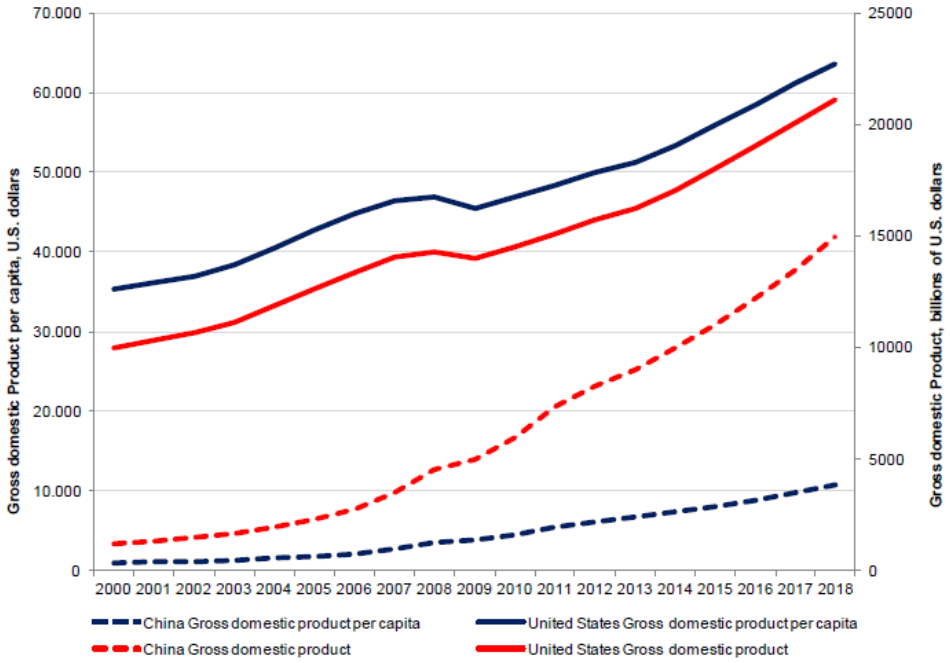


Fig. 1-1 Comparison of GDP and GDP per capita of China and US - 2000-2011 and prediction until 2018 - (calculated from data of IMF).

One of the strongest components supporting the urbanization process has been the massive rural-urban migration. Since the economic reform at the end of the 1970s, and the reduction of the household registration system (hukou) control in the mid-1980s, China has witnessed a remarkable phenomenon of migration from rural to urban areas, particularly from the west and central regions to the eastern coast. This trend of population flow has produced a significant increase in the urban population and a change in the population density in the eastern provinces (Fig. 1-2).

Certainly, the rural population decreased by more than 170 million people between 1990-2010 in China, while the number of residents of urban areas rose by more than 367 million (calculated from data of the NBS-National Bureau of Statistics of China). From 2000 to 2010, the urban population grew at an even higher rate, with an increase almost equivalent to the total of urban residents of the Unites States of America, escalating from 36.2% to 49.9% of the total population of China (calculated from data of NBS). But what is even more significant is that almost half of the increase in the number of city dwellers in that decade was concentrated in only 6 provinces, Henan, Hebei, Shangdon, Guangdong, Zhejiang and Jiangsu, which occupy only 9% of the national territory, but whose surface extension equates to 40% of the total of Chinese urban areas.

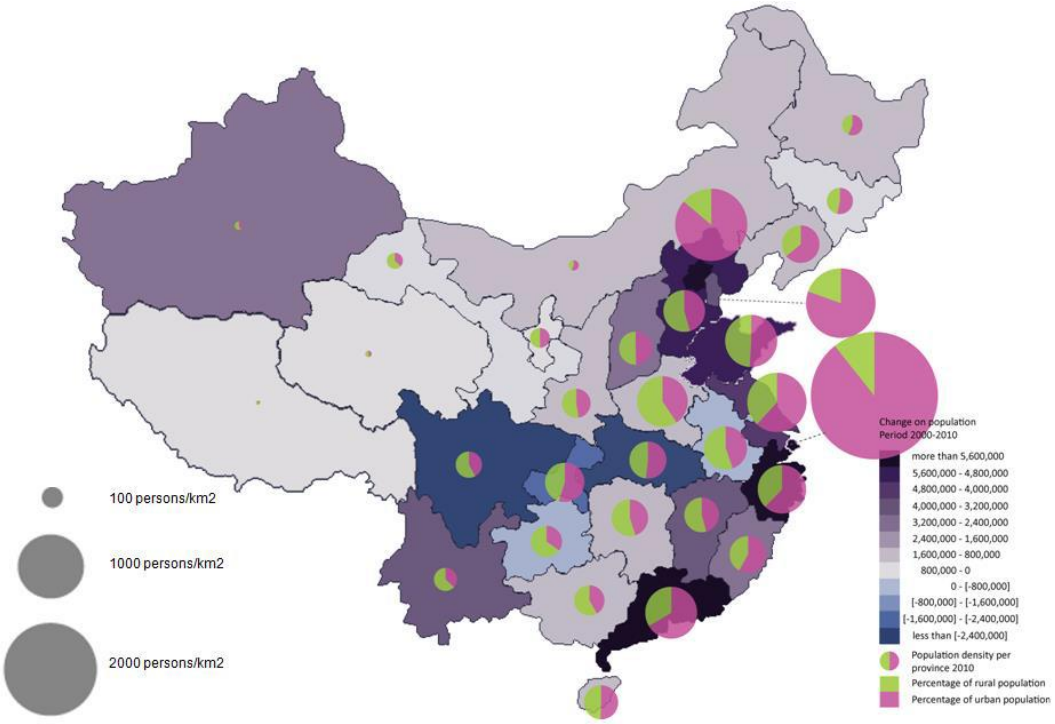


Fig. 1-2 Change of population period 2000-2010, population density and proportion of rural and urban population in 2010 at provincial level (calculated from data of the National Bureau of Statistics of China, NBS).

Some of the reasons for the uneven distribution of population between regions, and the tendency towards a concentration of population on the East Coast, can be found in the greater amount of capital investment (both domestic and foreign) in coastal areas, the setting

up of Special Economic Zones and Open Coastal Cities by the Government (Yeng et al, 2009), and the decentralization of central control, which was regulated by the economic reform (Fan, 2008). The economic development of the eastern provinces (Fig. 1-3) has produced an increase in job opportunities and higher wages, strengthening the in-migration flow to the East Coast (Fang and Dewen, 2003; Chen et al, 2011). Fig. 1-4 shows the greater out-migration from the central and western provinces towards the East, while the out-migration from the East provinces has been contained within the same region since 2000, this being even more pronounced in 2010.

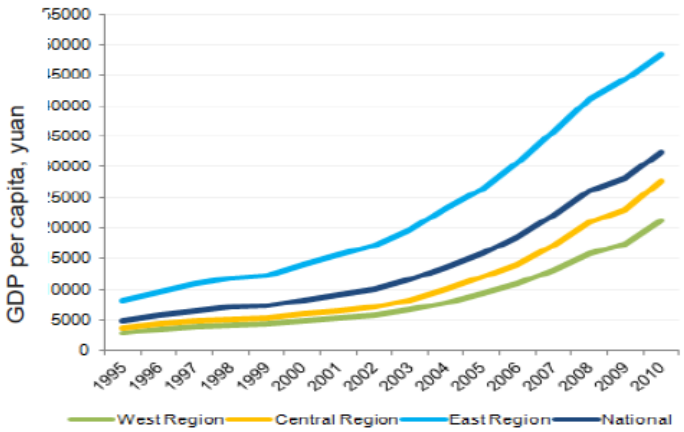


Fig. 1-3 Gross Domestic Product (GDP) per capita per region, period 1999-2010 (calculated from data of NBS).

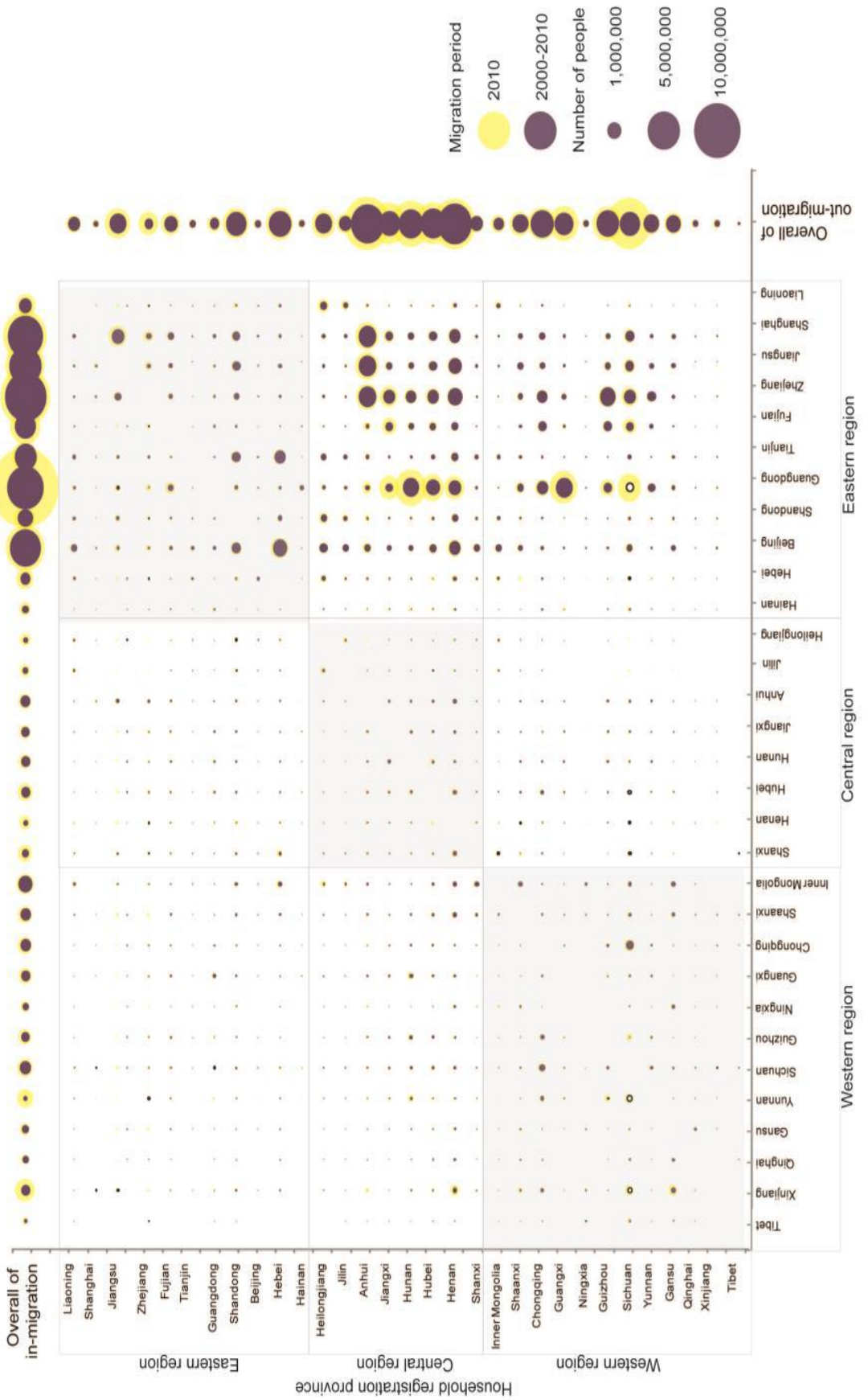


Fig. 1-4 Inter-provincial migration, 2000-2010 (calculated from data of the National Bureau of Statistics of China, NBS).

Simultaneously, the massive flow of cheap labour has reinforced the economic growth of the region and the demand for urban development to accommodate the rising population. A similar trend has been followed at the intra-regional and intra-provincial levels, with larger migration flows towards certain provinces and larger cities (e.g., Guangdong, Zhejiang, Jiangsu, Beijing and Shanghai), where the concentration of economic activities has been stronger. Therefore, the impact of the pace and volume of the growth of urban population has been intensified by its concentration in localised areas, resulting in large cities and megacities.

The proliferation of large cities, although more intensive in the eastern areas, is patent throughout the country. Indeed, the Chinese government has been attempting to promote more equal regional development since the late 1990s and to control the sprawl of large cities through policies enhancing the growth of small and medium-sized urban areas, especially since the Urban Planning Law of 1996 (Fan and Sun, 2008; Xu and Zhu, 2009). Some of these efforts have been effective, and the inter-regional and intra-regional disparities have decreased since 2004 (Fig. 1-5 and Fig. 1-6) – inequality in GDP and salaries has been assessed by the Theil index7 – although this may be attributed more to the rapid growth of specific provinces and cities in the western and central regions, than to the consistent development of the inland areas (Fan and Sun, 2008). Nevertheless, based on the results of this study, the eastern region continues to receive more investment, greater migration flows and has a higher annual GDP per capita and higher salaries (calculated from data of NBS, Fig. 1-3 and Fig. 1-4). These facts denote a still greater urbanization process and the proliferation of larger cities in the eastern areas, which – among other reasons explained in Chapter 3 - has triggered the selection of Shanghai and Ningbo as the cities for carrying out the field work of this investigation.

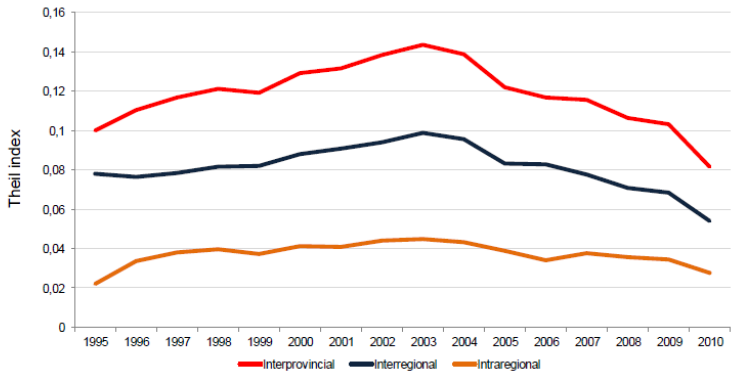


Fig. 1-5 Inter-provincial, inter-regional and intra-regional inequality in GDP per capita, 1995-2010 (calculated from data of the National Bureau of Statistics of China, NBS).

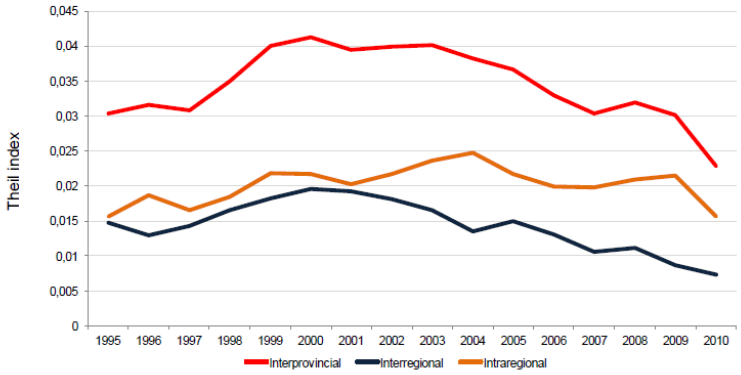


Fig. 1-6 Inter-provincial, inter-regional and intra-regional inequality in incomes per employer, 1995-2010 (calculated from data of the National Bureau of Statistics of China, NBS).

Thus, inevitably, the accelerated proliferation of large cities and megacities in the Chinese context and the vast rural-urban migration movement give rise to the question about how this process is impacting on the quality of life of their inhabitants, and particularly, in the case of this thesis, the influence on their social quality of life.

1.3. Urban Social Life: change from rural communities to the metropolis

As has been happening in China over the past decades, the agricultural advancements, the industrial revolution and the technological era progressively served to increased population size, density and heterogeneity of cities in the West. These physical, demographic and technological changes have diversified the means of interaction between people, the organization of the society and probably the *collective consciousness* of citizens – increasingly more global - and have modified the citizens' social life and encouraged the post-modern urban life style . The resulting attitude and behaviour of both the individual and the collective have been regarded in the West as an obstacle to developing social bonds between citizens, particularly when it comes to local ties, leading toward less cohesive and more unstable urban communities based on temporary and instrumental ties rather than lasting and emotional ones (Durkheim & Halls 1997; Simmel 1976; Wirth 1938). Indeed, this trend toward less cohesive communities in large urban areas has been noted in the Chinese context in recent years (Yuqi Liu, Wu, et al. 2017; Zhu, Breitung & Li 2012; Forrest & Yip 2007; Farrer 2002; Hazelzet & Wissink 2012).

During the last and current century, many sociologists have associated dense, heterogeneous and large-population cities with individualism, alienation and superficial relationships (Tönnies 2011; Durkheim 2005; Simmel 1976; Wirth 1938). The urban character has been said to become numbed and self-centred in comparison with the case in rural areas. Simmel (1976) defended that the dynamic exposure of citizens to many and diverse elements produced an over-stimulation which lead to introverted personalities and a *blasé* attitude. Weber (1966) described the metropolis as an inhuman and debasing social

environment where rationalization ruled the behaviour of citizens. Meanwhile, Durkheim (1963, 1997) used the concept of *anomie* to describe the social pathological behaviour of the citizen resulting from the heterogeneity of modern-day society. According to Durkheim, the rapid growth of cities produces the division of groups, and the lack of interaction between them might lead to a breakdown in their understanding and an *anomie* attitude. Also, Wirth (1938) described the *schizoid* character of the urban personality to point out the lower number of people known by city dwellers compared to those known by a rural population in relation to the amount of people they are exposed to each day, and of those, their superficial acquaintance. This schizoid character results in citizens who are suspicious, even with neighbours who are seen often, resulting not only in indifferent behaviour but even in aversion, mutual non-familiarity and repulsion, which turns into unfriendly behaviour (Simmel 1976). In short, the human beings react to an uncontrollable scenario full of external and unfamiliar factors, protecting themselves and adapting their behaviour and attitude toward their fellow citizens by adopting an alienated personality. Consequently, according to Wirth (1938) the citizen's social relationships become anonymous, superficial and transitory, characterized by close physical contact but distant social relations. These sociological changes occur at the same time as a new life style governed by different rules than in the countryside and a complete new socio-economic and political scenario is born in China. This new life and the behaviour of the city dwellers are now shaped more by the external conditioning of the urban context rather than by the interior of the individual, leading probably to an inner conflict and tension. As Simmel described in '*The metropolis and mental life'*:

"Punctuality, calculability and exactness, which are required by the complications and extensiveness of metropolitan life, are not only most intimately connected with its capitalistic and intellectualistic character but also colour the content of life and are conductive to the exclusion of those irrational, instinctive, sovereign human traits and impulses which originally seek to determine the form of life from within instead of receiving it from the outside in a general, schematically precise form." (Simmel 1976, p.13).

Besides the impact of the metropolis on the urban character, the change in the way in which tasks have been organised in the production system over the last century and the more recent technological evolution have changed not only the urban character but also that of the communities themselves and their foundations. Last century, many sociologists pointed out capitalism and division of labour as the consequences of the increase in population size and the primary reasons for the sociological change toward pragmatic rather than emotional communities. According to the deterministic approach, traditional communities underwent a social decline towards mere associations of people or social networks based on interests, dependence and cooperation rather than on common beliefs and emotional bonds (Tönnies 2011; Durkheim & Halls 1997; Simmel 1976; Wirth 1938). Tönnies (2011) differentiated between *Gemeinschaft* (community) associated with the social life of the country villages and *Gesellschaft* (association) characteristic of large cities. The social life of the former was

based on the unity of common purposes, language, traditions, beliefs, friends and enemies, and an intimate, private relationship. In short, a sense of 'we-ness'. Meanwhile, *Gesellschaft* refers to the social change from group to individualism and egotism where relationships become rational and calculated, and each person is understood in terms of a particular role and service to be provided. Durkheim (1895) shared the same idea and defended an evolution of societies from *mechanical solidarity* – where people are connected to others by personal ties and traditions- to *organic solidarity* in modern cities – where social connections are founded on increased reliance on others with regard to them performing their specialized tasks. Thus, the communities based on traditions, beliefs and emotional drivers with self-sufficient members shifted to become an association of people where interdependence, specialization and cooperation is great but emotional bonds are weak (Durkheim & Halls 1997). Simmel (1976) also highlighted the social change in modern societies towards an *intellectualistic attitude* and a calculating mind linked with the *money economy*. He stated that both intellectualistic attitudes and the money economy value quantitative aspects rather than qualitative ones and individuality. According to Simmel (1976), the intellectual relationships, contrary to the emotional, treat people as if were numbers, since they are only of interest insofar as they offer something objectively perceivable. And this intellectual attitude is reminiscent of the mass market production typical of modern cities, which is impersonal and concerned purely with maximising of economic benefits.

Conversely, other authors such as Thomas (1967) and Park & Burgess (1921) defended a systemic model which considered that the *Gemeinschaft-Gesellschaft* model of Tönnies lacked empirical evidence and failed to explain the forms of community organization found in modern society (Kasarda & Janowitz 1974). The systemic model questioned the existence of the *Gemeinschaft* in the pre-industrial era and defended that local communities are generic structures of mass society whose intensity depends, among other factors, more on the life-cycle stage of the members and their position within the social structure than on their rural or urban location (Kasarda & Janowitz 1974). However, nowadays, the different rhythm of life and the forces governing the daily activity of the inhabitants of towns and of megacities is radically opposite (Fig. 1-7 and Fig. 1-8), and the position upheld by the systemic model seems to loose strength in this new context in comparison with the *Gemeinschaft-Gesellschaft* model. Indeed, in the Chinese context, this trend noted by Tönnies (2011), Durkheim (1895) and Simmel (1976) where communities based on traditions and beliefs turn into an association of people is partially reflected in the traditional neighbourhoods and work unit – residential units before the economic reform - in comparison to the new commodity housing. The first two have been identified as communities characterised by tight social bonds while the latter is losing such social cohesiveness (Forrest & Yip 2007; Hazelzet & Wissink 2012; Zhu, Breitung & Li 2012).

Claude S. Fischer was another author with a conflicting perspective to the deterministic approach in relation to urban social life. In line with the Compositional Theory, Fischer &

Merton (1984) suggested that urbanism does not produce mental collapse or interpersonal estrangement, but urbanities are integrated into viable social worlds as rural people do. Furthermore, he developed the “Subculture theory” to express the sociological advantages of urbanism, according to which primary ties might be built on common interests and urban social heterogeneity flourishes into new, diverse, and rich subcultures rather than produce segregation or isolation (Fischer 1995). In any case, alienated or integrated, both lines of thought point out the different foundations for building social bonds between modern urbanities and between rural inhabitants or traditional communities. While the former is based on dependence or common interest, the latter is based on common traditions and beliefs built and maintained by daily face-to-face contact. These changes to the foundations of social ties necessarily affects the essence, objectives, durability and cohesion of urban communities as well as the benefits or support obtained from them.

Fig. 1-7 Qianhu Miao Village (above, www.tour-beijing.com/) and a village in Guangxi's Bama county (below, www.wsj.com/)

Fig. 1-8 Shanghai (above – www.spanish.peopledaily.com.cn/- and below - www.walesonline.co.uk)

Furthermore, the current exacerbated population size of large cities and megacities, globalization and the new technological means of long-distance communications are some of the latest ‘advances’ that have stirred up the contemporary social life of city dwellers. Indeed, globalization and the rise of information technology have been pointed out as being responsible for an unparalleled process of “deterritorialized social relations” (Beumer 2010; Scholte 2005; CoE 2008). In this new context, social interactions in large metropolises

frequently take place outside of a local context while virtual social networks seem to be *"further eroding the residual bonds of spatial proximity and kinship"* (Forrest & Kearns 2001, p.2126). Thus, all these social changes from the industrial revolution to the technological era seem to lead toward a loss of local social bonds, social cohesion and so greater societal risks and challenges (Beumer 2010; Giddens 2009) that do not appear to engage with the social principles of the collectivistic Chinese culture.

It is essential to highlight that all the aforementioned changes from the beginning of the industrial revolution up to the technological era have been gradual in the West. However, the Chinese case becomes as a shock, since many of these changes have been happening in large cities at an impressive accelerated rhythm, only over the last three decades with a great part of the migration movement going directly from rural areas to megacities – 63% of rural migrants were employed in large and medium cities and 20% in provincial capitals in 2009 (Gransow 2012). This fact makes it particularly interesting and urgent to carry out a sociological study of the Chinese case to shed some light on the impact that such changes are having on the new social quality of life of these new city dwellers and the character of their communities.

1.4. Megacities

1.4.1. Megacities and the social bonds – are megacities liveable?

Megacities have become the pillars of the global economy while the quality of the social life of the citizens and the provision of a healthy environment seem to have been overlooked. Castells (1998, p. 2) describes megacities as impersonal human settlements that *"constitute a complex unit of production, a single labour market and a specific system of power, beyond their extreme cultural and social differentiation…The size of the problems of mega cities and the feeling of their incredible power lead us to treat them as non-human constructions, as entities that have a life of their own*." Indeed, mega cities are pure growth engines and are the centres around which the world´s social and economic dynamic rotate. They are nuclei of economic influence, and the presence of globally renowned institutions headquartered there attracts millions of people from different background, culture, moral rules, religions, etc. to improve their working opportunities. On the other hand, the gathering of millions of people and the richness of diversity drive the emergence of these cities as centres for the arts, creativeness and innovation (Majd et al. 2015). Numerous leisure activities such as concerts, play theatre, opera, sports, cinemas, restaurants, pubs, cafes, shops, and almost all kind of amenities, are available simultaneously, thus providing more choice and increasing the vibrancy of the city (Fig. 1-9). However, does the presence of such amenities and advantages make them liveable and socially integrated?

Fig. 1-9 Nanjing road (left) and Art Museum in Shanghai (right)

On the one hand, the large group size of a megacity is unnatural and must hinder the development of bonds. Morris (1994) compared the people living in dense urban environments to animals in a zoo, since both are captured in a form of existence which does not fit their nature and this results in neurotic behaviour (Beumer 2010). He defended that human beings can cover their survival needs in this context, but the price to pay for living in this unnatural context leads to isolation, boredom and difficulties in developing healthy social relationships. It is true to say that humans currently cohabit, against their own nature, with millions of people within limited spaces (megacities). However, throughout history, humans have naturally tended to form bonds with small and controllable social groups. Indeed, as the population size has increased, society has tended to become divided into 'small' groups of similar people and specialised networks seeking cooperation, economic prosperity, and a containable and peaceful society. This is clearly exemplified by the division of labour and hierarchized societies but also currently by the diversity and multiplicity of social groups based on common interests or hobbies in populated conurbations. Certainly, the nature of the human being is physiologically limited to being integrated into large groups of people (Hill & Dunbar 2002). Some authors (Killworth et al. 1990; Pool & Kochen 1978) have pointed out that the average size of the human social networks is up to around 5000 people, while Hill & Dunbar (2002) specified that the size narrowed down to 150 people when it comes to establishing close social bonds. Thus, the multiplicity of groups in large cities is a logical process produced by the nature of the human being and might even strengthen the ties of in-group members as a reflection of identity and differentiation from the numerous out-groups (Quattrone & Jones 1980). However, this strengthening may occur when the individual belongs just only a few social networks, such as family, colleagues, neighbours, and reduced groups of friends, with which there is frequent contact and a sense of attachment can be developed. However, nowadays, the scenario is somewhat different.

Globalization has encouraged people to live in different cities and/or countries throughout their lives, building more social networks and maintaining some of the distant ties through ITC and sporadic face-to-face contact. Also, remarkably greater labour mobility encourages individuals to join more colleagues networks during their lives but for shorter periods of time. Along the same line, the advantage provided by large cities when it comes to becoming part

of a vast diversity of accessible groups formed by interests or hobbies further increases the range of groups that one can belong to. Most probably, many people engage temporarily in certain activities/hobbies and drop them often to participate in new ones in accordance with their different personal interests. These rotations of bonds, which are founded upon a common interest rather than on a common and permanent geographic location or a common belief and tradition (which is superior to the individual) – like Tönnies (2011) pointed out -, may instrumentalize and weaken the emotional ties of the relationships, making them fragile and more easily replaceable (Wirth 1938). Also, the lower expectations of durable relationships, given the great mobility of current society, especially in megacities, reinforces the trend towards more superficial and instrumental bonds. This is because our inner self is aware of the transience of belonging to most of the groups to which one belongs, and this leads to lower commitment and personal involvement even when emotional support is required.

On the other hand, the large distances in megacities and the decrease in the number of local social bonds hinder social face-to-face contact in favour of virtual communication which has been proved to reduce the intensity of ties and emotional involvement (Sherman et al. 2013; Small & Vorgan 2008; Turkle 2012). Certainly, the average commuting time in Chinese megacities is around one hour (Nelson 2015), which, when added to the working and personal care hours, leaves almost no time for leisure activities on a daily basis. Also, long travel distances are an obstacle to regular face-to-face contact with friends or relatives who may live in a different district of the city, leading to lonely citizens with daily relationships based mainly on working contacts or virtual interactions. It could be argued that long-distance communication means allow todays citizens to be socially more integrated – building new ties or maintaining existing ones. However, this form of interaction cannot replace face-to-face contact but should rather merely complement it. On the one hand, bonding "*requires a high level of encompassing knowledge of the others with whom one bonds*", which is particularly relevant for developing new ties and more easily achieved through personal contact than by online interaction (Etzioni & Etzioni 1999, p.242; Talcott Parsons 1951). On the other, face-to-face contact benefits from being an integral part of other social activities and within an interactive environment – going to the cinema, doing sports, or having a drink -, which opens up a wider range of possibilities for enjoyment and interaction, sharing hobbies and experiences, or spontaneously building ties with new people. The consequence is that the quality of the relationship and the social attraction between friends is higher through face-to-face communication (Antheunis, Valkenburg & Peter, 2012). This is in line with the evolution of interaction between human beings, which has been marked by face-to-face communication leading to us developing a special sensitivity to human faces and gestures from infancy (Goren et al. 1975; Tomasello et al. 2007; Sherman et al. 2013). In fact, it has been suggested that increased digital communication between young people contributes to stunted socio-emotional or empathic growth (Sherman et al. 2013; Small & Vorgan 2008; Turkle 2012). *"As digital communication*

more closely resembles in-person interaction, youth more effectively achieve emotional closeness." (Sherman et al. 2013, p.9).

Thus, the greater mobility of people, the ease of access to multiple social groups and the transience of belonging, excessively branch out the social bonds of the individuals towards a large number of temporary social networks where there is probably low frequency of contact and face-to-face interaction. Also, the progressive replacement of face-to-face relationships by ITC communication leads to the de-territorialisation of local bonds even though location seems to be one of the most important aspects taken into consideration for social integration in this context. This situation necessarily leads to less cohesive communities, a fact which may further increase the rate of turnover at the same time. This results in unstable and weak social networks with weak ties and where the members do not actually get to know each other, which is the trend of the social bonds in new gated communities in large Chinese cities (Yuqi Liu, Wu, et al. 2017; Zhu, Breitung & Li 2012; Forrest & Yip 2007; Farrer 2002; Hazelzet & Wissink 2012). These less cohesive and less durable communities may still be useful in providing pragmatic support (Granovetter 1973), but it is difficult for them to procure the emotional support required by the human being. However, paradoxically, inhabitants of large cities or megacities are very likely to be those with a greater need for belonging to a group in order to humanize their daily lives and reap the rewards of establishing strong emotional ties. Next section goes further into this aspect and focuses particularly on the Chinese context.

1.4.2. Social and built Chinese context in large cities and Megacities

In China, a great proportion of the population in megacities are migrants who leave behind all or most of their nuclei of friends, colleagues and family when moving to the city - around 40% of the population in Shanghai are migrants (Shanghai Municipal People's Government 2014b). In all likelihood, they move alone to an unknown context, living with more than 10 million people – more than 27 million in Shanghai in 2020 - who have different cultures, traditions, and even languages. This environment can often be hostile and cold, particularly for newcomers from a completely different background, such as those from rural environments -79% of Chinese migrants (Shanghai Statistics Bureau of Statistics 2011) - since everyone is a stranger and invisible, so hindering the process of integration. Thus, successful insertion of migrants depends not only on their employability and accessibility to a house and basic services, but also on the opportunities they have to build new personal bonds and a social network, so obtaining not only the means to survive but also the affection and instrumental support necessary to live (Yuqi Liu, Zhang, Wu, et al. 2017). Even, local residents of large Chinese cities can be isolated and in need of this emotional and instrumental support, given the social impact of the rapid reconstruction and urbanization process of many cities in China. Certainly, most of the traditional Chinese communities have been demolished (Yu et al. 2017) and replaced by higher density compounds with high-rise buildings over the last few decades (Fig. 1-10) - a process which is still going on. For

example, in Shanghai, the "*shikumen*" lanes have been reduced from 9000 in their heyday to 100 in 2014, with 98% of them having been demolished (Shanghai Municipal People's Government 2014a). The residents of these traditional communities have been "forced" to move to other parts of the city and the existing ties between neighbours and friends have probably disintegrated.

Furthermore, the short useful life of new Chinese buildings – 30 years average in comparison with the 74, 102, and 130 years average in the U.S, France and UK respectively (Cai et al. 2015; Hu et al. 2010) - and the centralised system of land tenure increases the periodic relocation of residents throughout the city, once more breaking the re-built social bonds and the cohesion of whole communities. Finally, the effects of this flow and relocation of people are aggravated given the aging Chinese population - 27% of the population in Shanghai is over 60 years old (Shanghai Municipal People's Government 2014b) - since the elderly may need more on-site physical and affectional support and a longer period of adaptation when moving to a new environment (Rowland 1977) – this is supported by results of the field work. Thus, besides the hostile environment of large cities as regards developing and maintain social ties, such scenarios further hinder the social integration of Chinese citizens and the development of cohesive communities.

Fig. 1-10 Demolition of traditional communities in Shanghai - photos by Anne (2013)

Likewise, migration and relocation of citizens not only shatter the ties with existing neighbours but the bonds with the place itself. The mentioned dramatic changes of location break numerous socio-spatial psychological links in a short period of time and may even produce the first stages of depression and the so-called "grief syndrome" even in cases where the conditions of the new environment are an improvement on the last (Fried 1966). Indeed, place identity and attachment are central feelings for individual well-being and the development of community cohesion. *"Like people, things, and activities, places are an integral part of the social world of everyday life; as such, they become important mechanisms through which identity is defined and situated"* (Cuba & Hummon 1993, p.112). Thus, place, and most of all a place of residence, is an important nucleus of sentiment which is associated with the concept of "being at home" or "being me", connecting one's personal identity with a particular environment (Dovey 1985; Hauge 2009; Cuba & Hummon 1993;

Kasarda & Janowitz 1974). Also, the association of the self with the physical environment is developed through interaction with other people in a familiar context which can favour a sense of shared interests and values bringing a sense of belonging and order to one´s socio-spatial world (Relph 1976; Cuba & Hummon 1993). Thus, building a new community from scratch or integrating new members into an existing one have an important socio-spatial and temporal dimension consisting not only of getting to know new neighbours but also adapting and developing feelings towards the place (Dovey 1985).

Even more so, the change of the concept and physical features of the built environment in residential spaces from traditional neighbourhoods and work units to gated commodity housing must also hinder this process of adapting to the location. On the one hand, the collectivistic and purely socialist concept of the *danwei* - built under the socialist centrally planned economy - havs been translated toward commodity housing during the market economy period. In the *danwei* compound model, residents of different status worked and lived within the same walled space. Families from different ranks lived and socialized, leading to complete social integration and an intensive coexistence. Indeed, a subculture - known as *dayuan wenhua* or compound culture - characterized by intensive social interaction and extensive mutual help as well as strong community identity, emerged among *danwei* members (Li et al. 2012). Conversely, the current commodity housing, in many cases, turns out to be “similar” to the western concept of gated communities with a purely residential character and where purchasing power determines the residents, reducing the social integration of different social classes. Also, the privacy, ownership, quality and aesthetics of the place seem to become primordial aspects over social collectivism.

On the other hand, the urban form has also been transformed in residential communities. The increase of urban population with higher living standards and the increase of living spaces triggered by economic development have brought with them a rapid change in urban size and building typologies. The traditional low-rise work units with a high population density have evolved towards high-rise typologies with greater living space per capita in commodity housing. Now, gated communities are provided with security and amenities such as landscaped gardens, small lakes, squares and sports areas where residents can socialise. This improvement on the quality of the indoor and outdoor spaces has increased the feeling of attachment and neighbourhood satisfaction of the residents (Zhu, Breitung, Li, et al. 2012). However, this increase in urban size – building height, distance between buildings, parks and squares sizes, etc. - must be carefully analysed since it may contributes to estrangement and social isolation, reducing the social quality of life of the citizens in their day-to-day lives (Ekblad & Werne 1990; Gifford 2007a; Li 1998; Forrest & Yip 2007; Lennard & Lennard 1984; Lennard & Lennard 1987; Marcus 2002; Kim & Kaplan 2004; Hester 1975; Dempsey 2011; Broyer 2002; Zaff & Devlin 1998). Indeed, despite the improvement of outdoor common spaces in commodity housing, the integration of Chinese society within their communities, their social bonds and cohesion has decreased with regards to the

traditional neighbourhoods and work unit model (Li et al. 2012; Zhu, Breitung, Li, et al. 2012; Ekblad & Werne 1990; Forrest & Yip 2007).

Thus, the importance of these inevitable individual and collective psychological processes, the magnitude of the social impact of the accepted system of relocation and massive migration, and the change of residential areas – conceptually and physically - seems to have been underestimated and overlooked in large cities in China. Indeed, psychologists fear an unsettling effect on local communities in China, given the sense of potential disorientation due to the rapid replacement of the old and familiar context with a changing and unstable new one (Week in China, 2010; Hessler, 2011). In this way, this thesis questions the social integration into viable and liveable communities of individuals in Chinese large cities and their social quality of life, opting for exploring the potential of the residential communities to fulfil their social, emotional and instrumental needs. Thus, a careful study of gated communities – the most important socio-spatial residential units that compose the city - and the encouragement of local ties through a sensitive design of their built environment is raised in this thesis as a possible solution. This suggestion seems crucial to softening the impact of the inevitable contextual situation and to improving the social quality of life[2] of Chinese urbanities through their neighbourhood relationships. The study of the optimization of these residential socio-spatial units should be crucial to facilitate and speed up urban planning and the design process firmly and in an informed way.

1.5. Aim and objectives

As explained in previous sections, China is passing through quick and crucial changes. The amount of large cities and megacities are increasing and the social quality of life of citizens in regards to their social integration – accomplishment of emotional and instrumental social needs – is questioned. This thesis defends the importance of local contacts and the need to belong to a controlled group of people in this context to improve the social quality of life of citizens – particularly the most disadvantaged groups. Thus, residential gated commodity housing is highlighted as a fundamental unit that offers a great opportunity for such social integration.

Therefore, the aim of this thesis is to find out how gated community can favour the social relationships between neighbours through their urban form - focusing on building height, density and population size - to improve their social quality of life in large cities in China. Based on this aim, two objectives are set:

- The first objective consists of an overview and review of the social existing relationships between neighbours within gated community and the residents' satisfaction with that social environment.

[2] Social quality is understood as the definition provided by Beck et al (2001) but adapted to the scale of the neighbourhood (further details in Chapter 3 section 3.2). Thus, paraphrasing Beck et al (2001, pp.6–7) social quality is defined here as the level to which people are able to participate in the social life of their communities to fulfil a need for emotional and instrumental support under conditions that enhance their well-being and individual potential.

- The second objective is to understand the impact of the built environment of gated communities on social interaction between residents.

1.5.1. Research questions

Two research questions are explored in this investigation (hypotheses detailed in Chapter 3 section 3.3.2):

Research questions in relation to objective 1:

- How are the social relationships between the residents of a medium economic level gated community in a large city in China?
- How would residents like the social relationships within their gated community in megacities in China to be in order to improve their social quality of life?

Research questions in relation to objective 2:

Regarding the built environment, physical and aesthetic features are taken into consideration – for further information see Chapter 3. However, the main aspects of study are centred on physical features so as to provide a tool to help the planning process. These variables – explained in Chapter 3 section 3.2.1.1 - are building height, density and population size, with the research question of objective 2 being:

- How does the built environment of a gated community, particularly its density, building height and population size, influence the social relationships between its residents?

1.5.2. Expected outcomes

The expected outcomes of this study seek to provide support in the form of guidelines for the urban planning and urban design decision-making process for new residential Chinese developments (gated commodity housing). Density, population size of the communities and building height are basic parameters used in urban planning and, at the same time, have an effect at the local – neighbourhood - level and on the social quality of life (SQOL) of the citizens. Exploring the impact of these indicators will allow the urban planning system hierarchy to take into account the social consequences of their decisions at the lower layers of the city, contributing to encouraging a feedback loop design process instead of a top-down one. Additionally, design features of the gated commodity housing such as topology, design of courtyards generated between buildings, central squares and common spaces´ design, aesthetic, facilities, etc. are analysed. The outcomes in relation to these morphological aspects are particularly relevant for the social success of the community and may help urban designers in the design process for gated communities.

1.6 Thesis outline

This thesis is structured into five chapters. Chapters one to three constitute the preliminary part, delving deeper into the context of the study and reviewing previous studies in order to define the objectives of the research and develop a methodological framework. At the end of chapter three, the nine gated communities selected as case studies for the field work in Shanghai are introduced. Meanwhile, chapter four presents the findings of this thesis through a lengthy and comprehensive analysis of the data. Finally, chapter five reviews and concludes the whole thesis, summarising the key findings, making recommendations for policy making, and proposing potential directions for further research.

Following the first, introductory chapter, **chapter two** attempts to provide multiple and confluent points of view to support the hypothetical emotional and instrumental social needs of citizens from large Chinese metropolises for building local bonds to achieve social quality of life (SQOL). This chapter makes an attempt to get closer to Chinese culture by analysing their beliefs, philosophies, and social norms, highlighting their collectivist and social character. The second part of the chapter takes a closer look at the characteristics of the physical unit of this study, the gated communities. In this part, firstly, a discussion about the controversial topic in relation to opening the gates is settled. Secondly, the evolution from work-unit compounds to gated residential communities is described and the change in living conditions and social relationships from one model to the other are highlighted. Finally, the confluence of the Chinese collectivist principles with their agitated recent history, the latest socio-economic reforms, the change of urban form and the neighbourhood concept lead to a discussion regarding the social dilemma that this society may have in the current Chinese scenario, particularly in large cities or megacities. To conclude, this chapter points out the imperious need for reviewing the urban form of the basic residential social unit of the Chinese cities – gated communities – and its potential to provide a local and social support – to cover emotional and instrumental needs – to improve the social quality of life of the residents in this context.

Chapter three gives an in-depth explanation of the conceptual model proposed for investigating the research objectives of this investigation and the methodology and methods used. The first part attempts to clearly delimit the physical and conceptual boundaries of the research. To do so, the concept of social quality of life, dependent variables - social network, social capital and social cohesion - and independent ones - building height, density, population size, environmental quality, aesthetic and maintenance - are defined and their relationship is explained. The second part focuses on the methodology and methods of analysis used, which are approached from a broad perspective. The methodology for collecting data played an important role in this investigation and has been re-defined and reviewed several times, particularly following the pilot study conducted in Ningbo. The results obtained from this process are presented in this chapter to make a contribution to and facilitate field work for future researchers. Finally, this chapter introduces the area of

Shanghai where the field work was conducted and the nine gated communities were the data were collected. A brief description of each community is provided together with the plans and digital information on the general aspects of these walled residential units and their specific traits.

Chapter four contains the data analysis and the main findings of this investigation. The results are organised principally into four parts and includes contextual conditions, general trends, comparisons between communities, and regression analysis. The first part provides a general view of the influence of the independent variables related to environmental quality, aesthetic and maintenance of the built environment and demographic variables on social network to facilitate the understanding of following sections´ outcomes. The second part provides an overview of the tendency of social network, social capital and social cohesion and the participants´ standards for those dependent variables – taking into account the sample size of each of the communities. The analysis of the relationship between these variables provides an understanding of the meaning of social quality of life in this context. The third section focuses on the comparison between communities to respond to the hypotheses set out as to the impact of height of buildings, built density and community size on the compounds´ social network, social capital and social cohesion. The last section is composed of a series of regression analyses between social ties and the independent variables including the physical (building height, community´s size and density), demographic and environmental ones to estimate the weight that each variable may have on social ties.

Chapter five summarizes and discuss the major findings of the research, and draws conclusions in relation to the research questions set out for this investigation. According to these findings, certain recommendations are made for two scales of intervention. On the one hand, the conclusions regarding building height, density, and population size of the gated communities will facilitate informed decision making at the urban planning scale to favour the social quality of life of citizens within residential communities in megacities. On the other, guidelines are provided for urban designers in relation to the topology and geometry of the communities as well as the design of the outdoor common spaces. Finally, the challenges and limitations of this research are summarised and potential future research subjects suggested.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

The second chapter is organized in two main parts. The literature review of the first part supports the hypothesised social need (both emotional and instrumental) of Chinese citizens from large metropolises to build local bonds to achieve social quality of life, while questioning the adequacy of the design of contemporary built environments to attain that aim. Meanwhile, the second part of this Chapter goes into greater depth as regards the concept of gated communities as an essential social unit in China and its evolution from the work units. Finally, a discussion brings together social needs and built environment to point out both the need for a better understanding of the current principles for social interaction and optimise the design of gated communities for social quality of life.

One of the main foundations upon which the hypothesised social need is based is the understanding of the *collective consciousness* of the Chinese culture, particularly focused here on the relevance of maintaining social relationships for social and individual well-being. With this aim, the principles of the more influential philosophies/religions (Confucianism, Taoism and Buddhism) in Chinese culture, the own code of norms for social relationships marked by the concept of *guanxi* and the inherent social needs of human beings are analysed and contrasted with the current scenario. Also, the loss of connection between beliefs and the design of the built environment over recent decades in China is underlined as being a major obstacle to social integration. On the other hand, a second part introduces the gated communities as a potential solution to fulfil the aforementioned social needs by building local ties – gradually being lost in China. The conceptual and physical evolution of the work units toward the gated communities is discussed in relation to their opportunities and barriers for social boding. Finally, the confluence of all the matters mentioned above is discussed, leading toward a defence of the need to provide a local and familiar context in large cities such as residential communities that humanizes the citizens´ social life. However, the evolution of the urban form of the gated communities is questioned and the need for exploring its impact on social interaction pointed out.

2.2. A social need: the relevance of social bonds and the Chinese context

2.2.1. Philosophies, beliefs and culture

China is a secular state but with strong and rooted beliefs and superstitions. Confucianism and Taoism are the most relevant and ancient Chinese philosophies that have soaked to today's society. They emerged during a period of political and social turmoil in the Zhou dynasty (c.1050-256 BCE) in order to establish a social order – period known as the "100 Schools of Thought". Meanwhile, Buddhism, coming from India, was introduced later in China and adapted to Chinese culture and became the third most popular philosophy (or religion) in the country. These philosophies have largely shaped Chinese society towards a collectivist and socialist culture, the principles of which have been clearly reflected in the design of the built environment. All of these are focused on achieving a status of harmony between man and environment (including nature, the built environment and society) through self-cultivation and various principles that in one way or another regulate the interaction between people, and social relationships therefore take pride of place. Thus, despite the fact that each doctrine has its own codes and meanings, all of them encourage achieving social order and cohesion and understand the self from the social sphere. The continuous presence of such social values in Chinese culture might lead to significant differences from the West in the interpretations of social quality of life and basic and social needs (emotional and instrumental).

Additionally, the recent economic reform and opening to the outside world since 1970s have brought about an important social change in the last decades. Social inequality is now patent in Chinese society, particularly in the main megacities – Beijing and Shanghai - and large cities due to the widening wealth gap and the limited welfare benefits of migrants. Social segregation has been accentuated due to the consequences of the market economy and some institutional systems (*hukou*). Also, the change in the built environment and the socialist concept of residential areas have weakened the intensity of social bonds between neighbours toward less cohesive communities (Forrest & Yip 2007; Hazelzet & Wissink 2012; Zhu, Breitung & Li 2012). Therefore, these socio-economic, institutional and urban changes have introduced new factors into Chinese society that may shake the foundations of their social values and create some conflicts – particularly in the context of large cities. A deep exploration of the principles of these philosophies and the possible clash with the current context reveal essential insights for approaching the concept of social quality of life and the importance of social relationships in Chinese culture nowadays.

Confucianism

Confucianism seeks social order by introducing a marked social hierarchy and specific behavioural norms for interaction. This philosophy is the base of the Chinese culture (Waldmann 2000; Gao & Handley-Schachler 2003) and its values have shaped the Chinese cultural identity and social principles for millennia. The Confucianism has been the most influential philosophy in China and has been considered the official state ideology since the

Han Dynasty (206 BC – 220 AD) (Adler & College 2011). Subsequent influences of Buddhism and, to a lesser extent, Taoism resulted in Neo-Confucianism, which became the basis of the imperial examinations and the core philosophy of the scholarly official class in the Song dynasty (960-1279 AD) (Adler & College 2011), and therefore it carries a great deal of weight in Chinese society. This philosophy was rejected during the two subsequent periods, the Nationalist´s "Republic of China" (1912-1949) and Mao Zedong's communist "People's Republic of China" (1949-1976), since this philosophical current was considered to be the blame for China's weaknesses and the brake to the process of modernization of the nation[3] (Lin 2013; Adler & College 2011). However, the strong influence of the Confucian tradition did not vanish from the Chinese culture and some of the elements of this philosophy remained present subtly in the whole structure and functioning of Chinese society (Lin 2013).

This leading philosophy is purely social and its doctrines were centred on rescuing the sense of community and family ethics to achieve a harmonious society through introducing a set of norms guiding the behaviour of individuals in their interaction with others within a social hierarchy (Fan 1995). Hofstede & Bond (1988, p. 8) summarized Confucian philosophy quite aptly in four main principles: (1) the stability of society is based on unequal relationships between people; (2) the family is the prototype of all social organizations; (3) virtuous behaviour towards others lies in reciprocity; and (4) virtuous behaviour includes self-improvement through education, diligence, perseverance and moderation in all things. Within these ideals, the individual was regarded as a component of various overlapping social networks whose rights and obligations were defined in relation to his/her hierarchical position within such networks (Gao & Handley-Schachler 2003). The social rankings were outlined through the *five cardinal role relations – "Wu Lun"* - between emperor and subject, father and son, husband and wife, elder and younger brothers, and between friends (Gao & Handley-Schachler 2003). However, that social hierarchy did not pursue utilitarian aims or material interests, but rather contributed to regulating social interactions through certain virtues of morality: humaneness (ren) – respect and love for others; righteousness (yi); ritual propriety and respect for social norms (li) – fundamental regulatory etiquette consistent with cultural norms; trustworthiness (xin), and filial respect (xiao) (Lin 2013; Gao & Handley-Schachler 2003). Thus, despite the strong hierarchical and unequal nature of the relationships, the Confucian ideal of "harmony" meant inclusion, social diversity, coexistence of difference, and openness to participate in different social networks ruled by respect, politeness and reciprocity (*guanxi*).

Furthermore, in this philosophy there is no strict 'good–bad', ´better-worst´ or 'right–wrong' dichotomies but instead an inevitable 'balance of forces', yin-yang, that encourages the acceptance of undesirable situations which facilitates the process of conflict resolution (Gao

[3] *For decades scholars had followed the lead of Max Weber in considering Confucianism the main cultural impediment to national development due to powerful negative factors such as the existence of a powerful land-based aristocracy and the justification of authoritarian rule over individual freedom and creativity* (Choe 1998, p.73).

& Handley-Schachler 2003). Under these ideals, the social interactions of the Chinese attempt to avoid conflicts, disagreement, competition and frustration; and looks for understanding, tolerance, peaceful interaction and collaboration. Thus, *"the value of harmony guides people's interaction manners and norms in every aspect of Chinese social interaction—in family, between friends, at school, in business and among strangers. The ability to achieve interpersonal harmony is the crucial criterion of one's competence in Chinese social interaction."* (Wei & Li 2013, p.3).

Currently, some of these principles are present in Chinese culture but within a different social hierarchy and ranking of values. On the one hand, the personal connections and relationships still acquire a central position for individual fulfilment. Indeed, *guanxi* is a term that represents the importance given to belonging to different social networks and describes essential "rules" governing such personalised networks of influence. This concept has inherited some social norms of implicit mutual obligations, reciprocity, and trust from Confucian philosophy (Yadong et al. 2011). But even more, *guanxi* includes specific notions of behaviour and interactions (Gold, Douglas Guthrie, et al. 2002) – see section *guanxi* bellow. The presence of this concept in all social spheres - personal, business and governmental – reveals its weight in Chinese culture, representing not only a manner of interaction but a life style and the understanding of the self always within a network of social relationships.

On the other hand, the Confucian principle of acceptance of a hierarchy and inequality may have changed its basis from a social and filial rank toward an economic foundation. This fact produces a change not only in the nature of the relationships but in the principles of inclusion, social order and harmony. Social segregation and conflicts emerge from the yawning wealth gap and the consequences of the *hukou* system – rising cost of housing, education and medical care for migrants. This distance between different income groups and locals and migrants is even more patent in megacities with stronger restrictions. Therefore, the clash between the millennial principles of Confucius and the current situation are evident, stressing the social principles of this culture. However, it would not be reasonable to ignore a millennial culture dragged down by the socio-economic changes introduced by the market economy. Urban planners and urban designers should pay special attention to integrating Chinese citizens within viable communities and social networks in order to palliate these institutional and socio-economic inequalities, in this way improving the realization of the self and the social quality of life.

Indeed, the importance of these social principles is reflected in the behaviour and life style of people, and so, inevitably, also in the spatial dimension (Wolch & Dear 2013). Certainly, the planning of the imperial city was greatly influenced by the principles set by the Confucian classic writings called Zhou Li, where the size, structure and distribution of the city were specified and followed hierarchical principles (Xu 2009). The design (Fig. 2-1) aimed to match the hierarchy of social behaviour with the necessary spatial arrangements to achieve

an ideal social order. To do so, the city was planned as a walled square of almost 3x3 km divided by nine[4] main streets north-south and nine east-west with three gates on each side of the walls (Xu & Yang 2009; Xu 2009). The palace of the emperor was to be located in the middle of the city facing south[5] and surrounded by the administration body. Thus, this gridded and centralized mesh divided the city into different walled districts, organizing the population into several groups to facilitate their control and achieve the social order. These ideals were perfectly in line with hierarchical centralised feudal governments and so the model was implemented as the official planning norm in all the dynasties throughout China´s imperial age (Xu 2009).

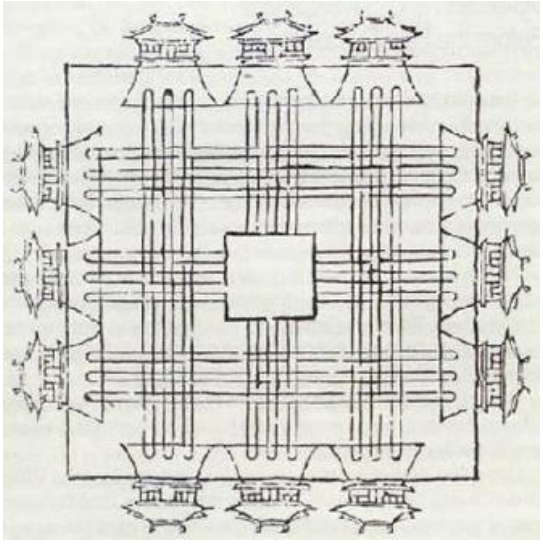


Fig. 2-1 Plan of Chinese medieval city (http://en.chinaculture.org/library/2008-01/16/content_38819.htm)

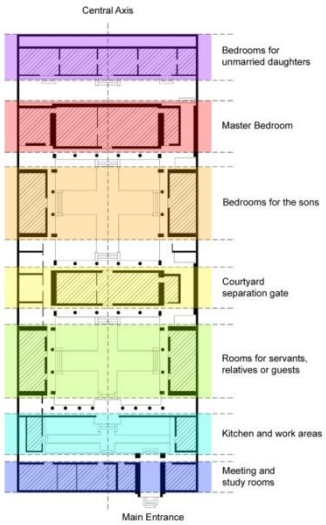


Fig. 2-2 Plan of typical Chinese courtyard house (Lo 2010).

In the same way, the hierarchical social structure enclosed by walls is reproduced at a smaller scale in the traditional courtyard house. This typology was conceived to be occupied by several generations of the same family at once, constituting the elementary socio-spatial unit of the city. The whole compound consisted of aggregations of individual houses for each generation – usually, three generations lived together. The single house was built along a main north-south axis with a succession of courtyards that became more private, the further

[4] Many Chinese have faith in the traditional association of certain numbers with positive and negative meanings based on the Chinese word that the number name sounds similar to. In this case, the number nine means “long lasting” and has been historically associated with the Emperor of China. This is reflected in the design of the imperial palaces to show the Emperor´s power and the desire for longevity and the eternal reign of their empire. One example is the Forbidden City in Beijing, which, among other things, has 9,999 rooms and its three mayor halls have 81 doornails in nine rows and nine columns on each gate. Also, the number 9 is associated nowadays with people that have a gift for serving others and creating a relaxed atmosphere around them.

[5] The traditional design of cities and buildings in China is very much marked by axiality and cardinal orientation. The north-south direction is the main axis while the south orientation the more desirable, since for the Chinese the north represented the rigors of winter and the threat of barbarian invasion. For the same reason all important buildings opened towards the south. Also, that orientation is also preferable according to feng-shui, since the south represents the positive Yang Qi (Lu & Bozovic-Stamenovic 2004).

north they were situated. The orientation of the buildings and their level of privacy were the key elements in defining their occupation by the various members of the family (Fig. 2-2). Accordingly, the courtyards served a different purpose and they increased their degree of privacy from south to north (Li 2009). Therefore, the design of the house was made of layers of privacy and the occupation of the buildings or rooms was allocated according to the social hierarchical position of each member within the family. Furthermore, besides the hierarchical arrangement, this typology aimed to regulate interaction between the occupants to avoid possible conflicts due to the large number of families present. Thus, the functional distribution of individual units around the central courtyard separated the family members providing enough privacy and individualism to maintain more harmonized relationships and common central spaces for interaction (Lo 2010).

Also, the districts were walled spaces, but the rigidity of the design was softened inside to favour social inclusion. Their layout was more organic than the orthogonal and cardinal city and courtyard house. A random assortment of houses of different sizes and ages were separated by meandering narrow lanes in Shanghai called *longtangs* (Fig. 2-3 and Fig. 2-4) – in Beijing they were laid out as a rectangular grid and they were called hutongs (Chinasage 2012). Here, people of different social classes lived close to each other reflecting the importance that Confucianism gave to social inclusion and integration. In this way, the structured design of the city and courtyard houses provided the order needed to divide the population into controllable groups while the more organic forms of the district would encourage a vibrant social life on the local scale. This combination of structured and organic forms to mould the life of the citizens under specific social principles is reminiscent of the concept of the complementary forces of the yin-yang since one is required to ‘let the other be’ in order to achieve social order, integration and harmony.

Fig. 2-3 Longtang in Shanghai (image taken by Kloppenborg, 2005)

Fig. 2-4 Longtang lifestyle (Qiongfang 2014) http://www.trekearth.com

The influence of these collective ideals in the urban form were partially preserved in the *danwei* or work units during the Mao period. People of different ranks lived and worked together under a certain social hierarchy but without great income gaps, which facilitated social inclusion. The presence of walls - that in line with Confucian philosophy were important to define the collective – was more powerful since the flow of people in-out was quite restricted. As a result daily interactions were very intensive and the sense of community and identity was strong (He 1998). However, the case of gated communities seems to be further away from the Confucian ideals. Here, walls are seen as elements of segregation due to the impact of the market economy. Certainly, they produce a division between different socio-economic groups in residential areas but, would it be possible to break down the barriers that the market economy is introducing by demolishing the walls? Possibly, people would be anyway grouped by areas and neighbourhoods of different socio-economic level, however the definition of a collective produced by walls would be lost. Thus, the gated commodity housing model would also lose the possibility of achieving certain cohesiveness and the benefits – emotional and instrumental - of belonging to a social network.

Taoism

The principles of Taoism also collide with the social values derived from a market economy and the inequalities and conflicts generated by institutional regulations such as *hukou*. This philosophy emerges from the same situation of conflict as Confucianism, to promote equilibrium, harmony and fairness. Unlike Confucianism, Taoism rejects the hierarchical vision of society and stands for an equalitarian society where individuality is defended. This philosophy also considers the achievement of harmonic relationships with nature and the society as being crucial to leading a balanced life. However, the achievement of this equilibrium for Taoists can only be attained through individual freedom and selflessness but never by societal conventions and regulations. Only *"when selflessness is attained does the*

distinction between "I" and "other" disappear" achieving an equalitarian and integrated society free from prejudices, external social constrictions and internal psychological impediments" (Ho 1995, p.120). Taoists think that under such conditions, society can act spontaneously and free from envy or interest and lead a good life. Thus, this philosophy promotes a simple life governed by equilibrium, where success is achieved questioning one's own values, rejecting the self and renouncing superfluous things in defence of social equity (López Sastre 2013).

This idea of an attitude of selflessness is directly related with the concept of Tao – the core of this philosophy - and the notions of social inclusion, cohesion and equality. The Tao is a very abstract notion and it is impossible to provide a specific definition for it since this would go against its very nature. The Tao could be described as vacuity and entirety at once, or the absolute and infinite, involving the acceptance of contradictions and paradoxes. Certainly, the Tao is regarded as the unitary force made up of complementary and inseparable forces which are unpredictable and at the same time unalterable (Gazi 2005). These forces within the Tao are known as Yin Yang (Fig. 2-5) and constitute a purely relativistic philosophical principle which implies that all things can be described only in relation to each other; *"being and not being produce each other [and] each derives its meaning from the coexistence of the other"* (Ho 1995, p.119). Thus, in this context of thought, what in the western social context might be seen as an incompatibility, here may be understood as complementary and facilitating the successful development of social bonds. Also, under these principles, the individual is considered as a part of a whole, into which he or she is immersed by forces beyond their control, and the self loses relevance in favour of a sense of belonging and irremediable integration with a larger entity. This principle of complementary and dependent units must have a significant implication for the social behaviour of the believers and ought to favour their social interaction, inclusion and cohesion. Taoists must need to feel part of social networks and viable communities in order to be fulfilled since the self loses meaning without the rest. This feeling goes further than an emotional or instrumental social need, it is a belief and a way of understanding existence.

On the other hand, the acceptance of the Tao and the Yin Yang implies acceptance of adversities and privileges, sorrow and joy, life and death, because everything is an integral part of the endless and unavoidable cosmological change. This idea of dual, indivisible and uncontrollable forces - present also in the principles of Confucianism, although in a different way[6] - highlights how important it is to understand the inevitability of change and the importance of being willing to make the necessary adjustments in life to maintain a harmonious and balanced state (Gao & Handley-Schachler 2003). In fact, there is a specific concept within Taoism that refers to this attitude, the *Wu wei* which could be translated as

[6] Confucianism also believes in the principle of the Yin Yang, but it bestows it with a hierarchical meaning in some cases. For example, yin is associated with women and yang with man the former being subordinated and inferior to the latter.

the “no action”, meaning do not interfere in the natural course of things and behave spontaneously with no deliberate plan. This does not defend a passive attitude but rather suggests that forcing a situation and fighting for something that is impossible is a great mistake. Thus, surely this attitude in life is particularly convenient for controlling the demands of a massive society and avoiding confrontations between individuals and maintaining social order despite inequalities.

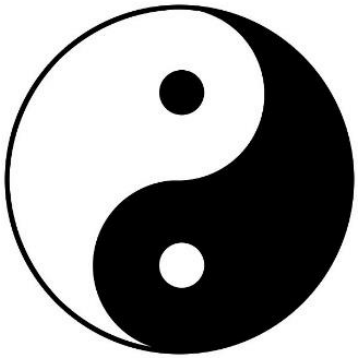


Fig. 2-5 Symbol of Yin yang

Another sociological consequence of this philosophy is related with the ways of achieving the Tao. The ultimate purpose of every Taoists is to reach the Tao, which has been translated as the “way” toward the achievement of personal equilibrium and equity in harmony with the fundamental laws of the universe, nature and all living creatures (Preciado 2013). However, contrary to other ideologies, this philosophy is particularly flexible and adaptable to each individual´s understanding of how to achieve the “way”, there being no specific commandments. Instead, Taoism provides a series of stories in the *Tao Te Ching* - the main book of the Taoism - to exemplify various routes towards the Tao, and it is open to personal interpretations (Lao-tzu 1972). This freedom of thought with no constrictions must favour open-mindedness, tolerance and respect towards the various beliefs and how people behave towards each other, avoiding conflicts and facilitating their resolution. But also, these principles – including acceptance of inevitability, keeping an open mind, a sense of belonging and the importance of social harmony - should facilitate the development of large and numerous social networks since it is easier to get along with more people, although the bonds might not necessarily be strong. This ease of dealing with others and fluidity in social relationships shows a different nature and language of how people interact. Maybe social networks do not have to be so tight as in the West in order to obtain social benefits – related to the mentioned emotional and instrumental support - and have a good social quality of life. Indeed, this idea of a large social network with weak bonds is present in some of the communities analysed during the pilot study and the field work of this research, since a significant proportion of the residents can interact and congregate in the public spaces of their compound on a daily basis, suggesting a strong collective bond although the individual

ties between them may be superficial (Fig. 2-6). This is one more indication, like *guanxi*, of the importance given to social relationships in China although under its own code of behaviour different from western principles.

Fig. 2-6 Residents doing Taichi in the common space

Finally, as with Confucianism, Taoism had an important impact on Chinese society and its principles have been reflected in the traditional urban structure and residential pattern, it being particularly patent in the relationship between enclosed open spaces and man-made constructions. This relationship is regarded as a manifestation of the Ying-Yang concept and the idea of linking man and nature (Xu 1998), which is based on spiritual and practical objectives. A perfect example is the traditional Chinese courtyard house where the courtyard becomes the natural setting with more organic shapes symbolizing the void-entity (negative-yin) while the buildings - the man-made entities - with their regular forms (yang-positive) complement the former so bringing together man and nature. Thus, both void and built represent the whole. Meanwhile, in practice, the courtyard was a natural way of regulating the microclimate of the house and managing how much sunlight enters and ventilation. In any event, both interpretations, both the conceptual and the practical, deal with the intimate and harmonious relationship that the Chinese maintain with nature. Indeed, the relevance and presence of nature is one of the few elements that have been consistently preserved in contemporary Chinese residential compounds. Nevertheless, this nature-indoor spaces relationship has these days become more distant and mainly visual in gated communities. The change of typology and scale of urban form has resulted in excessively large and inaccessible green areas that hinder direct contact with nature and become a mere stage setting or backdrop which occupies most of the outdoor space of the compounds. Also, the

squares and outdoor public spaces to gather within the community sometimes acquire such large dimension that result in an overwhelming scale even counterproductive to be used and interact with others (supported by results of the field work of this research, see Chapter 4 section 4.4.2.)

Buddhism

Buddhism was created in the north of India by a man called Shakyamuni o Siddhartha Gautama, Buddha, around 3000 years ago and was introduced into China in the late Han Dynasty in AD 64. This religion emerged from Buddha's reflection on the feelings of suffering, pain and frustration that everyone perceives throughout their lives and their relationship to the theory of impermanence. Buddha pointed out that everything is constantly changing and nothing remains the same, even for a moment. Attachment to transitory elements such as wealth, social status, power, health or love - which are aspects upon which human beings usually base their happiness - produces suffering given the incompatibility of being attached to something ephemeral. Thus, according to Buddha, the cessation of pain and suffering is possible only through the absence of desire. Indeed, Chinese Buddhists considered that people's desires were the roots of evil and that to get rid of misery and distress it was necessary to give up all material desires (including money, personal values, etc.) and attempt to escape from reality. However, this life style and spiritual state appears to be difficult to achieve within current large metropolises, where there is continuous exposure to material stimuli and competitiveness. In fact, some authors have pointed out the contrast between the principles of Buddhism and city life. Narain (2000) highlighted the association of urbanism to material prosperity but at the expense of tensions in life and the insecurity of the people (Narain 2000; Bailey & Mabbett 2003). Also, Reynolds (1972) pointed out the incompatibility between a spiritual life and the alienated character of the city dwellers, which fosters "lostness and despair" (Reynolds 1972; Bailey & Mabbett 2003). Thus, there seems to be a patent tension between the spiritual beliefs of a significant proportion of the Chinese population – there are 102 million Buddhists in China (Buddha Darma Education & Association) - and the context of this research.

On the other hand, it is important to reflect upon the sociological influence of Buddhist principles. This philosophy/religion seeks the complete liberation of individuals and rejects not only attachment to worldly objects but even to life and the self. Buddhists believe that when someone dies, what remains is the resulting karma of his/her actions, which will continue to have effects on the lives of other beings. In this way, there is a transfer of karma but not of an individual soul. Thus, *"[speaking] of the self in Buddhism is a contradiction in itself"* (Ho 1995, p.121). In this respect, Buddhism becomes close to the idea of selflessness in Taoism and so to the sociological implications that the dissolution of the self may have for accepting and understanding others and their interaction. Certainly, not being conscious of the self implies an easier fusion with the whole which ultimately must impact positively on social integration, cohesion and inclusion. So, the detachment from the self might be

interpreted as a complete integration with the rest from which one must at the same time be detached in order to avoid suffering. Again, likewise in Taoism thought, this idea of easier integration through the concept of detachment provides a different language for feelings, ways of interacting and involvement in relationships. In fact, it is relevant to mention again that this possible sociological impact of Buddhism was observed during the field work in some communities, where the residents maintained daily relationships with their neighbours, doing activities together, helping each other and sharing their worries, but they were not considered friends but rather merely neighbours. Thus, the same social behaviour that for westerners means involvement and commitment - and so attachment - for the Chinese is simply a natural merging process with others based on a different understanding of the self and freedom from attachments. Indeed, the Noble Eightfold Path – that is, the Buddhist rules for correct living - encourages detachment and cultivation of oneself towards the state of Nirvana, but always in relation to respect and love for others.

Guanxi – A culture understood from a language inherent to the social network

The origin of this concept is related to Confucian principles and is based on similar social norms of implicit mutual obligations, reciprocity, and trust (Yadong et al. 2011). *Guanxi* is a term that describes essential "rules" governing the personalised networks of influence, based on direct and indirect personal connections and relationships. However, the Chinese concept goes much further than the western idea of social networks, and even includes specific notions such as *ganqing,* to measures the depth of feeling within an interpersonal relationship; *renqing* and *wu-lune,* to refer to the moral obligation to maintain a relationship and the importance of long term relationships; *face*, to represent the social status, propriety and prestige; and *yin-ren* to stress the relevance of reciprocity and empathy (Gold, Douglas Guthrie, et al. 2002).

In this way, the relevance and power of *guanxi* is present in China in all social spheres - personal, business and governmental. Indeed, the aforementioned set of moral rules and the language for interaction regulated the *exchange of favours and scarce goods between relationship-based partners d*uring the *socialist planned economy* (Liu 2006, pp.236–237). Also, although the concept has been instrumentalised during the market economy, still today it continues to be an absolutely essential tool for the advancement of daily business operations in inter-business relationships and in business-government agreements. Actually, the significance of *guanxi* comes from the traditional Chinese aversion to law defended by the Confucian moral thinking, which upheld that "*law does not eradicate problems; people's behaviour can only be influenced effectively by a set of self-regulating moral mechanisms…and by instilling a sense of shame into people's mind."* (Faure & Fang 2008, p.201; Fang 1999). Consequently, laws have traditionally been viewed in China as something made to be circumvented and the rule of man has taken precedence over the rule of law (Faure & Fang 2008). Indeed, the negotiations between companies usually begin with individual interactions that are based on interpersonal ties between members of each

business and which are later applied at corporate level (Gu et al. 2008). Even, the lack of legal contracts was quite common in business agreements in China until the entry of Western companies into the market. This thin line between business and social lives is common in East Asian societies where people tend to rely heavily on their closer relations and friends for all aspects of life, including work.

Furthermore, the power of *guanxi* also acts as an essential informal governance mechanism contributing to the leverage of Chinese organizations on social and economic platforms. Relationships at governmental level play an essential role for doing business in China since the major legislative power and authority to approve projects, allocate resources, and distribute finances remain centralised (Ying Fan 2007). However, the existence of *guanxi* in the governmental sphere has, of late, been considered as corruption since it leads to the violation of bureaucratic norms (Luo 2008), the ethic of the reciprocal obligation at this level becoming unclear and put in question. Meanwhile, in a personal context, *guanxi* implies having a network of contacts that one can call upon when one needs help or a favour. This relationship should not be understood as being purely instrumental, since *"instrumentalism and sentiment come together in guanxi"* (Gold, Douglas Guthrie, et al. 2002, p.8). In this way, personal *guanxi* perfectly represents the meaning adopted in this research for social capital although here it is constrained to the boundaries of the residential communities, involving emotional and instrumental support.

To sum up, it is clear that the social principles and norms governing the interaction between people and the understanding of the self are marked by a strong collectivistic character which is completely different from western individualism. While western religions, such as Christianism, find their identity and fulfilment in a spiritual relationship with God, for a Chinese person *"there can be no fulfilment for the individuals in isolation from his fellow men" since "the self is realized in the social sphere"* (Gold, Doug Guthrie, et al. 2002, p.10; DeBary 1985, p.333; King 1985, p.57). This strong social culture, where the self acquires a second place provides a different meaning to the concept of community and social quality of life, which becomes more relevant for the daily life and spiritual fulfilment of individuals than in the West and must be explored in the current scenario.

2.2.2. The social nature of the human being – instrumental and emotional support

Besides the importance given by Chinese culture to building and maintaining harmonic social relationships, this section goes further, and highlights the detrimental effects that the lack of social bonds and participation and a sense of belonging to a group can have on our well-being and health – both mental and physical - given the innate human need for emotional and instrumental support to achieve social quality of life (Fig. 2-7).

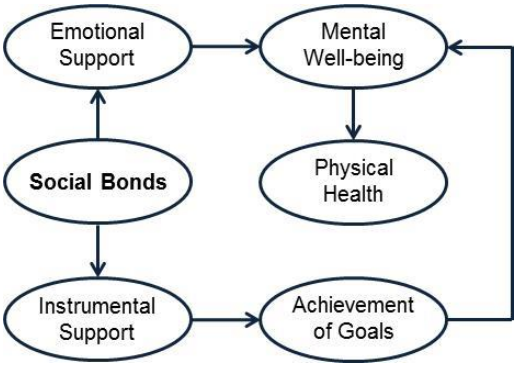


Fig. 2-7 Relation between social bonds and well-being

Aristotle said that:

"Man is by nature a social animal; an individual who is unsocial naturally and not accidentally is either beneath our notice or more than human. Society is something that precedes the individual. Anyone who either cannot lead the common life or is so self-sufficient as not to need to, and therefore does not partake of society, is either a beast or a god." (Aristotle 1932, p.325)

Indeed, the humans are natural, social and conscious beings with a need for intimacy and relating with others. Basic functions of the human being such as appetite, sexual desire and self-protection have led individuals to build social bonds and organise themselves into groups throughout evolution to accomplish elementary aims such as survival and reproduction (Axelrod & Hamilton 1981; Moreland 1987). Our ancestors, for instance, began to gather in settlements to be more efficient and to organise tasks in a safer environment. Men hunted large animals together while women fed and took care of the family (cooperation and division of tasks for a common goal). Defensive vigilance of the group and barriers around settlements were set to define a territory belonging to its inhabitants and protect themselves against predatory enemies (collective ownership and defence). Also, experimentation and collaboration between individuals favoured the development of new tools to survive and improve living conditions (collective evolution). Thus, human beings intuitively tend to form social groups to obtain the benefits (instrumental support and achievement of goals) from being part of a cooperative social network (Adler & Kwon 2002). And certainly, teamwork, exchange of knowledge, specialization, division of labour, and communication have made possible the development of civilizations to the present day and concepts such as social capital have become essential nowadays not only for the well-being of society but for the prosperity of a country (Putnam 1993). Now, a new challenge arises in the Chinese context: to adapt to large cities and megacities. Here, individuals do not have to group together to protect themselves against predatory enemies but they have to be able to be part of day-to-day life, feeling socially integrated within an overwhelming scenario and achieving the social support required for a good social quality of life.

However, human behaviour is triggered not only by pragmatic drivers but also by the need for affective and emotional support. For example, children, instinctively, remain close to adults to receive food and protection (survival instinct), nonetheless they also need pastoral care and emotional support to develop their cognitive skills and abilities (Epstein 2010; Ogina 2010). Furthermore, social relationships have been related to the eagerness for happiness and to mental health. For instance, McAdams & Bryant (1987) found a positive correlation between the intimacy motivation - willingness for experiences of warm, close, and communicative interaction with others - and levels of happiness and subjective mental health - happiness, gratification, self-confidence, and certainty. He pointed out this relationship as one essential explanation for people´s need to form and maintain lasting social bonds. Also, Jiang et al. (2018) find a positive correlation between Chinese children´s mental health and their social relationships with family, peers and teachers. Along the same line, Mao & Zhao (2012) concluded that peer association and social cohesion played major roles in migrants' well-being in China. They reported that migrant adolescents have significantly fewer social connections, lower self-esteem, and higher levels of depression than their native peers – these results also show the segregation of migrants and their higher demands for bonding. Actually, a wide range of authors have shown that integration, acceptance and inclusion in a group lead to happiness and calm; while rejection, exclusion or loss of an existing relationship provoke negative emotions such as anxiety, depression and loneliness (Leary 1990; Baumeister & Tice 1990; Barden et al. 1985). Moreover, E. Durkheim (1963) even stressed the influence of the lack of social integration on the likelihood to commit suicide, something which has since been supported by other authors (Trout 1980; Rothberg & Jones 1987).

Nonetheless, social bonds not only have an impact on mental health but also on physical well-being. A lack of social relationships may expose people to prolonged negative emotions, which can affect the health of the mind and consequently that of the body. For instance, stress[7], which is a common evil in today´s society, can be produced by the lack of supportive social bonds and may have a negative influence on our mood and physical health at the same time. DeLongis, Folkman, & Lazarus (1988) demonstrated that daily stress has a significant relationship with minor health problems such as flu, sore throats, headaches, and backaches. They also showed that people with unsupportive social relationships are more likely to have psychological and somatic problems both on and following stressful days. Moreover, Cohen & Wills (1985) showed that the simple fact of being part of a supportive social network reduces stress even if the members do not receive specific emotional or practical help (Cohen & Wills 1985). Besides, some authors have found a relationship

[7] Stress is the response of the organism when facing a challenge in its environment (employment, diet, family or personal problems, environmental conditions, etc) for which it does not have an appropriate coping response. The typical effects of dealing with the stressing factor are negative affection, elevation of physiological response and behavioural adaptations (Baum et al. 1981; Cohen & Wills 1985). The sympathetic nervous system is then activated to fight and overcome the situation of danger, usually producing muscle tension, gastric problems, increased blood pressure, and rapid pulse. Consequently, the immune system is weakened and the chances of having somatic illness and even the risk of cardiac diseases increase.

between the lack of social bonds and mortal sickness and crime rates (Lynch 1979; Goodwin et al. 1987). Certainly, loneliness is an unpleasant emotion for the human being that can decrease he efficiency of the immune system and increases cortisol levels (Kiecolt-Glaser, Garner, et al. 1984; Kiecolt-Glaser, Ricker, et al. 1984), leading to anxiety, depression, sleeping problems (Arborelius et al. 1999), heart diseases (Smith et al. 2005) and other health issues. In contrast, *"being well integrated into good relationships, rather than merely having social attachment,…*can even…*reduce criminality"* (Baumeister & Leary 1995, p.514; Sampson & Laub 1993).

Therefore, it seems reasonable to state that the evolution of the human being, from no matter which culture, has been marked by a need for building social bonds and a natural tendency to form groups (Coon 1946), which is beneficial for the social quality of life of the individual and consequently for the cohabitation of the society. However, nowadays the socio-economic and physical context of the metropolis, particularly in large cities, is hindering social integration and the fulfilment of these social needs (Putnam 1995a). It is essential to reflect upon how the evolution of the Chinese cities has impacted on the social interaction of the city dwellers and whether these cultural and inherent human needs for building and maintaining pragmatic but also emotional ties can be satisfied in this context.

2.3. Background of social ties in walled residential units in China.

Chapter one and the previous section have introduced the context of Chinese megacities and defended an existing social need for a local emotional and instrumental support sustained by the Chinese collectivistic and socialist culture, philosophy and human nature. Meanwhile, gated communities, which are the essential socio-spatial unit that compose the Chinese city, have been identified as a great opportunity for social integration and for providing such local social support. This section goes deeper into the conceptual and physical evolution of such gated residential spaces. Firstly, the controversial topic about keeping or opening the gates and its social implications is discussed to later expose the evolution from the work unit toward the current gated communities and its social implications.

2.3.1. The meaning of gates and walls in China

The use of gated communities is spread wide world like a global trend but also questioned. Gating the spaces is a deeply-rooted tradition in China, and is present from the imperial city and the courtyard houses to the socialist work-units (*danwei*) and post-socialist gated communities (Wu 2005; Xu 2009). As pointed out in section 2.2.1., before the socialist period, walled residential quarters and introspective courtyard archetypes were common. The imperial walled cities were divided orthogonally into walled districts distributed hierarchically. This design facilitated control of the population and made it possible to maintain social order. Also, the courtyard house was designed to accommodate several generations of the same family within a walled area with common spaces in which to

socialize and with a hierarchical social distribution of the rooms. Later, during the socialist period 1949-1978, the gated work-compounds (*danwei*) were the basic unit dominating the urban landscape. During this period, people worked and lived together within the same community and controlled flow of people, which significantly strengthened their bonds. Finally, during the post-socialist era (1978-now), the *danwei* has been gradually substituted by the contemporary gated community which is currently the questioned prevalent model in the commodity housing market (Xu & Yang 2009).

In all cases mentioned, there is one morphological character constant; the presence of walls and enclosed open space with a social functionality. This prototype of inverted spatial organization through the use of enclosed open spaces has been present in the Chinese urbanism and architecture from the very beginning of Chinese written history (Xu & Yang 2009). While in the West, the open area might be surrounding a house standing in a garden, in China, the open space is only conceived within walls serving social purposes - among others climatic factors. Grouping different generations of families - within a courtyard house - or organizing group of families to live and work together - in a *danwei* -, both show the importance given to developing strong ties within delimited social groups in an environment composed of housing and defined indoor/outdoor common spaces. Indeed, despite gated communities are present also in the west, the meaning that these features acquire in China is different and very remarkable of the Chinese urban fabric (Hamama & Liu 2020; Xu 2009).

However, nowadays, there is controversy about the reasons of maintaining the walls and gates of residential commodity housing in the market economy. The reasons pointed out by scholars as to why this structure might have been kept in the post-reform era are mainly based on the interest of the State to control society and facilitate security in the city, keeping social stability and order (Miao 2003); the strength of the Confucian concept of collectivism to be preserved (Y. Huang 2006; Dutton 1998); and the preference of the residents for security reasons and management of the common space (Miao 2003; Kan et al. 2017). However, an intense debate arises when the intention of not building more enclosed residential spaces and opening up the existing ones was launched during the China Urban Work Conference in 2016.

On the one hand, homeowners have shown a clear opposition to this policy since it contravenes the 2007 *Property Right Law of The People´s Republic of China*, which states that the roads and public areas and facilities within a building zone are owned by the owners (Hamama & Liu 2020). Indeed, in China, the administrative multi-level and hierarchical system recognizes the Homeowners´ Association as an independent organization at the bottom level with the authority for managing their communities (Huang & Low 2008). These associations were constituted for taking care of the welfare functions of the communities - releasing the government from this task and expenses in growing cities – and were expected to be a social collective (Huang & Low 2008). Thise whole system should be modified to

proceed with the dismantling of gated commodity housing and take into consideration the impact on the social quality of life of the citizens.

On the other hand, the main reasons why the State proposes to open the gates and bury the ancient Chinese tradition of walled spaces are the need for alleviating traffic congestion and reducing pollution and social segregation (China's 'National New Urbanization Plan 2014–2020). However, gates *per se* should not be considered the main element producing social segregation. The wealth gap introduced by the market economy and the inequalities in access to education, health and housing present in megacities, and exacerbated in China, are the basis reasons for this segregation. Otherwise, it should be questioned whether the work units produced segregation or it was only a division of the citizens organised by mixed groups in different communities. Indeed, social cohesion and close ties have been highlighted as remarkable in Chinese *danwei* (Whyte & Parish 1984; Besharov & Baehler 2013; Forrest & Yip 2007; Y. Huang 2006), which also was a gated community. Obviously, the work unit is not a desirable and reproducible model in current Chinese cities but it should be considered if reducing social segregation can be more easily achieved by integrative policies than by opening the gates of communities. Indeed, opening gates and introducing road traffic inside the communities would not avoid segregation at city level since different socio-economic groups would be anyway organized by areas in the city, neighbourhoods and blocks. However, the introduction of traffic within the communities will extend the chaos, pollution and noise to the whole metropolis and the pockets of peace that can now be found all around the city will vanish. Thus, gated communities should be understood as an oasis where the human scale gains some protagonism over the megacitymachine. Indeed, the gating of neighbourhoods in China, far from being considered an element of social segregation or exclusion, is understood here as a great opportunity to create a basic social unit to enhance social integration in megacities.

Therefore, the approach of this aggressive intervention should consider at once how to solve the traffic congestion of a growing machine such as a megacity and how the quality of life of the citizens – social quality of life in the case of this thesis – can be improved at once. To get an answer, it is essential to look at the bottom and human scale of the city in order to inform on the impact of the interventions at the top of the scale. One solution is to study and control the size and population density of the communities which jointly will help to optimize both traffic congestion and citizens' quality of life. Without a doubt, the solution is not equating Western and Chinese gated communities and discarding an ancient collectivistic and social culture so patent in its urban form. China must be able to design its megacities and solve the impacts of a market economy while respecting and boosting its culture and social beliefs to achieve quality of life.

Thus, this thesis aims to shed light on the optimization of the gated communities from a social point of view which could partially contribute to finding a global solution. The following

sub-sections review the evolution of the socially cohesive work-units toward the new concept and urban form of the controversial gated communities.

2.3.2. Work-unit compounds, – danwei – socialist period (1949-1978)

The work-unit model emerges after the People´s Republic of China (PRC) was founded in 1949, when the urbanization process began to be dominated by a socialist political framework. The Soviet model of urban planning was taken as a reference to transform the city into an engine of production instead of a place of consumption. The slogan of the time was "Production first, livelihood second" (Xu & Yang 2009). Thus, a series of policies such as low cash wages and an urban welfare system were established to develop these production centre cities (Lu 2006; Ma 2002; Hazelzet & Wissink 2012). It was in this atmosphere that the work-unit (*danwei*) emerged as the main unit for production. However, unlike the Soviet model, the *danwei* combined housing, workplace and social services. The state-owned enterprises were within the community providing housing to the workers and other services such as health-care, education, administration, etc. This model soon spread through the whole urban landscape, all of them sharing a number of common points: their self-contained character and their high level of social facilities and services; the social mix of different families and ages, and their close bonds strengthened by the joint living and working under a patriarchal authority – reminiscent of the kinship family structure of ancient times; and the walled enclosure. Depending on the size of the work unit compounds, there was a higher or lesser diversity and quantity of services and social facilities (such as canteens, social halls, clinics, nurseries, kindergartens, parks, libraries, sport fields, shops,…), although all of them had the basics. The provision of services and the degree to which they were self-contained could be such that bigger communities appeared to be miniature cities (Lu 2006).

Thus, work-unit compounds were economic entities for collective production and consumption with a strong social component in terms of division and organization of the whole population. This model, although created with an economic objective, generated tight-knit communities with great social cohesion. The control system for access to the compounds was one of the aspects that further reinforced this feeling of belonging to a place and to a group. The walled *danwei* had several entrances with a small janitor´s room at each to control the access of citizens. The doors were usually closed at night and the access would be restricted for those who were not residents (Xu & Yang 2009). Thus, this access restriction, together with the six-day working week, resulted in fewer possibilities of visiting people elsewhere. As result, the work-units became a neighbourhood-based life with intensive neighbouring. Indeed, some studies have found that close bonds were more common in these socialist compounds than in the neighbourhoods of some Western cities (Whyte & Parish 1984).

However, the reforms towards a market-oriented economy from 1978 resulted in the gradual termination of the work-unit system. The new life-style coincided with the spatial separation

of workplace and residence, and the centralized nature of the work-unit as a unit for social organization progressively disappeared. The labour-market reforms introduced changes such as the use of temporary workers who had access to neither housing in the compound nor social services. Also, the work-unit workers were encouraged to buy their apartments within the compounds for less than the market price. But their value rapidly increased under the new economic conditions and many of these new homeowners sold or rented out those old apartments to move into new commodity-housing developments after the reestablishment of the housing market in 1988. Thus, the economic boom and the increase in incomes triggered a rise in residential mobility – voluntary or forced - (Li et al. 2005; Li et al. 2010; Hazelzet & Wissink 2012). Meanwhile, the Chinese Government policies were mainly concerned with the reorganising welfare provision during this changing period more rather than with the impact that this new structure might have on social relationships (Yan & Gao 2007; Hazelzet & Wissink 2012). The consequences seem to have been a weakening of ties between neighbours in the new gated community model (Forrest & Yip 2007; Farrer 2002; Hazelzet & Wissink 2012) due to the relocation process and the socio-economic and institutional context but, also due to the new concept of purely residential developments and possibly to their uninformed design process. Nowadays, the question is whether the current walled model – gated communities - is still able to maintain this social functionality in the new context. To approach an answer to this question, it is worthy reviewing the physical, political and social conditions of the current gate communities to optimize their potential as social-units and improve the social quality of life of the residents.

2.3.3. Gated community – post-socialist period (1978-now)

Changes in management and property rights from work units

At the beginning of the post-socialist period, there was a shortage of housing, and living conditions were poor in China, due to reduced investment on housing during the People´s Republic of China (PRC) and the Cultural Revolution. The national boom in commodity housing during the post socialist period has significantly improved these living conditions and the quality of the residential compounds. Thus, nowadays, the gated communities occupy most of the urban development of China and most of the work-units have already been substituted by this new structure.

One of the reasons boosting the expansion of new residential developments since 1980 was the lack of sustainability of the housing welfare system from a fiscal point of view and the limited capacity of the government to improve the housing´s conditions. In the new socialist market economy, the government could not deal with this fiscal pressure and launched a series of new programmes that triggered the proliferation of commodity housing and, at the same time, had an influence on their design and functioning (Besharov & Baehler 2013; Pow 2007; Wu 2018). On one hand, the government decided to provide the housing benefits in cash payments rather than in kind (Xu & Yang 2009; Chen 1993; Wu 1996), which drove people to move to new housing communities –breaking the existing bonds with their previous

neighbours. On the other hand, the body responsible for managing and maintaining the communities was de-centralised. Firstly, during the process of market-oriented housing reforms, the Central Chinese Government transferred the maintenance service for the communities to the local Department of Housing Bureau, which entailed huge pressure on local governments. However, the local governments were soon overwhelmed and could not satisfy the huge demand for those services. Thus, in the mid-1980s, the figure of the property management company came on the scene to alleviate this pressure and a tax on the residents was applied (Wu 2018). The companies collected a service fee directly from the residents in return for providing a maintenance and security service . However, under the conditions of this new system, the residents felt that the area maintained by these companies was their own private property and felt the need to clearly delimit it. The demarcation would prevent potential harm to their property by non-resident citizens and would clarify what the responsibilities of the management company were (Xu & Yang 2009). This fact entailed a relevant change in the relationship between the residents and the place. Now, they can be owners of their houses but they also share ownership of a common space with their neighbours, which foster feelings of attachment and identity towards both the place and the neighbours residing there (Lu et al. 2018). Indeed, Lu et al (2018) found through their analysis of several neighbourhoods in Wenzhou that private governance contributes to residents´ social ties and participation in the neighbourhood by making them members of homeowners´ associations and providing social neighbourhood events. Also, at the same time, the private governance contributes to improving and maintaining a good neighbourhood image and services which positively impact on place identity and neighbourhood attachment (Bonaiuto et al. 1999; McGuire 1997; Lu et al. 2018).

Another program which has an effect on the relationships between neighbours of the gated commodity housing is the “Community construction” policy launched by the Government in 2000 (Yan & Gao 2007; Hazelzet & Wissink 2012). This project is led by the Communist Party to create social institutions within the communities, in which the residents are requested to participate. These organizations are set up to perform certain social welfare functions which were previously the responsibility of the work-units, such as public order, caring for the elderly, and so on. Indeed, these residents committees are extensions of the local governments and may not be completely free to organize their functions. Nevertheless, this social organization within the residential unit have a positive influence and foster the neighbourhood social bonds (Forrest & Yip 2007; Lu et al. 2018; Kasarda & Janowitz 1974).

Thus, private governance and the social institutions within the gated communities contribute, in one way or another, to building feelings of place-identity and attachment as well as boosting the social ties between residents. Demolishing the walls and opening up the Chinese gated communities would blur the boundaries of these social groups. Residents would refuse to continue paying the fees for the maintenance of the complex leading probably to a deterioration of the aesthetics of the area - diminished feeling of place identity

and attachment. The sentiment of common ownership would be broken and the idea of "community construction" impeded. To sum up, the feelings toward the place and the sense ofbelonging to a sub-group within a megacity will disappear, weakening the ties between residents, eroding local social support and leading to more isolated people in a highly populated place. As Lu et al (2018, p.146) state quoting Wu (2012, p.552) *"gating does not necessarily lead to the end of community participation and engagement, but helps to build the internal solidarity of neighbourhoods".*

Changes in the built environment from work units

Apart from the changes in terms of policies from the *danwei* to the gated communities, physical changes are also noticeable. Despite gated communities maintaining a morphological continuity with previous residential units – such as the culture of collective living as part of a territorial control and the inverted housing compound with buildings and walls deployed around the communal outdoor spaces - the design strategies, development processes and physical outcomes are quite different (Xu & Yang 2009). The walls delimiting the community are no longer only conceived as a means of spatial demarcation but rather they are designed and developed according to market needs, converting the streets into vibrant areas for business. In this way, this new model introduced the mixed-use buildings facing streets as boundaries, providing the streets with diverse uses and activities while at the same time functioning as a means of separation. Thus, although gated communities are still provided with some communal amenities, facilities and services, the commercial activity and main services are located outside. This strategy - which reinforces the purely residential use of the current communities - may slightly weaken attachment and neighbourhood cohesion within the gated community as the availability of services and facilities have been shown to reinforce those feelings (McCool & Martin 1994; Riger & Lavrakas 1981). However, on the other hand, it should stimulate encounter and interaction between residents of nearby communities reducing the alleged segregation produced by gating[8].

Regarding the built environment within communities, there have been relevant transformations related to aspects of form and aesthetics.

In relation to formal features, the communities can be of different sizes, varying from two or three apartment buildings in a small plot to large residential districts of over 100 hectares composed of high-, mid- and/or low-rise building types (Xu & Yang 2009). Usually, they are designed with mid- and, particularly, high-rise buildings – except those made up of luxury villas -, so achieving a certain high-density form. However, from a social point of view, density and high-rise buildings have often been associated with damage to the character of the neighbourhoods, the creation of isolation of residents and increased feelings of fear and

[8] Boosting the relationship between residents of different communities and mixing the socio-economic groups at this scale is also important for palliating social segregation. The government could drive this social mix at the level of the city given the land tenure system in China.

mistrust, among other aspects (Gifford 2007a; Newman 1975; Ekblad & Werne 1990). These individual perceptions of the built environment not only influence the feelings of the residents towards the environment *per se,* but also in relation to the neighbours, while at the same time affecting their willingness to interact (Pfeiffer 1980; Korpela 1989).

Fear, for example, is one of the feelings that has been widely associated with high-rise buildings. Gifford (2007) mentioned several fears in relation to this building type, such as the fear of being trapped inside during a fire, the fear of falling from a high window or the fear of the entire building falling due to an earthquake. These psychological fears may influence the comfortability, the state of relaxation, and the well-being of the residents in their homes, which at the same time affects their mood and their willingness to interact with others. He also highlighted the fear of crime, due to the anonymous large population size living in the same building. Indeed, this feeling is increasing in urban China due to the rise in the crime rate – more than threefold only between 1978 and 1999 mainly for economic reasons– since the economic reform and the open-door policy in the 1980s (Liu 2005; Zhong & Broadhurst 2007). The controlled access to gated communities should help to reduce that feeling of fear and also the crime rate inside. Also, the hierarchical administrative system in China – government at the top, district and sub-district government, and Urban Residents' Committee and Property Ownership Committee - contributes to crime prevention through neighbourhood action[9] (Zhong & Broadhurst 2007). Despite these measures, the increased crime rate is a fact while the growing use of high-rise typology and large population sizes will reinforce the fear of crime by hindering the development of familiarity and interaction between residents. Certainly, according to Gifford (2007), sharing the common areas of a building with "strangers" produces fear of crime, a lack of social support and the absence of a sense of community. Also, Newman (1975) demonstrates that the number of crimes increases with the height of the buildings. He showed that the number of crimes inside the apartments is similar for low and high-rise residential buildings. However, the rate increases when it comes to being in the outside areas of high-rise buildings and particularly in the interior public spaces of high-rises. Thus, again, the gating of commodity housing with controlled access seems a reasonable model to palliate the negative social consequences of the flourishing high-rise typology.

Emotional health, which has also been related to the built and social environment, is another aspect acquiring increasing importance in China where the prevalence of depressive symptoms has turned into a serious societal challenge (Wang et al. 2019). 30 years ago Ekblad & Werne (1990) highlighted the effect of living in high-rise buildings in comparison with living in traditional courtyard houses and mid-rise buildings (3-6 storeys) for children and the elderly in Beijing. They pointed out that children in high-rise residential buildings have difficulties in meeting each other at home while in the traditional Chinese dwelling, the courtyard turned into a natural and controlled playground. Along the same line, they

[9] One more reason for reconsidering the 2016 policy for opening the gates.

highlighted the wide range of activities that the elderly could carry out in the traditional courtyard houses and work units to enrich their lives – take care of grandchildren, spend time with friends, grow flowers, keep pet birds or fishes, write, paint or calligraphy, play cards or chess with friends and do physical exercise - in comparison to the feelings of loneliness and uselessness that they can suffer in high-rise buildings. Indeed, in relation to the impact of high-rise neighbourhoods, the incidence of depression, schizophrenia and phobias has been found in the West to be higher than for those living in low-rise buildings in Nashville when comparing two elderly groups of 271 and 373 people (Husaini et al. 1991). Also, children living in high-rise buildings have been reported to have more behaviour problems such as bedwetting, temper tantrums and hyperactivity (Saegert 1982; Ineichen & Hooper 1974; Richman 1977).

However, it is not only building height which is responsible for such behavioural problems and emotional reactions. R. Gifford & Lacombe (2006) found a strong relationship between the physical condition of the dwellings and children´s behavioural problems, aesthetics and level of maintenance also playing an important role. Another factor driving these emotional reactions is not the height of the buildings *per se* but the feeling of crowding that the population density of high-rise buildings can produce. Residents can experience a psychological sense of overload from there being too many people in close proximity (Gifford 2007a). For example, McCarthy & Saegert (1978) reported residents of high-rise in the Bronx feeling more crowded and with a lower sense of control and social support than low-rise residents. Also, Bordas-Astudillo, Moch, & Hermand (2003) found in Parisian high-rises that residents felt more crowded and, in consequence, the relationships within the buildings were worse. Thus, the general satisfaction of residents living in high-rise buildings tends to be lower than those living in low-rise (Rohe 1985; Holahan & Wilcox 1979; Saegert 1979). Holahan & Wilcox (1979) found that the satisfaction of students with their residence in low-rise dormitory buildings (2 to 5 floors) was higher than those living in high-rises (10 to 13 floors). Also, Saegert (1979) found greater feelings of alienation and less satisfaction in his comparison between high-rise (14-storey) and low-rise (3-storey) public housing buildings. He suggested that these differences might be due to social factors such as mistrust, heterogeneity and unfamiliarity among residents, which at once are associated with the building type.

All these perceptions influence pro-social behaviour and the relationships between residents. Indeed, many authors have found a weakening of social interaction between residents of high-rise buildings (Jephcott 1971; A Churchman & Ginsberg 1984; S. Huang 2006; S Bochner et al. 1976; C Korte & Huismans 1983; Sinnett et al. 1972; Li 1998; Whyte & Parish 1984) and the weakening of pro/social behaviour (Nadler et al. 1982; Bynum & Purri 1984; Holahan & Wilcox 1979; Husaini et al. 1991; Bickman et al. 1973). For example, Forrest & Yip (2007) highlighted the studies of Li (1998) and Tian (1997) - published in Chinese - in relation to the weakening of ties in China in recent years, and particularly, associated to

high-rise typologies. Tian (1997) found through a study of quality of life in Wuhan that interaction with neighbours was infrequent and mutual help among neighbours minimal. Also, Li (1998) found that residents of high-rise apartments had more distant and superficial neighbourhood relationships than those living in other typologies, particularly those living in bungalows who had the highest frequency of interaction. Whyte & Parish (1984) discussion is in line with Li (1998), since they state that the close-knit neighbourhood ties and mutual aid have survived to a greater degree in China than in western countries, partially due to the lower residential densities. Additionally, literature reviews from western areas support these trends. For example, Nadler et al. (1982) found that students who lived in low-rise buildings were more willing to offer help and to seek help than those living in high-rise buildings. Also, Bynum & Purri (1984) investigated the sense of community of students at the university in the U.S. Midwest finding that students living in low-rise dormitories knew more residents from whom they could ask a favour. Indeed, the relationship between residents of high-rise buildings has been proved to be poorer, even among the residents living on the same floor (C. Korte & Huismans 1983; Edwards et al. 1982). The large number of people sharing a high-rise building produces a different kind of relationship between neighbours, leading to one having more acquaintances but weaker ties (A. Churchman & Ginsberg 1984; Williamson 1978). Certainly, Bochner, Duncan, Kennedy, & Orr (1976) found that proximity is quite decisive for social interaction in high-rise buildings and mentioned the residents living the same floor as being those with greater interaction. On the basis of these premises, they suggested that in buildings with many floors residents will have a few friends and many people they don't know from other floors. Thus, it is common that residents of high-rise buildings develop their social network and choose their friends from work or school but outside their residential building (Michelson 1977). Indeed, Forrest, La Grange, & Ngai-Ming (2002) pointed out that in Hong Kong – a high-rise and high density city - the overall sense of residential community is low and people only have a strong sense of neighbourhood if colleagues or schoolmates live in the same area.

On the other hand, the characteristics and role played by common outdoor space within the gated communities has also changed from the traditional neighbourhoods - such as *shikumen* in Shanghai and *hutong* in Beijing – and work units to the post-reform commodity housing. Before the economic reform and privatization of the housing market in the 1980s, the State had remarkable control over the residential models. The Chinese Communist State was able to direct personal activities and behaviour of residents by establishing an austere environment and life style (Pow 2007). Some of Mao´s principles installed in people's minds were based on *"idealizing the public realm as a supreme good and stigmatizing attachment to private property and private life as merely selfish"* (McDougall 2004, p.3). The results were crowded housing conditions – still existing in China – with several families living together and sharing communal facilities such as the kitchen and wash basin and taps. Thus, the restricted space of the house forces residents to make use of the outdoor space for daily and domestic activities, which result in an increased intensity of relationships between

neighbours. However, the situation has turned around for commodity housing conditions since great importance is given to the private space and the aesthetics of the environment (Pow 2007). Flats are larger– the average size for two bedrooms is 100 m^2 and upwards - with better qualities and residents now pay special attention to "more superfluous" aspects such as decoration (Pow 2007). The increase in living space eliminates the need to extend domestic uses to the outside, and the improved quality encourages spending more time inside the house. In this way, the common outdoor space goes from having an intense and domestic use with partially forced social relations, to becoming, in some cases, a luxury setting of leisure with large green areas and, even with small lakes where interactions are fewer but voluntary.

Indeed, the aesthetics, maintenance and quality of the outdoor space is very much valued by the residents and acquire great importance in gated commodity housing in China. No matter what the type of community is, there is a shared concern by all residents as regards the presence of beautiful shared open spaces and green areas where one can take part in daily outdoor activities (Yiyong Chen et al. 2016) – findings also supported by the outcomes of this thesis. Hence, the shared open spaces, the landscape, green areas and the facilities are seen now as an essential factor in the quality of the housing and the value of the property. Actually, these requests are reasonably within a market economy since it has been proved that the availability and conditions of outdoor space are relevant for mental health, social interaction and social quality of life (Wang et al. 2019; Ambrey & Fleming 2013; Yiyong Chen et al. 2016; Mehta 2009). For example, Wang et al. (2019) discover that the exposure of Chinese residents to green spaces favours mental health, probably through physical activity but also due to higher social interaction with neighbours. Ambrey & Fleming (2013) find a positive relationship between the availability of green space and the self-reported life satisfaction of urban residents in Australia. They also suggest that the value of green space increases with population density and that people living in high-rise dwellings –a typology widely used in Chinese gated communities - benefit to a greater extent from the provision of public green space than the general population. Also, the availability of facilities and organization of group activities – claimed by the residents according to this research - contributes to congregating people within the community, providing some of the vibrancy and "street life" that Jane Jacobs (1961) defended for knitting households into communities and liveable neighbourhoods.

However, casual encounters and such vibrancy is also conditioned by formal aspects such as the physical features of the space between buildings and public space (Lund 2002; Kim & Kaplan 2004; Gehl 2011; Gehl 1977; Marcus 2002; Lennard & Lennard 1984; Lennard & Lennard 1987; Hester 1975; Newman 1973; Jacobs 1961; Festinger et al. 1950). The use of high-rise buildings brings an increase in the distance between them. Streets within the community become wide and impersonal, and the close relationship between buildings in the old neighbourhoods disappears. Now, there is a tendency to clearly delimit the private from

the public realm – public realm here refers to the outdoor space within the community - and the use of a blur space or "*soft interface*" (Gehl 1977) between buildings to socialize is lost. Also, physical and functional proximity or the relative position between the entrances to flats or buildings highlighted by Festinger et al (1950) for forming friendships are ignored (Fig. 2-8). Spaces between buildings acquire an overwhelming scale and are often devoid of shade and suitably designed seating areas (Fig. 2-9). On the other hand, central squares are usually provided with facilities and suitable areas to stay but, in many cases, they tend to be oversized (Fig. 2-10 and Fid. 2.11). In short, public space loses human scale, the sense of visual enclosure and intimacy widely identified for encouraging social interaction (Lennard & Lennard 1984; Lennard & Lennard 1987; Marcus 2002). Thus, the relevance of the physical features of outdoor spaces in relation to their impact on the social interaction between users seems to have been overlooked in Chinese gated commodity housing.

Fig. 2-8 Space between building in Shikumen (CSL_2)

Fig. 2-9 Space between building in CBH

Fig. 2-10 Central square of CBM

Fig. 2-11 Square of CBH

Therefore, at first glance, it could be said that some of the conditions for bonding with the neighbours in gated communities are favourable and have improved from those of the *danwei*. The living conditions are better; the outdoor spaces usually have beautiful green areas; facilities are displayed in the community for doing exercise and there are extensive areas for children to play in; the possibility of home-ownership and the shared ownership of the common spaces should increase the feelings of attachment and identity with both the place and the neighbours; the work of the residents' committee aims to cover the services provided by the social welfare system; and controlled access to the communities contributes to maintaining the feeling of safety while at the same time residents have the freedom to participate in city life whenever they want. All of these are reasons may favour the strengthening of bonds between residents. However, the bonds within these neighbourhoods are weaker than in the previous model (Forrest & Yip 2007; Hazelzet & Wissink 2012; Farrer 2002; Zhu, Breitung & Li 2012). Several authors have found that collective activities between neighbours such as chatting and meeting in their free time, together with the strength of their bonds, have decreased (Chan 1993; Farrer 2002; Wu & He 2005; Forrest & Yip 2007). Farrer (2002) even pointed out the social isolation that could be produced by moving to the new high-rise communities in comparison with the intensive social contacts maintained in the old neighbourhood "alleyways" in Shanghai. The improvement of the subjective aspects of the built environment such as the aesthetics or quality of commodity housing increases the feeling of identity and attachment to the place (Zhu, Breitung, Li, et al. 2012). However, the objective physical features of the built environment – oversized public spaces, high-rise typology, design of space between buildings, population size – could be reducing the use of outdoor space and hindering interaction between residents.

2.4. Discussion

A new built environment and the social dilemma: shaking the foundations

The recent history of China, particularly over the last century, has been marked by accelerated and continuous situations of social tension, wars, social revolutions and

contradictory cycles that may have shaken the beliefs and social principles of Chinese society. On one hand, the main philosophies/religions which have been guiding this population for millennia– Confucianism, Taoism and Buddhism- have been focused, to a great extent, on ways of social interaction and the meaning of social relationships. They have promoted the achievement of the individual equilibrium away from superfluous values and self-realization through successful, harmonic social relationships, aiming to maintain a certain social and economic order. However, the recent succession of events may have brought those principles into question. The internal and external conflicts before and during the Second World War and the imminent dictatorial, repressive and revolutionary period of Mao Zedong (1946-1976) have brought decades of social disorder and confrontation. Indeed, Mao Zedong led two of the least auspicious moments in Chinese history, the Great Leap Forward (1958-1961) and the Cultural Revolution (1966-1976), which around 40 years ago left behind a traumatized psyche of millenarian culture and left Chinese collectivism profoundly scarred (Fig. 2-12 and Fig. 2-13).

As if that were not sufficient, the later accelerated shift from Mao´s communist utopianism towards the materialism and hedonism of the market economy (Ci 1994; Liu 2006) must have brought yet more confusion into the Chinese social principles. The Taoist and Buddhist ideals of a simple life based on essential values and far removed from unnecessary things coincide, after a fashion, with the austere life-style defended by Mao, where superfluous things were destroyed - everyone had to wear the same kind of clothes with similar colours, and even avoid planting flowers in private gardens, and so on (Chang 2012). Even, Confucian principles of collectivism and unity shared certain aspects with the ideals of the Chairman. However, the change to the capitalist financial system initiated by Deng Xiaoping in 1978 exposed Chinese society to an explosion of incentives that turned all aspects of their life up-side down. Certainly, the Chinese life-style has changed dramatically during this recent period and is associated with higher living standards and an widened gap between socio-economic classes. The continuous exposure to new material (Fig. 2-14) and spiritual stimuli – such as fashionable clothes, vehicles, houses, access to respected and highly remunerated jobs, partial ownership of a business, etc. - that are no longer forbidden but rather have become signs of prestige and high social status, has resulted in a consumerist and probably more individualistic society which goes against the main Chinese philosophical principles. Moreover, the speed of change from a period of extreme oppression towards the new era may have maximized a compulsive march toward the desire to adopt everything that represents “freedom of action”. The Chinese must need to make use of this new although still restricted “liberty”, travelling, migrating, owning a property, or buying fashionable brands or luxury items. This freedom of acquisition has given rise to a drift towards a consumer

population that may be trying to demonstrate what they are through what they own, which is the opposite of traditional philosophies[10].

Certainly, L. Liu (2006) pointed out precisely this social dilemma between following traditional beliefs or the stimulus of the current scenario in his study about Chinese quality of life. He stressed the relevance of this dichotomy of the human being, particularly in the Chinese context, between the dyad of "having" and "being", the former responding to an "economic logic" and the latter to an "existential logic". Predominantly, he highlighted that this dilemma "…*interpolates the daily life of ordinary Chinese people and requires them to position themselves in uncertain social, political, and economic conditions."* (Liu, 2006:233-234). Furthermore, this moral confrontation is not simply associated to a temporary period of transition since the conflict is clear to see and, at the moment, permanently engrained in the whole Chinese system (Communist market economy). Needless to say, the great contradiction and experimental coexistence of a communist system, the principles of which are supposed to defend equality and collectivism, and a capitalist economy that tends to go in the opposite direction – greater inequality between social classes and the individualistic character of citizens - might generate confusion as to a broad spectrum of aspects from the objective governance of the country to the citizen´s understanding of cultural social values.

Fig. 2-12 Mao´s great famine, 1958-1961 (photo by Patrick Cabouat)

Fig. 2-13 Cultural Revolution, 1966-1976

[10] Humbleness is a fundamental trait in Taoist and, particularly, Buddhist ideals. Not parading and even hiding one's virtues is admirable and respectful behaviour, which is even one of the ten sacred qualities attributed to Buddha of Compassion in the Buddhist text on Maha-karuna (great compassion) (Yu-Hsi 1995).

Fig. 2-14 Current importance of luxury in China (photos by Chantal Le Roux and STR/AFP/Getty Images)

Likewise, it not only the principles of equilibrium, equality and collectivism which are at stake but also the basis of the Confucian hierarchical society since the economic power emerges as a new parameter with which to define it. Although Chinese society is still highly hierarchical, the Confucian basis for social stratification were filial ranks, age, wisdom or authority power while for the current capitalistic economic system it tends to be purchasing power. This change may be shaking the social norms of behaviour consolidated until now and the hierarchical principles of respect ruling the interaction between family members, friends, colleagues or neighbours. Now, the cultural values and social rules are questioned and consequently the internal functioning of the social structures can be put under pressure due to the forces of change. These social structures refer here to every social organization starting from the simple unit of the family to the social sphere and the institutional level. Even the bureaucratic procedures and centralised power will probably end up being questioned simply due to the natural evolution of society in this new scenario.

In short, yet unhealed social wound of the Cultural Revolution, the conflict between the new stimuli of the market economy and the Chinese fundamental philosophical doctrines, and the socio-economic inequality between citizens – exacerbated by the great migration movement and the *hukou* institutional limitations - must create a deep social dilemma that impacts on the meaning of social relationships, the interaction between people and the ways to achieve a social quality of life. Thus, exploring this new social language and social needs in the context of megacities is essential to a better understanding of the Chinese people's requirements for social quality of life – see the first objective of this research in section 3.2. for further and detailed information.

But also, the engines of this dilemma are reflected in the new features of the city and the built environment. The influence of the new technological, socio-economic and political situation not only create a moral and social debate but also trigger the emergence of large, highly-populated cities and the modification of the built environment towards a new typology - high rise residential buildings - and denser residential communities to accommodate the massive numbers of migrants (Fig. 2-15 and 2-16). This new socio-spatial context seems to

be hindering spontaneous development and the maintaining of social bonds between citizens, leading to more isolated citizens with a low level of local social attachment (Zhu, Breitung, Li, et al. 2012; Qiu & Tu 2014) and de-territorialized local ties (Gifford 2007a). Therefore, these spatial modifications are simultaneously feeding back into the social changes instigated by the policies of Mao and the market economy in a cyclical way, further encouraging individualism and mistrust between residents (Gifford 2007a; Newman 1975; Ekblad & Werne 1990; Tian 1997; Li 1998)**.** Indeed, many of the residents interviewed during the field work of this research stressed the feeling of isolation that living in high-rise communities can produce. "*Living in a high-rise building is scary because you don't know your neighbours and nowadays nobody can be trusted in a city such as Shanghai. I moved with my daughter´s family into a high-rise community and I felt lonely at home. I came back to my old community where I live alone, I have an old house and less space but I feel safe and have more friends*" (resident of the *shikumen* interviewed during the field work, woman 65 y.o).

Fig. 2-15 High-rise residential compounds (photo by Johannes Eisele/AFP/GETTY Images)

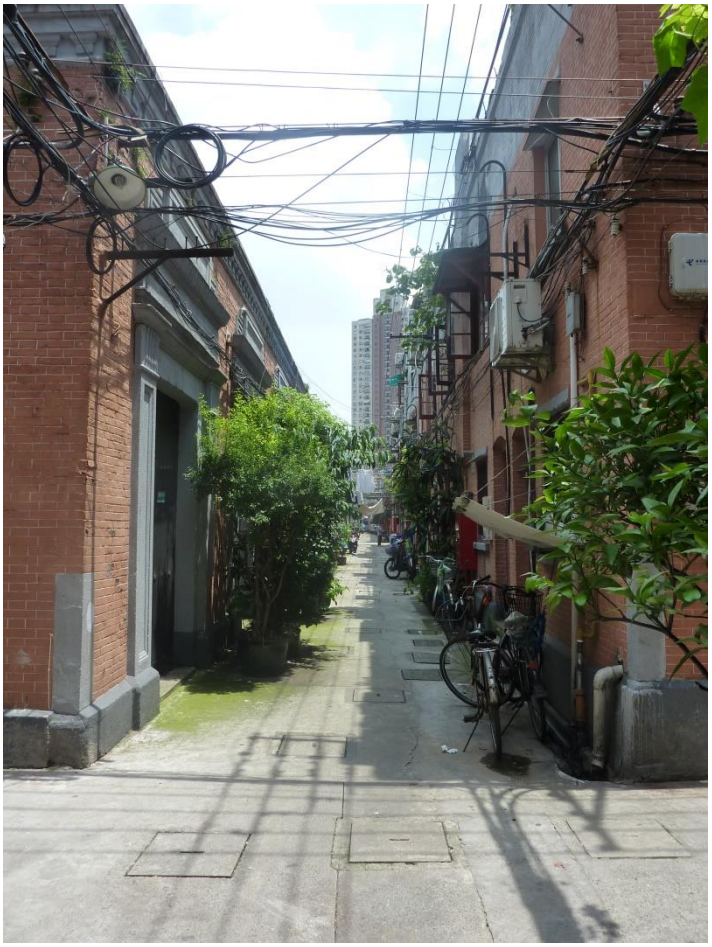


Fig. 2-16 Street of CSL_1 – from field work

Thus, a relevant question is whether the new built environment is simply adjusting to a natural change in Chinese social principles within this context or whether it is forcing and pushing for an undesired yet avoidable change. This research accepts the need to explore the possible changes in relation to social principles for interaction but, at the same time, supports the idea that Chinese culture continues to be a social relationship-based society. Indeed, the described contextual scenario of megacities in China marked by a great rural-urban migration movement and relocation of citizens together with the millennial Chinese collectivistic culture point toward an evident and even more intense need for social integration and local social support – emotional and instrumental – for social quality of life. Certainly, the decline in well-being in China has been associated with the decreasing role of sociability and the increasing role of income comparisons in life introduced by the market economy (Bartolini & Sarracino 2015). Also, engagement in different types of social activities and participation in groups have been proved to increase the well-being of Chinese people (Lei et al. 2015). Thus, there is a patent tension between the social reality created by the socio-economic contextual scenario of Chinese megacities and the desired sociability for social quality of life. Here, the provision of a local context where social interaction becomes familiar through the concept of the neighbourhood is identified as a relevant solution for this context to provide security, comfort and the social support required (Forrest & Kearns 2001)

for dealing with the aforementioned social challenges and for the social quality of life of citizens.

Consequently, a twofold task is required in this context and explored in this thesis. On the one hand, although there is a patent need for sociability, it is important to explore the evolution of the social principles of Chinese culture in order to better understand the real social needs demanded - in the case of this research related to emotional and instrumental local support – to achieve social quality of life – see objective one in section 3.2 for further information. Meanwhile, gated communities are identified as a great opportunity for providing the required local social support in a megacity and their design must be optimised. Thus, a profound investigation of the urban form and design features of these living units within the de-humanizing large metropolises and megacities is considered essential for providing social quality of life to their citizens – see objective two in section 3.2 for further information.

CHAPTER 3

DETAIL APPROACH, METHODOLOGY AND CASE STUDIES

3.1. Introduction

This Chapter explains the development of the conceptual model proposed to investigate the aim of this research and the methodology used. Firstly, the concept of social quality of life adopted here is defined together with the components of objective one of the research. Then, the second objective and the introduction of the variables involved are presented. Finally, a clear definition and delimitation of both the dependent variables, social network, social capital and social cohesion, and the independent, building height, density, population size, environmental quality, aesthetic and maintenance, is laid out in addition to the relationship between them.

The second part of the Chapter is focussed on the methodology and methods of analysis used, which are approached in detail. Some of the results obtained during the pilot study and field work of this investigation are related to the methodology for collection of data and design of the research. These results are included in this chapter since they could be fairly useful in facilitating the collection of data for future research done in China.

Finally, a third part introduce the case studies during the field work in Shanghai.

3.1. Detailed approach, conceptual and physical boundaries and variables of the research

This section presents in detail the scope of this investigation through an in-depth view of its aim and objectives, and a detailed explanation and contextualization of the variables considered and their relationship in order to clearly delimit the boundaries of the research. To do so, it is essential to get back to the general aim of this social study, which consists in finding out how gated commodity housing and its built environment can favour the social integration of the residents to improve their social quality of life in large cities in China – the foundations for this aim has been developed in Chapters 1 and 2.

Firstly, it is important to define what this research means by social quality of life. The term social quality is a broad concept usually related to life satisfaction and subjective well-being involving individual characteristics and social relations with macrosocial structures and institutions. Well-being in China has received substantial attention for researchers during the last decade and has been studied in relation to diverse aspects impacting on social quality such as income (Brockmann et al. 2009; Knight & Gunatilaka 2011; Tang 2014), income

inequality (Jiang et al. 2012; Smyth et al. 2008; Wang et al. 2015), the effect of various aspects of the *hukou* (Afridi et al. 2015; Jiang et al. 2012), rural-urban migration (Cao & Liu 2015; Chu & Hail 2014), social exclusion of migrants (Huang et al. 2010), spiritual beliefs (Lu & Gao 2017), social networks (Awaworyi Churchill & Mishra 2017), social and public policies (Chen et al. 2017), and poverty (Yang & Mukhopadhaya 2016). All these aspects are considered within the Social Quality Model derived from sociological theory and used for public policies, including economic policy, labour market policy and social policy (Van Der Maesen & Walker 2005). This model measures the quality of the social context of everyday life which is seen as the relationship between the formation of collective identities and the self-realisation of the human subject (Abbott & Wallace 2012). It is a broad theoretical framework that links need, action and policies with economic and social development considering the structural features of societies and their institutions to measure their impact on citizens. Thus, the Social Quality Model provides an all-encompassing view which addressing global processes and biographical processes on the one hand, and systems, institutions and communities and individuals on the other (Fig. 3-1). The intersection between these global components results in four fields of study involved in social quality: economic security, social cohesion, social inclusion and the conditions for social empowerment (Abbott & Wallace 2012; Van Der Maesen & Walker 2005). The proved applicability of this model to a wide range of countries (Abbott & Wallace 2012) and its overarching nature with no apparent cultural limitations make this framework suitable to be taken as a reference and to be adapted to this research.

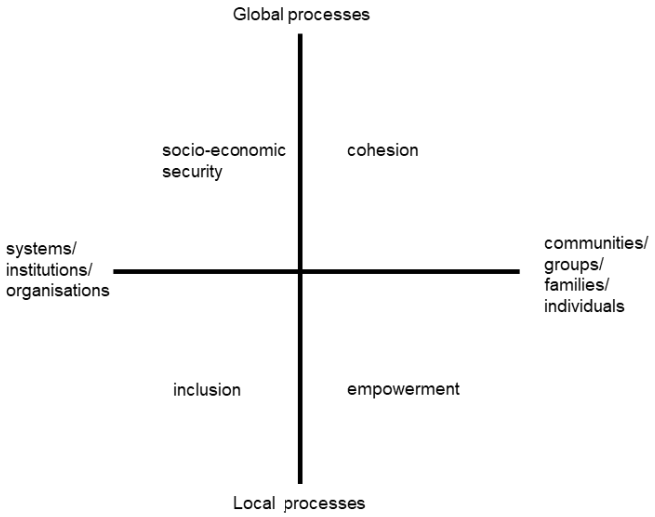


Fig. 3-1 Components of the Social Quality Model (Abbott & Wallace 2012)

Thus, this model basically evolves around understanding the position of this thesis within a global conceptual framework and comprehending the definition of the variables used and, particularly, the concept of social quality of life. Firstly, the theoretical understanding of the

wide components defined by the axes of this model in the Chinese context – from national migration movement and its social influence; impacts of economic reform on cultural and social aspects; social influence of important milestones in history; impact of policies and institutional rules such as *hukou,* land tenure, government layers and authorities, etc.; to the evolution of cities and their morphological and social changes; physical, socio-economic and social network changes on the neighbourhoods; and the understanding of Chinese beliefs, philosophies and culture – has been essential for defining the aim and limits of this research. Indeed, the purpose of this investigation was born from a social need identified from the analysis of a global context despite the research is focussed at a microscale of the city - gated community. Secondly, the meaning of social quality accepted by the Social Quality Model is taken as a reference and adapted to the context of this research. Thus, paraphrasing Beck et al (2001, pp.6–7), social quality of life is defined here as the level at which people are able to participate in the social life of their communities to fulfil a need for emotional and instrumental support under conditions that enhance their well-being and individual potential. This definition delineates the first objective of this research by relating the hypothesised need for socializing in a local context – gated community – to achieve a support with the requirement to feel satisfied as a result. However, this relationship cannot be taken for granted and the intensity of bonds and of the needs for social support - emotional and instrumental - must be tested and calibrated in this context. Indeed, given the changing character of the Chinese context and the scarce research in this area in comparison to the West, the foundation of this objective is based on the necessity for understanding how are the relationships between the residents and how they should be in order to have social quality of life.

Thus, the first objective is to overview and review of the social existing relationships between neighbours within gated commodity housing and the residents' satisfaction with that social environment.

This objective involves a twofold task, understanding how the relationships between neighbours actually are, and how they should be to feel satisfied. At the same time, being satisfied requires the consideration of two aspects. On one hand, evaluating the variables representing the highlighted social needs – emotional and instrumental support - and their relation with the characteristics of the social network composing the neighbourhood. Through this comparative analysis it is possible to comprehend how tight the bonds between residents must be to obtain such support. On the other hand, it is essential to know the standards of the neighbourhoods in this regard in order to understand how the social network should be and the social support that they require to feel socially satisfied within their communities. Thus, this first objective proposes to clarify the relationship between three components: the emotional and instrumental support associated here with the concept of social sustainability, the characteristics of the community's social network and the social

standards of the residents (Fig. 3-2). The point where a harmonic relationship between the three of them is found, corresponds to the achievement of social quality of life in this context.

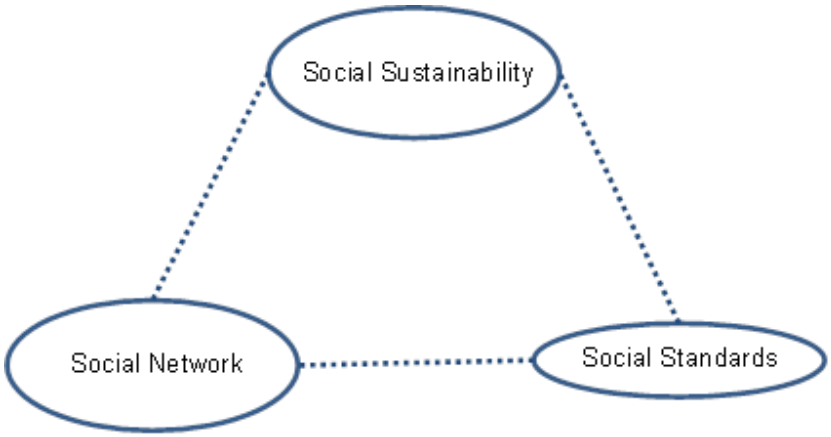


Fig. 3-2 Main components of the social quality of life

In relation to the first component, social sustainability is associated to the hypothesised need for emotional and instrumental support and measured here by social capital and social cohesion – both concepts being clearly outlined in section 3.2.2. They are identified with the concepts of social inclusion and social cohesion of the Social Quality Model respectively but adapted to the scale of the gated community. Social capital, like social inclusion in the Social Quality Model, addresses how the individual is included in the community. Meanwhile social cohesion takes into account how the community as a whole coheres together. The use of the concept of social capital instead of social inclusion is required due to conceptual reasons deriving from the different scale of the analysis. Meanwhile the inclusion of an individual or community into society on a global scale involves providing everyone – particularly exclusion groups – with the required opportunities and resources to participate in economic, social and cultural life, achieving an acceptable level of well-being (Abbott & Wallace 2012). Social capital – further developed in section 3.2.2.2 - is associated to the benefits and opportunities arising from the relationship or collaboration between individuals or different groups of a human collective. Both concepts are related to obtaining social support but at different levels of intervention. Thus, in short, social capital and social cohesion represent, respectively, the personal and collective involvement of the residents in the community and the possible individual and common benefits – emotional and instrumental - obtained from it.

The second component comprises the study of the community as a social network to show the existing social relationships between neighbours– this component is also essential for the second objective. This social network component is studied through the density and strength of ties measured by the type of ties, intimacy and the frequency of interaction between residents (Granovetter 1973) associated with the place of encounter – further developed in section 3.2.2.1. Finally, the social standards component relates to whether the

residents desire to develop social bonds with their neighbours and the importance given to obtaining social capital and cohesion within their residential communities to achieve social quality of life in this context.

While several studies have looked at social capital, cohesion, networks in this context (Forrest & Yip 2007; Hazelzet & Wissink 2012; Farrer 2002; Bartolini & Sarracino 2015), none of them has considered those aspects simultaneously and in conjunction with the characteristics of a community and their social standards. The clarification of these variables and of the threefold relationship between the three components set out by the first objective is essential to having any insight into the social realm of the Chinese context. Indeed, in one respect, the cultural differences between the researcher – a westerner - and the context of the study together with the greater ease of access to western literature in relation to social quality of life and social sustainability might lead to one mistakenly aligning the standards of the East culture with those of the West. Certainly, according to the available literature, it might be sensible to state that social sustainability correlates positively with a close social network, since the more numerous and stronger the ties between neighbours are – built voluntarily - the larger their social capital and community cohesion should be, and so the benefits obtained from it (Beumer 2010; Forrest & Kearns 2001; Putnam 1993). However, it may also be possible that Chinese residents do not need to establish particularly close bonds to obtain the specific benefits pointed out here, as their culture is based in other social norms, principles of interaction and philosophy or beliefs. Furthermore, the benefits obtained from close bonds between Chinese residents may possibly be different from those in western culture. Another relevant reason for delving into current Chinese social standards, is to do with its evolving nature, due to the impact of the recent history of this Asiatic country -including the Mao Zedong period and the market economy. Indeed, currently Chinese society is passing through a period of profound transition, given the accelerated transformations derived from the change to a market economy since the 1980's. Their life-style and, very probably, their social standards are undergoing rapid change and are going through a process of adaptation. Changes such as the increase in the minimum living space - from an average of 3.6m^2 per capita in the late 1970s up to 30m^2 in 2005 (Li 2011) -, the possibility of ownership, improved living standards, the increase in privacy, the freedom to migrate, and the sociological implications of living in large cities, to mention but a few, have had an impact on their daily lives and must necessarily alter their social behaviour, social needs, and progressively their social norms.

Thus, only if the correlation between these three blocks –social sustainability, social network, and social standards- is clarified can any light be shed on the social interests or needs of the Chinese population and their codes of interaction, providing a clear understanding of what social quality of life is in this context.

On the other hand, the second objective of the research is to understand the impact of the built environment of gated communities on social interaction between residents. To this end,

the relationship between the built environment and the social network and social sustainability – social capital and cohesion - variables is addressed considering now also the standards of the residents for the quality of the built environment (Fig. 3-3).

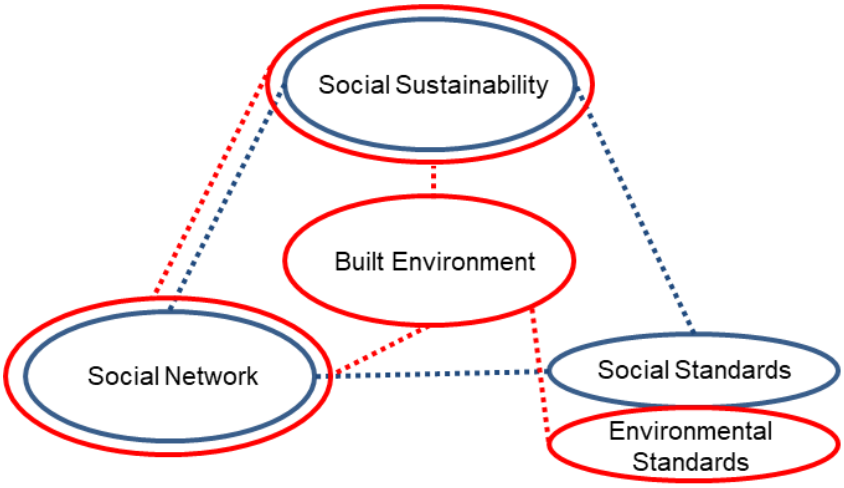


Fig. 3-3 Main components of the social quality of life in relation to the built environment

In this field, there are mainly two broad bodies of research. On one side, there is a wide array of studies relating social concepts such as social cohesion, social capital and social network to demographic variables - ethnic and economic heterogeneity, educational level, etc. - and other socio-economic indicators such as poverty, crime or residential mobility (Tolsma et al. 2009; Letki 2008; Putnam 2007; Bailey et al. 2012; Li et al. 2019; Liu 2019; Huang 2018). On the other side, there is significant research into the relationship between interactions with neighbours and the physical environment (Dempsey 2008; Gehl 2011; Farrell et al. 2003; Urban Task Force 1999; Barton et al. 2003; Bentley et al. 1985; Talen 1999; Lau et al. 2005; Williams 2000; Pasaogullari & Doratli 2004; Fisher 2009; Mouratidis & Poortinga 2020; Brown & Lombard 2014; French et al. 2014).

In China, the studies in relation to demographic and socio-economic indicators are now extensive and mainly concerned with the incorporation of migrants into the urban neighbourhoods, particularly with local residents given not only the background differences but the *hukou* limitations (Wu & Logan 2014; Li & Tong 2018; Liu et al. 2018; Wang et al. 2017a; Wang et al. 2017b; Yuqi Liu, Zhang, Liu, et al. 2017; Liu 2019; Wang et al. 2016). This line of research looks into the social atmosphere within the community without giving any detailed consideration to the built environment, even though different types of communities are analysed and compared – traditional neighbourhood, work units and commodity housing.

Regarding the study of the relationship between interactions with neighbours and the physical environment, much of the research involves the weakening of cohesive

communities due to the dissolution of *danwei* compounds and traditional neighbourhoods, which are a place-based social ties, towards new commodity housing. However, within this area of study, the physical environment has received a twofold approach.

On the one hand, the different model of communities – traditional neighbourhoods, work units and commodity housing - are compared in relation to the ties between neighbours, finding a general trend of weakening of social bonds for the commodification of housing (Zhu, Breitung, Li, et al. 2012; Forrest & Yip 2007; Hazelzet & Wissink 2012; Liu et al. 2020). This area of research is very valuable for informing about the feelings of neighbours toward the place as a physical and social space for each model of residence. For example, Zhu et al. (2012) find that residents of commodity housing have weaker interactions but stronger neighboruhood attachments than those living in tradicitonal neighbourhoods. This result shows that, in commodity housing, neighbourhood attachment is more based on their satisfaction with the physical environment than on their neighbourly contacts, changing the function of neighbourhoods from social arenas to privatised living environments. Also, Forrest & Yip (2007) find a decline in social bonds and a weakened pattern of social interaction for the commodification of housing in Guangzhou. Liu et al (2020) even analyse the impact of public spaces on social interaction between locals and migrants, finding them to be less in commodity housing despite the provision of public spaces. They conclude that it is more important to “force” the opportunities for social interaction in the neighbourhood than the presence of public space *per se*.

However, this approach of research does not provide clear indications as to how the new model of commodity housing should be designed to avoid, if possible, this marked decline in neighbourhood bonds. In the case of Zhu et al (2012), they analyse the influence of social and physical environment but only though two variables called perception of relationship and of environment. Liu et al (2020) consider the presence of public spaces but neither their form nor their aesthetics. Forrest & Yip (2007) look into the concept of neighbourhood in relation to the definition of their limits but with no information about whether they are adequate in relation to the size of the community or their design. Thus, although the comparison between these three different models provides essential outcomes related to the social sphere, they are not applicable for making infomed decisions on the design process. Also, the sharp difference of living conditions between traditional neighbourhoods and commodity housing, and the dissimilar residential concept between work units - working and living together - and commodity housing – only residential – make it impossible to obtain clear conclusions for the design of the new communities.

Nevertheless, there is another approach to studying the relationship between the physical environemt and social interaction which addresses specific aspects of the built environment. In this area, a great amount of research has been conducted in the West while in China it is emerging but still remains quite scarce at neighbourhood level. Most of these recent investigations are oriented to the influence of density and availability of public spaces and

facilities on quality of life, well-being, social cohesion or social capital (Dong & Qin 2017; Gao et al. 2015; Wang & Shaw 2018)**.** Also, a great part of the studies are focused on vulnerable social groups such as the elderly, people with mental problems and migrants (Y. Liu et al. 2017; Y Chen et al. 2016; Shen 2014; Feng et al. 2018; Qiu et al. 2019; Gao et al. 2016) **.**

In relation to density, the findings point toward a different direction than in developed countries, showing the disparate influence of the urban form on different socio-economic contexts (Feng et al. 2018) and the urgent need for investigation in China. Thus, in this context, urban density seems to lose relevance for quality of life and well-being, and can even be beneficial through its impact on walkability and accessibility. For example, Dong & Qin (2017) looked at the impact of land use density, neighbourhood size, mix land use and proximity to an urban park for subjective well-being, finding that only proximity to urban parks have a significant and positive effect. Even more, they highlighted that perceived neighbourhood social environment - harmonious interpersonal relationship between neighbours -, personal health and demographic characteristics are more relevant for subjective well-being than the physical environment of the neighbourhood. Also, Gao et al (2015) study the relationship between social environment - social cohesion and social participation - and physical attributes - aesthetics and walkability - of neighbourhoods with physical activity and participation in social activities among the Chinese elders. Their results support the positive effect of density through walkability, which together with social cohesion, promote physical activity within the neighbourhood, and consequently, an increase in participation in social activities. Indeed, several authors have pointed out the positive effect that density has on the elderly and on mental health through accessibility and walkability in China (Y. Liu et al. 2017; Y Chen et al. 2016; Shen 2014; Feng et al. 2018; Qiu et al. 2019; Gao et al. 2016).

However, density must be further tested and calibrated considering a wider range of aspects impacting on the well-being of the Chinese since some negative effects have also been found. For example, Feng et al (2018) find that Chinese elderly give more importance to residential environment, transportation, accessibility and walkability – aspects improved as density is increased - than even to social interaction. However, Sun et al (2011) highlighted the great contribution that social interaction produced on their quality of life. Also, Tang et al (2020) found contradictory results for the mental health of local elderly people and *laopiao* – floating elderly people in cities who look after their children and grandchildren. While the mental health of the first group was improved through lower street network density and better access to parks, the second benefited from by higher street network density and more open space within the community. Gao et al (2016) found also divergent results since accessibility and increased perceived diversity - associated to density - were found to benefit mental and physical well-being, but safety also had the same effect. However, safety has been noted to decrease as density increases (Newman 1975)**.** Moreover, Wang & Shaw (2018), looking at

the social consequences of high-density small-scale developments, found general discontent among the neighbours due to the scarce amount and size of public spaces and facilities for them to participate in the social life of the neighbourhood. Thus, density, despite being one of the essential and more studied design units for gated communities in China, is still a great unknown in relation to its impact at neighbourhood level.

The other important area of research for social interaction in Chinese gated communities that has received certain attention lately is the relevance of public spaces. Studies of this aspect have been mainly focused on the association between communal spaces and green areas with the well-being and participation of the residents within the community. The general results indicate these spaces as being rather relevant. Thus, Yushu Zhu (2015) finds a positive association between communal space and community participation although it has less influence than that of the social context - informal social control, social capital. However, the presence of more communal spaces in a neighbourhood and residents' satisfaction with them is seen result in a higher likelihood of resident participation (Zhu 2015). Also green spaces have been widely found to contribute to mental health and well-being in China (Fan et al. 2011; Van den Berg et al. 2010). The main reasons are a decrease in stress and restored attention (Markevych et al. 2017), they are conducive to physical activity – at the same time related to psychological health (Almanza et al. 2012)-, and they function as a public place for residents' daily social interactions, which also enhances social capital within the neighbourhood and consequently psychological benefits (Maas et al. 2009). Indeed, neighbourhood communal space has been highlighted by several authors as enhancing the development of social solidarity and collective spirit among residents as well as encouraging participation in community affairs (Curley 2010; Manzo & Perkins 2006; Parisi et al. 2002; Perkins et al. 1996)**.** Going further into the design of these communal spaces some studies are taking place. For example, Staub & Yu (2014) look at which elements are important for residents of gated communities to make use of public spaces, pointing out visibility into the activities taking place, transitional and "edge spaces", and threshold spaces that allow residents to assume a territorial attitude. This kind of research - where specific outcomes on the impact of design on the social life of the neighbourhood are provided - is emerging in China but still significantly scarce (at least in international and English version publications) despite its enormous importance for informing the extensive development process under way.

Thus, this research aims to contribute to partially fill this gap and produce outcomes that can inform the process of urban design and planning from a twofold contribution at the scale of the gate community. On one side, introducing the concept of social quality of life in the study of the relationship between built environment and social bonds provides a deeper understanding of the present social realm of the Chinese culture in gated communities. On the other side, it is aimed to provide specific outcomes for the definition of the built

environment - density, population size and building height – in relation to its impact on social quality of life, considering the social and physical environment of the gate communities.

The diagram in Fig. 3-4 illustrates the global approach and components involved in the research. The diagram shows that despite the ultimate goal of the research is finding the relationship between density, building height and population size with social quality of life within the Chinese gate community, an amalgam of elements must be considered.

On one side, the physical variables targeted in this research cannot be isolated from all the elements involved in the contextual or neighbourhood environment, which is composed by a social and a physical order. Both social and physical order influence on the probabilities of encounter and interaction between the neighbours. The physical spectrum through the urban form provides certain environmental conditions and chances to meet. Also, urban form in relation to the provision of public spaces and their quality, together with the aesthetic features influence on the use that residents make of the space. However, the probabilities of social interaction are not only defined by the objective possibilities generated due to urban form and social composition, but by the perception and evaluation that the user make of the contextual environment depending on his standards (Campbell et al. 1976; Connerly & Marans 1985; Marans 2012). On the other side, the interaction between the residents define the characteristics of the social network, social capital and social cohesion. Also, at the same time, the relationship between the three of them with the standards of the residents in relation to them determines the social quality of life of the neighbours within the community.

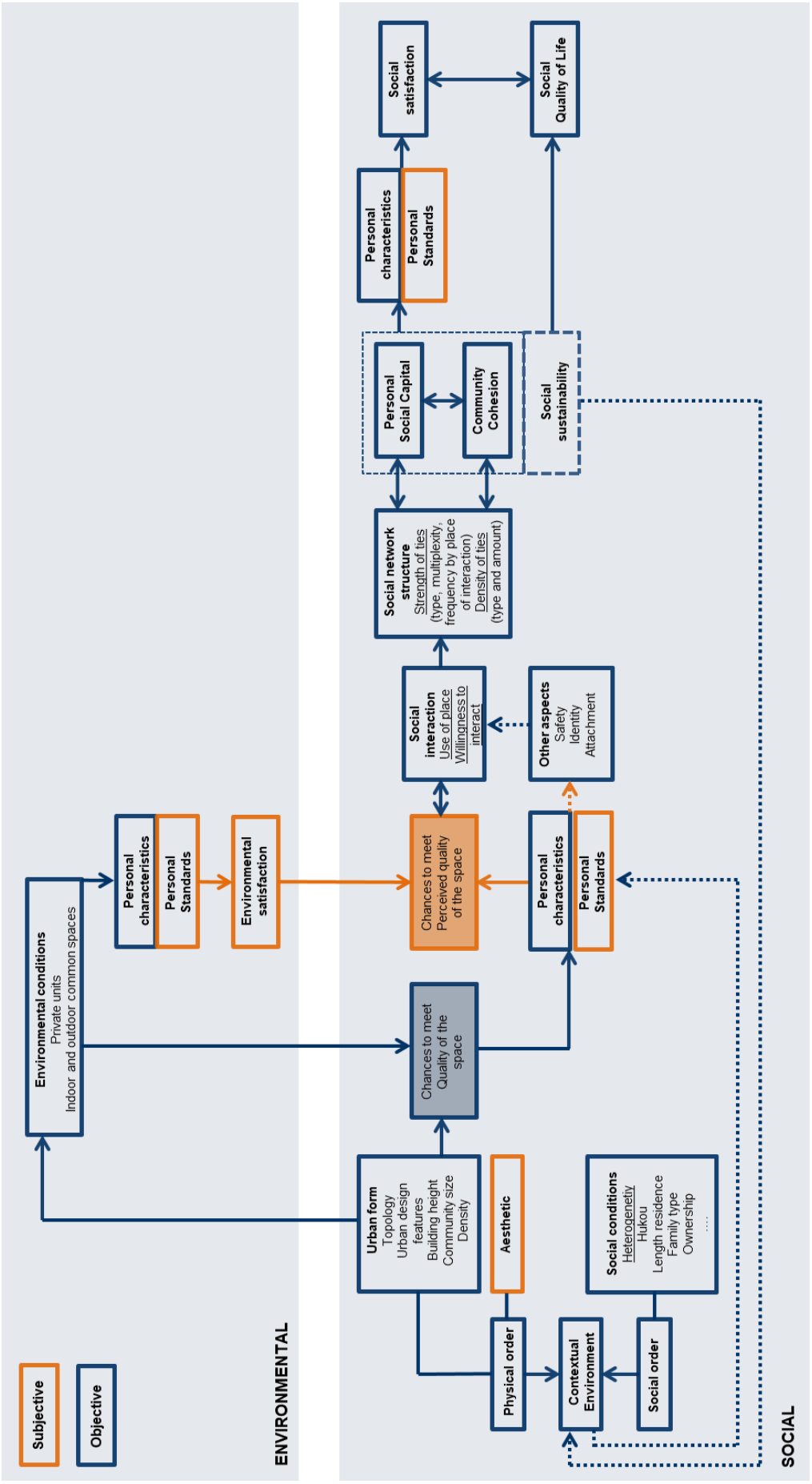


Fig.3-4 Framework of study and components of the research

Most of the research looking at the relationship between the built environment and quality of life use satisfaction or subjective well-being for assessment (Mohit 2013)**.** In this research, the consideration of the standard components in relation to the neighbourhood environment and social network, capital and cohesion instead of a variable measuring the satisfaction of the residents with the social life of the community is essential for having a deeper understanding of the Chinese requirements in this changing scenario. The reason is based on the philosophical principles guiding Chinese culture and their recent history - discussed in Chapter 2. For example, the acceptance of the Tao and the Yin Yang implies acceptance of adversities and privileges, sorrow and joy, life and death, because everything is an integral part of the endless and unavoidable cosmological change. This idea of dual, indivisible and uncontrollable forces - present also in the principles of Confucianism - highlights how important it is to understand the inevitability of change and the importance of being willing to make the necessary adjustments in life to maintain a harmonious and balanced state (Gao & Handley-Schachler 2003). Also, Buddhists reject attachment to transitory elements such as wealth, social status, power, health or love to avoid pain and suffering. Thus, these ideals of acceptance of the situation and rejection of desires – also found during the field work and results of this research, see Chapter 4 – may lead to a misleading answer when asking about satisfaction to avoid complaining. However, asking about the importance given to certain aspects must facilitate an honest and clearer answer in this context.

Thus, the diagram illustrated in Fig. 3-5 represents quite briefly the framework of this research. The dotted red square represents the first objective of the research, highlighting the relationship between social sustainability - social capital and social cohesion -, social network and standards to understand what is the social quality of life. Meanwhile, the same dotted red square represents the dependent variables of the second objective and the continuous red square the independent ones.

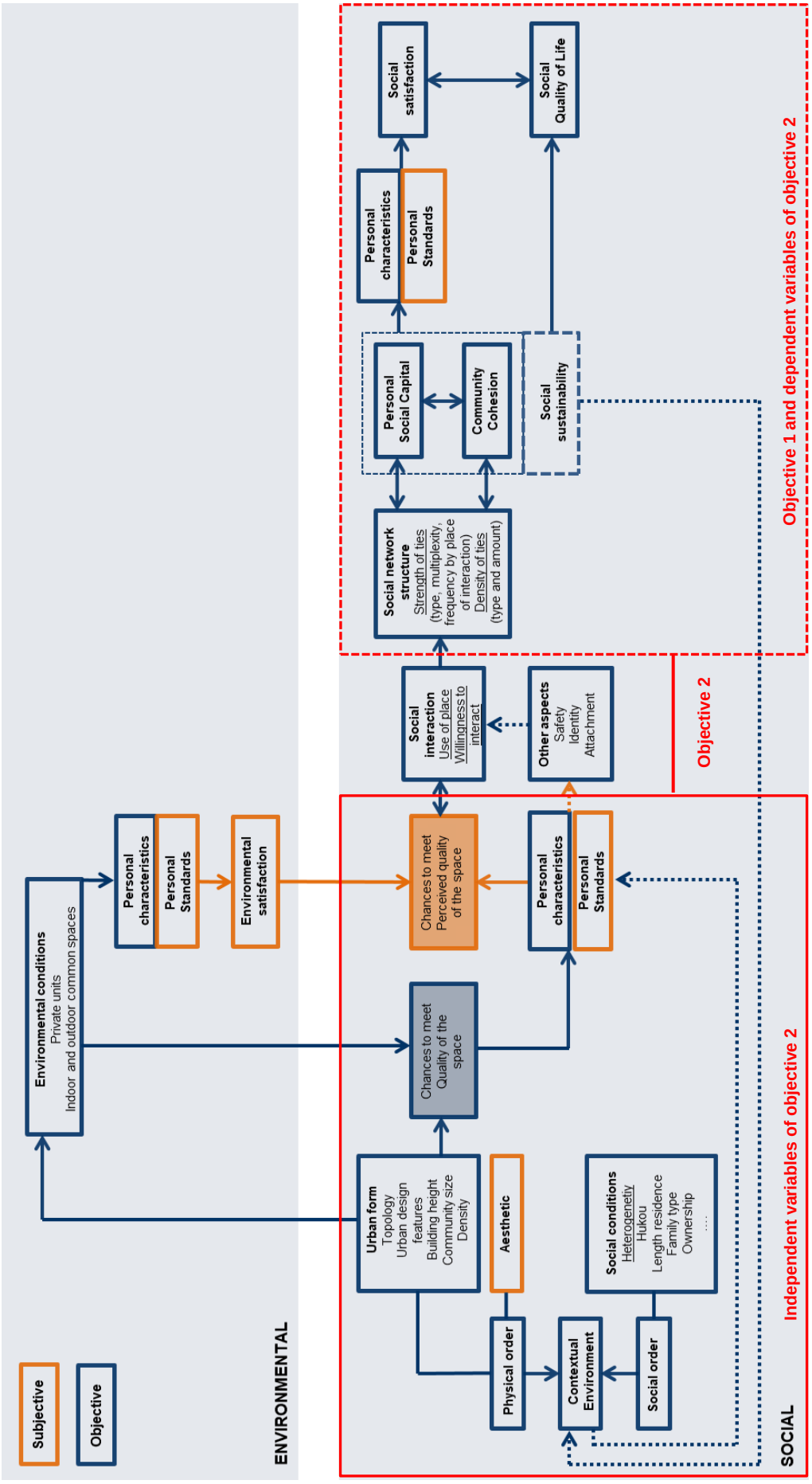


Fig.3-5 Framework of study. Highlight of dependent and independent variables.

The last aspect to introduce is the consideration of different scales of analysis in order to have a comprehensive understanding of the results obtained at the scale of interest. That means, if the study focuses on the scale of the gated community, considering the social relationships at other local spheres, such as the dwelling, building courtyard and *jiedao*, leads to a more accurate interpretation of the outcomes, since strong ties and frequent contact at one scale may influence the bonds at others (Marans 2012). Simultaneously, building and maintaining social ties at one scale will depend on its social composition and physical traits and quality, but also on the comparative characteristics of the other places. Choosing one place of interaction means not using the rest - at least not that much - leading to an interdependence, particularly between the immediate superior and inferior scales given their comparative accessibility (Fig. 3-6)**.** Thus, for instance, a very small dwelling size may increase the use that residents make of the outdoor space of the community increasing their interaction with other residents - something typical in traditional neighbourhoods. Also, the absence of a proper shared outdoor space inside a community can lead residents to make greater use of parks outside the compound, so influencing their local ties both inside and outside the community at the same time - see results from the field work. Along the same line, if the quality of services, amenities or outdoor spaces of the *jiedao* is poor, the residents may remain inside the community, at home or go to another place in the city. Thus, this cross-scale study is required so that there may be more certainty about the hypothetical causal relationship between the built environment and the structure of local social networks and avoid biased conclusions. This study considers only the immediate superior and inferior physical scales to the gated community, that is the building courtyard and *jiedao,* with a fairly ample study within the community and limited to the *jiedao* given the limitations of resources and available access to data[11].

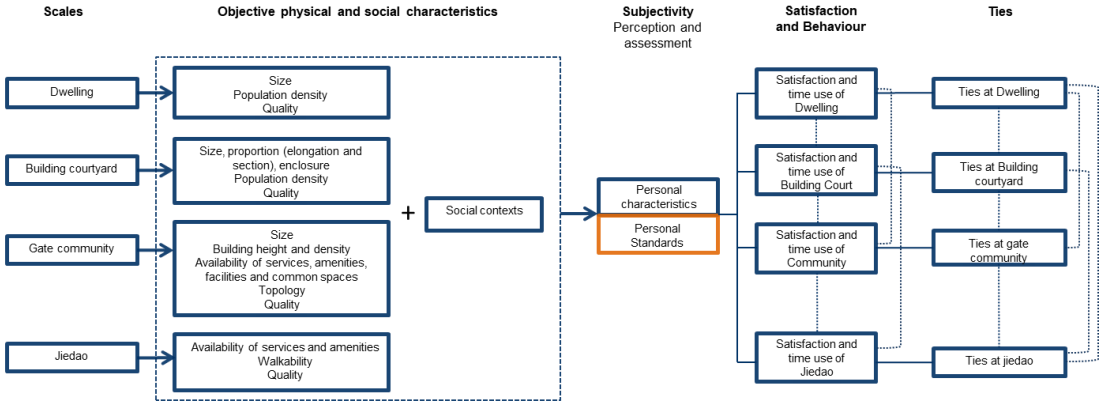


Fig. 3-6 Relation of different scales of analysis for the study of social ties

[11] The lack of collaboration from the Ministry of Construction of Shanghai made it impossible to access dwelling plans and hindered the study of this physical level. Also, the residents of most of the communities did not feel comfortable allowing us into their homes. On the other hand, the limited time and resources available to conduct the field work hindered a deeper analysis of the *jiedao* level.

Next sections 3.2.1. and 3.2.2 provide detail information about both independent and dependent variables.

3.2.1. The neighbourhood environment: physical and social order (independent variables)

This section provides a detailed description of the concepts of each independent variable in this research and how they are assessed.

On the one hand, the physical order is defined by two elements. One is the formal aspect of the built environment named here "urban form", which largely conditions the environmental quality of the space and the chances of meeting other residents by pure probability of encounter in relation to the density, size, geometry and topology of the built environment. The second is the aesthetic component, which here includes beauty, functionality - provision of facilities, accessibility, night lighting, etc.- and maintenance. Thus, the sum of both together with the standards of the users define the overall physical quality of the place and so the chances of interaction between residents and their willingness to do so. A high level of satisfaction with the quality of communal spaces may intensify the neighbours´ frequency and length of use increasing the possibilities of encounters (Anquetil 2009; Williams 2005). Also, regular use of a space brings feelings of familiarity and recognition of the place and people, which can result in a higher level of comfortability and the development of senses of belonging and attachment (Corcoran 2002). These feelings, at the same time, reinforce the frequency of use.

On the other hand, the social order is the other large component defining the environment of a place. It consider both subjective and objective components since the demography, personal characteristics of the members and heterogeneity are objective factors that define the social composition of the group but their behaviour is also conditioned by personal standards which are subjective (Perkins et al. 1990; Marans 2012; Bowling & Stafford 2007; Sampson & Raudenbush 2004).

However, the influence of the social order on the local social network structure cannot be understood without pointing out its interdependency with the physical order (Hidalgo & Hernandez 2001; Scannell & Gifford 2010). The built environment, including urban form and aesthetic, influences the behaviour of users due to, among other reasons, its impact on surveillance, safety, accessibility, functionality, flexibility of use or adaptability. For example, low density, too wide, poor lighting or 'cul-de sac' streets may hinder surveillance of the outdoor spaces and the chance of escape, so decreasing the safety of the place (Newman 1973). Consequently, the residents will be very likely to use the shared space less frequently and withdraw from interacting with other residents due to apprehension. Also, aesthetic appearance has a decisive effect on the behaviour of the users. Broken facilities, dirty floors, abandoned buildings or ugly graffiti in the walls reflect a social disorder that is understood as a threat, leading to withdrawal into a safe place such as home or using other outdoor spaces (Ross & Jang 2000; Lu et al. 2018). Contrarily, a clean and well-maintained built

environment can transmit a sensation of harmony and be unconsciously associated with a concordant social environment and the expectation of shared values, which may be perceived positively and lead to the promotion of users´ interaction as well as the preservation of the shared spaces (Bonaiuto et al. 1999). In contrast, a depressed social atmosphere can lead to neglecting the maintenance and conservation of the built environment or even to damaging it intentionally (Ross & Jang 2000). For instance, during the field work, the oldest community with the poorest quality materials and no facilities was physically attractive and comfortable since the members collectively took care of the common space maintaining it properly, adding decorative elements, plants, etc., which is a reflection of a certain social coordination - CSL_1.

In short, the social and physical order of an environment are interdependent and they can encourage or hinder feelings of comfort and safety, which influence the mood of users and their confidence and willingness to both use a space and initiate a conversation with others (Sampson & Raudenbush 2004). Thus, the order of the environment influences the readiness to interact with other residents, which is triggered by the underlying intuitive feeling that the group´s members share general social norms and moral principles, given their civilized and respectful behaviour, akin to one's own. Even more, this intangible empathy may lead to a gradual development of social identity[12] with the community which at the same time might produce or reinforce feelings of social attachment and belonging.

Next three subsections define each independent variable and how they have been measured.

3.2.1.1. Independent variables in relation to the urban form and design features of the built environment

Four independent variables in relation to the urban form of the communities have been considered as exercising an influence on their social network. These are: building height, site coverage, plot ratio, and community size.

The groups for building height are:

- Low-rise, from 2 to 5 storeys.
- Medium-rise, from 6 to 12 storeys.
- Medium-high-rise, from 12 to 18 storeys.
- High-rise, higher than 20 storeys. In the cases analysed in this research, between 24 and 32 storeys.

In relation to density, the two independent variables considered are: plot ratio and site coverage.

[12] Familiarity with a place does not necessarily lead to identity with a place, but regular use of a place may facilitate finding certain elements with which one may feel identified. Along the same lines, the deepening of a relationship can lead to social identification or simply feelings of attachment.

- Plot ratio is the gross floor area of the buildings divided by the plot size
- Site coverage is the built surface area divided by the plot size.

Combining both variables provides an insight into the potential population density in the outdoor space of the community. On one side, the plot ratio relates the gross floor area to the plot size, which is an indicator of the number of people sharing the outdoor space - considering that the communities compared are in the same economic level range and have similar indoor living space per person. On the other hand, site coverage provides more specific information as to the available outdoor space to meet in. So, these two measures of density are relevant in order to be aware of the possibilities of encounters between the residents in the outdoor space and the capaciousness of such spaces.

Finally, two groups of community sizes have been considered:

- Small communities, between 400 and 600 families
- Large communities, between 700 and 2300 families

Several design features have also been taken into account due to their possible influence on encounters between residents. These variables are mainly:

- Topology. This variable refers to the connectivity and global integration of the streets and common outdoor spaces within the community. An organic configuration of streets around integrated squares generates probabilistic patterns of movement and encounters between the users. Meanwhile, a grid pattern may hinder unplanned encounters between residents of different building courtyards. Thus, several configuration properties defined within the space syntax[13] approach (Fisher 2009), such as symmetry or level of distribution, (Fig. 3-7) have been considered during the analysis.

[13] **Space syntax** is a science-based, human-focused approach that investigates relationships between spatial layout and a range of social, economic and environmental phenomena.
These phenomena include patterns of movement, awareness and interaction; density, land use and land value; urban growth and societal differentiation; safety and crime distribution.

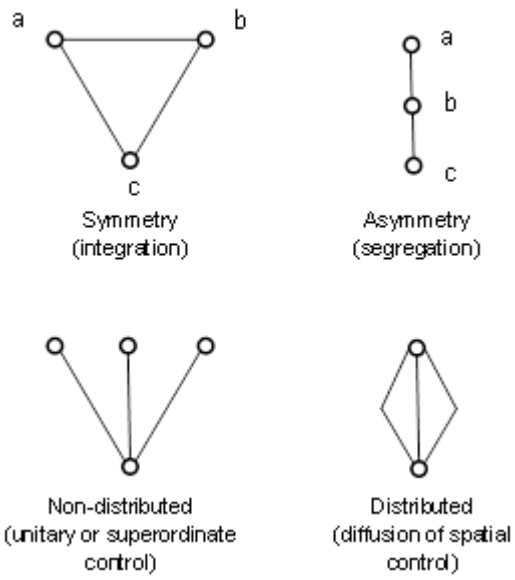


Fig. 3-7 Configuration properties of the urban form

- Geometry of shared spaces (squares, transverse spaces and space between buildings). The geometry of the squares and spaces between buildings in terms of size, degree of elongation, shape and visibility are relevant aspects that have an impact on the use of the space and the interaction between the users (A Staub & Yu 2014)**.** Relevant outcomes have been found in relation to the impact of these design features on the social ties between residents.
- Finally, the influence of different ground heights and the integrated accessibility to such spaces have also been considered. These physical characteristics can influence the use made by residents of the outdoor spaces and the frequency of visiting them.

Finally, the *jiedao* has been considered only in order to look at the impact that its physical and social conditions may have on the reinforcement or weakening of developing ties within the communities. From a physical perspective, the factors considered are the accessibility and walkability to services, amenities and shops needed for a daily routine. This aspect is very relevant to encouraging the presence of the residents in the surroundings of their community. Having services and amenities within walking distance may encourage residents to remain in the nearby area and have more chances of encounter with the community´s neighbours outside the compound, thus strengthening the ties by multiplexity – see section 3.2.2.1. Also, this accessibility reduces the need to travel and optimises the time use of the residents, since it results in more leisure time to spend in the shared spaces of the community if they wish. Similarly, the availability of green areas or parks in the *jiedao* may impact on the time spent within the community, particularly if the shared spaces of the

compound are poor. Also, the possible influence of the social context has been analysed through the study of the heterogeneity of the *jiedao* and the observation of the daily social life and atmosphere - documented with digital information, pictures and videos. This aspect may be relevant in relation to the use that residents make of the *jiedao*, given the usual homogeneity within the community and the hierarchical and classist[14] traits of Chinese society (Bluegill & Dong 2013).

3.2.1.2. Independent variables in relation to environmental quality and the aesthetic and maintenance of the built environment

Environmental quality

The environmental quality of an outdoor space can be decisive for the use that residents make of it (Yiyong Chen et al. 2016). The design of the space, the presence of vegetation and the materials used are some of the variables that influence the thermal and hygrometric comfort of people. This research has not studied the impact of the design of the built environment on outdoor comfort. However, it has taken into consideration its possible influence on social ties. Thus, several environmental aspects are analysed to find out whether they affect the development of social ties within the community and the use that residents make of the outdoor common spaces. The environmental variables considered are air quality, noise, temperature, presence of areas in shade and in sunshine, and beauty. The selection of those variables is based on the results obtained from the pilot study in Ningbo. During the pilot study, more variables were included and the residents highlighted these six as the most relevant for them to spend time in the outdoor space.

Aesthetic and maintenance

The features analysed related to quality are classified into three groups:

- The first is related to the aesthetics and the maintenance of the place, including the quality of the materials, façade and building maintenance, and the overall cleanliness of the community.
- The second group deals with the availability of public spaces and their suitability for leisure, such as green areas and courtyards between buildings.
- The third group appraises the adequacy of the equipment provided in those spaces including facilities, public furniture and quality of night lighting.

Finally, the overall quality of the community is also measured. The measurement is made through a Likert 5-point scale ranging from poor, average, good, very good and excellent quality.

[14] Confucianism principles deeply engrained into a hierarchical social structure in the Chinese society. However, such hierarchy was based on principles of respect, filial love and social order. Currently, the differentiation of rights between citizens in relation to their *hukou* (household registration system) together with the increased gap between socio-economic groups is resulting in the distinction between “low- and high-quality people” and so in a classist society.

3.2.1.3. Independent variables in relation to demographic aspects

The demographic variables considered are age, length of residence, family type, family incomes, ownership, background (rural or urban) and educational background. Place of work is also included within this group, despite not being a demographic variable - it might be considered a personal characteristic - given its impact on the person´s time use and so on their ties within the community. The demographic and personal characteristic used are included in most of empirical studies (Bonnefond & Mabrouk 2019; Dolan et al. 2008; Organisation for Economic Cooperation and Development 2013).

3.2.2. Social quality of life: social network, capital and cohesion (dependent variables)

3.2.2.1. Social network

The basic notion of a social network refers to a social structure formed by a set of actors (nodes) that are related according to certain criteria holding them together (working place, friendship, kinship, neighbourhood, social club, etc.) and that may have relationships (ties) with one another. Actors can be individuals or aggregate units such as departments, organizations, or families (Chung et al. 2005). Social networks analysis (SNA) involves the study of in-groups and/or out-groups links conceived as patterns of specifiable relations that join social units - these being, individuals or subgroups (Marsden 1990). Generally, the ties within the network are built and developed through the exchange of resources (information, goods, services, social support or financial support), and their strength ranges from weak to strong *depending on the number and types of resources they exchange, the frequency of exchanges and the intimacy of the exchanges* (Chung et al. 2005, p.1; Marsden & Campbell 1984). The cumulative knowledge of the relationships of each actor within the network provides an overview of the social structure as a whole, which "*may be used to interpret the social behaviour of the persons involved"* at the same time (Mitchell 1969, p.2). A rigorous and complete description of the pattern of social relationships between the actors is needed to have a comprehensive insight into a social network. However, a full understanding would involve being aware of all of the relationships between each pair of actors in the population (Hanneman & Riddle 2005), which becomes impossible when examining large sized groups. Thus, adequate sampling of the population is considered to be sufficiently representative of the whole network- section 3.3.3.1.

The social unit to be studied in this research is the residential Chinese gated community with a population size ranging from 400 to 2300 families. Within these communities, two levels of analysis are considered: the group of neighbours living in the same building courtyard - subgroups - and the whole population of the community. The former population is embedded in the latter but their differentiation makes it possible to compare them and do an in-group and out-group analysis within the same community. Additionally, the definition of boundaries in network studies is particularly relevant since its analysis focus explicitly on interdependencies among the actors involved (Marsden 1990; Barnes 1979). In this research, the clear physical delimitation of the Chinese walled communities and the essential

requirement of being a resident to participate in the study greatly simplify the definition of the boundaries.

Regarding the methodology for social network studies, there are two main approaches that were developed by the late 1930s: socio-centric and egocentric. The former was developed from the work of a group at Harvard University who sought ways of finding subgroups of people among larger groups (Chung et al. 2005). This approach focuses on "*measuring the structural patterns of…the interactions between actors… and how those patterns explain outcomes"* (Chung et al. 2005, p.1). This analysis of the network is done from "the outside in" considering each individual as a node and aiming to arrive at an understanding of the overall structure of the network. The behaviour of individuals is inferred from their position in the overall network, i.e., similar behaviour is predicted for individuals who are in the same position within the overall network (Bridge 2002). This theory was referred to as "structural equivalence" according to Burt (1987).

The latter approach, the egocentric method, developed by a group of anthropologists at the University of Manchester (Radcliffe-Brown 1957), focuses on the networks of relations surrounding individuals rather than the whole society (Chung et al. 2005). This approach has an "inside-out" approach and follows network ties from individual respondents to their social contacts through name generator queries (Bridge 2002). Thus, this line requires an in-depth analysis of the social ties of a few individuals within the network providing a more limited overview of the whole population but a deeper understanding of the relationships. The egocentric method is commonly employed for the use of network analysis in neighbourhood research (Bridge 2002), however this research adopts a mixed mode, based primarily on the socio-centric method. The reason for this has to do with the ultimate aim of this research, which is to establish comparisons between the social network, social cohesion and social capital of several communities with patently different built environments (in terms of building height, density and population size). Therefore, an understanding of the social interactions and collective behaviour of the residents as a whole is required. Nevertheless, the interpretation of this quantitative data - obtained through a general survey - is supported by the qualitative information collected during personal interviews and observation analysis. The combination of both methods for the study of social networks in neighbourhoods has been sucessfully tested and used previously in the Chinese context (Hazelzet & Wissink 2012; Forrest & Yip 2007; Wu & Logan 2014; Liu 2019).

Ultimately, another characteristic of the social network analysis is that relational data are collected along with attribute data, which can offer rich insights into understanding individual and social outcomes in a given social setting (Chung et al. 2005). In this case, the collection of socio-demographic data - attribute data - has been essential to understanding the interaction patterns of the communities, turning into relevant results - see chapter 4 section 4.2.1.

Properties and measures of a social network

As it has been outlined, the socio-centric SNA involves understanding the individuals' connections and those of the network as a whole. The relevance of this integral study lies in the impact that the network´s composition can have on the stratification order of the social group and its cohesion (Hanneman & Riddle 2005). For instance, some communities may be formed by confined subgroups that can be integrated to a different extent with the whole, strengthening or lessening the global cohesion of the network. Also, some communities may be composed of residents with similar connections within the compound while others may show stark differences, there being a small, highly-connected elite and the rest of the population being isolated or with few ties. Only the study of these unequal distributions and their foundations can lead to an understanding of the structure and cohesion of the group as a whole. According to the findings of this research, community design features, homophily, and network size are some of the bases which bring about uneven distributions within Chinese gated communities - see Chapter 4 for further information.

The metrics used to measure the social network of the gated communities are density and strength of ties between residents. They are selected from the analysis of previous works in neighbourhoods in China (Hazelzet & Wissink 2012; Forrest & Yip 2007; Wu & Logan 2014; Liu 2019; Lu et al. 2018) and social network theory (Granovetter 1973; Berkman 2000; Bridge 2002; Gehl 2011). Density refers to the proportion of direct ties in a network relative to the total possible number of bonds, whereas strength is related to the combination of type of tie or emotional intensity, intimacy, frequency of contact and reciprocity (Granovetter 1973). These metrics are used to establish comparisons between communities in relation to their global social structure, while propinquity (physical closeness) and homophily are the basis for analysing the distribution of connections within each community. A detailed description of these metrics is provided below.

Density of ties

The density of a network refers to the proportion of existing links between individuals or subgroups relative to those that are possible. This metric can be misleading when networks of different size are compared (Marsden 1990). The reason is that "*the number of potential links in a network grows at a much faster rate than the number of network members*. *Thus, the larger the network, the lower the measure of density is likely to be."* (Bridge 2002, p.9). Additionally, the concept of density does not take into account different types of ties (intensity) and their multiplexity (single or multiple stranded), which are aspects crucial to understanding the social structure and cohesion of the group. These two measures (type of ties and multiplexity) are commonly associated with the strength of ties – see next section. However, this research has introduced the type of ties within both concepts -density and strength of ties – in order to better understand the relationship between number of ties and intimacy.

Type of ties

The classification of the type of ties adopted is based on the work developed by Gehl (2011) in *Life between buildings*. He categorized the possible social interactions in the public spaces of a city or in a residential area according to the degree of contact intensity ranging from non-committal contacts - low intensity - to complex and emotionally involved connections - high intensity (Fig. 3-8). Gehl (2011) stressed the relevance of the lower end of this scale, the passive contacts ("see and hear" contacts), since they are prerequisites for other forms of contact involving more complex interactions and also for the social atmosphere that their presence implies. Indeed, considering passive contacts in this research is particularly relevant since they can motivate the development of closer ties, but also contribute to providing a sense of safety and belonging. Furthermore, Henning & Lieberg (1996) suggested that weak ties can be more relevant in a neighbourhood than stronger ones since they are practical and easy to be maintained, given the issues that close physical proximity might cause for stronger ties. Bridge (2002, p. 22) also pointed out that the "*neighbourhood is still a significant site of social networks for weak ties*" although "*strong and weak ties are doing different things and both are necessary for a healthy social network*". Thus, the Gehl scale is quite complete and worth considering in order to dig into the various intensities of ties between the residents.

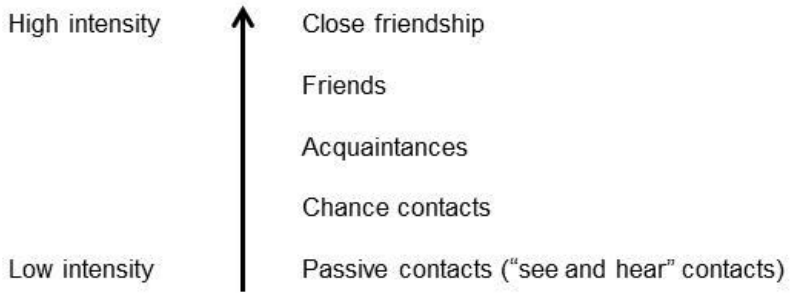


Fig. 3-8 Jan Gehl categorization of possible social interactions (Gehl 2011)

However, given the distinctive features of Chinese culture and the specific context of the study - residential gated communities - the Gehl scale has been adjusted to the requirements of this research, reducing the five levels of intensity to only three. The two lower ends of the scale have been preserved, and represent "passive contacts", those that can be recognised by visual contact (R) and "chance contacts", those with whom people speak sporadically (TS). Nevertheless, the higher-intensity ties - acquaintances, friends and close friends - have been grouped into a single type called "regular contacts", which represent those residents with whom people socialise. Obviously, there are several levels of intimacy within this type of ties but this is further scrutinized quantitatively through the question in the survey relating frequency of socialization with place of interaction - detailed in next section "strength of ties" - and qualitatively through the interviews.

The reason for re-defining Gehl's scale was mainly based on the participants' feedback during the pilot study, who complaint about the extension, complexity and difficulty for understanding the terminology of the survey in this regard. Indeed, the meaning of friendship in China can be ambiguous and induce to confusion in the context of residential communities. Hazelzet & Wissink (2012) also found difficulties with the meaning for friendship in their study in Guangzhou defining two groups of friendship as heart-to-heart and ordinary friends. In their case, this was needed as they were focussing on more intimate relations within and outside the neighbourhood. However, this study has to broaden each of the groups in order to cover the whole spectrum of relationships within the neighbourhood.

Thus, during the pilot study, the meaning of the term "friend" was explored. Most participants of the pilot study stated that neighbours are not friends but merely "neighbours" despite the fact that they might spend most of the day together, attend several activities jointly, share their concerns and help each other out with daily issues. Friendship in the Chinese culture involves a much deeper and committed relationship, usually developed with colleagues that have been working together for long time, share similar social status and have the capabilities of influence and reciprocity (affection + instrumentalization). Indeed, Ruan, Freeman, Dai, Pan, & Zhang (1997) pointed out the difference between the source of social linkages for the American and Chinese society. While the Americans based their social network on three kinds of linkage: kin, fellow workers and friends; the Chinese only differentiated between family and co-workers. This was also supported by Hazelzet & Wissink (2012) and Forrest & Yip (2007) since both courses of research highlight that working together was the main reason for bonding in work-units and for weakened bonding in new residential gated communities. Indeed, this has been reinforced by several interviewees during the field work. One of them stated that "*a friend* (referring to close colleagues) *can come into my house, know some of my family "gossip", and support me if I need a favour such as getting my son into a specific University or if I have financial issues: However, a neighbour does not. I simply share my time with some of my neighbours and we help each other in basic matters if possible, but friendship is something much deeper*." Thus, friendship entails a high degree of solicitude and involvement in China. Certainly, friendship ('youai', friendly affection, and 'youqing', friendly sentiments or friendship) is a concept that Chinese people hold in high esteem – over and above, even, the romantic love between a couple - since it has probably been encouraged more than any other emotion (Ellis 2009). The reasons must be the stress which is placed on the collective consciousness through the influences of Confucian values, and the communal life style and collective ideals driven by Chinese philosophies and policies. Thus, the use of a specific nomenclature and associating the concepts of friend and neighbour has been averted in the survey to avoid misunderstandings. Accordingly, in this research the type of ties has been related to the actions of recognising, talking and socializing, to be quantified by groups while further detail of the insights into the relationships is obtained through the interviews and the frequency of contact by place.

Due to the complexity of the conceptualization of type of ties and the differences in population size between communities, the formulation of the survey´s questions in relation to density of ties – taken primarily from the work of Lu et al (2018) -, was thought through particularly carefully and tested by different means - such as the carrying out of a pilot study in Ningbo (China) and subsequent individual and group reviews with local people - for further details see section 3.3.1.2. Finally, the scale of measurement was defined using a five-point scale ranging from strongly disagree to strongly agree and by the implicit association of the number and type of ties in the formulation of the question (table 3-1). The higher the level of intimacy according to the type of tie, the smaller the number of ties estimated as maximum. So, recognition by visual contact (R) is associated with “most” residents, talking sporadically (TS) is associated with “many” residents, and socialising with “some” residents (S). In this way, although an exact number for the network´s density is not provided, the scale overcomes the limitations of comparing communities of different population size and distinguishes between types of ties. Also, completing the questions of the survey has been quickened, since during the pilot study the answer scale was numerical and the participants very often complained about how time-consuming and difficulty it was to answer them.

Table 3-1 Questions of the survey in relation to density ties

You recognise by visual contact most residents of your…					
	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Court building					
Xiaoqu					
You talk sporadically with many residents of your…					
	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Court building					
Xiaoqu					
You take the initiative to socialize with some residents of your…					
	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Court building					
Xiaoqu					
Jiedao					

Strength of ties

Closeness, frequency and duration are three of the most common aspects taken into account when measuring the strength of ties (Marsden & Campbell 1984; Marsden 1990).

Here, the type of ties and their multiplexity represent one of the measures for intensity of ties. This is complemented with the frequency of contact associated with a place of interaction, which provides more complete information regarding not only the intensity but also the intimacy of the tie. Additionally, the duration of the relationships is not measured as such, but the length of residence in the community is considered, which has turned out to be one of the important aspects when it comes to building ties with neighbours - see Chapter 4 section 4.2.1. – as pointed by other authors (Hazelzet & Wissink 2012; Forrest & Yip 2007; Liu 2019; Wu & Logan 2014; Lu et al. 2018)

Type of ties

In relation to the type of ties, an additional question to those exposed in the previous section is introduced, relating to the number of relatives living in the same community. This question is straight-forward since there is no possible misunderstanding in this regard. Having this information has been considered important since the presence of very close ties such as relatives may influence the interaction with other residents. In some cases, it can constrain the development of new relationships since the emotional and instrumental needs are likely to be already covered; and in other cases, it may have the opposite effect, meeting new people through the family members. Wellman, Carrington, & Hall (1988) considered that neighbourhoods with a large proportion of non-kin members were healthier and more successful communities, given the larger diversity of type of relationships. Here, no assumptions have been made in this sense, but its inclusion is important since it may contribute to the understanding of the results.

Multiplexity

The concept of multiplexity refers to the amount of content-forms contained in a tie i.e., if the ties with the residents are multi-stranded - knowing each other in a range of roles such as neighbours, colleagues, partners of gym, etc.- or single-stranded. This metric provides an idea of the strength of the ties and some authors have associated it with the reinforcement of the link between people. Tönnies (2011) defended the idea that rural communities (gemeinschaft) were based on multi-stranded ties which contributed to achieving more social support and the maintenance of social order, unlike the single-stranded urban neighbourhoods (gesellschaft). Contrarily, other researchers questioned the relationship between multiplexity and social support since that would depend on the quality of ties (Bridge 2002). However, the positive effect of the multiplexity of the relationships between neighbours in the work units for strengthening their bonds has been greatly highlighted (Zhu, Breitung, Li, et al. 2012; Forrest & Yip 2007; Hazelzet & Wissink 2012; Liu et al. 2020). Thus, in this context, multi-stranded ties are associated with greater strength of ties since, in general terms, a person is free to decide whether or not to interact with his/her neighbours in the community. Additionally, if the multi-stranded relationship is with passive contacts using the same facilities and amenities, this may strengthen the feelings of identity with the

neighbours and so with the community. Therefore, the questions shown in table 3-2 are used to measure multiplexity in this research.

Table 3-2 Questions of the survey in relation to multiplexity and relatives and friends type of ties

You share activities (e.g., work, gym, school...) with many of the neighbours that you know from your…

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Courtyard building					
Xiaoqu					

Number of friends and/or relatives that you have in… (please, indicate an approximate number)

	Friends	Relatives
…your *xiaoqu*		
…your *jiedao*		

Frequency of personal contact

Frequency of contact provides further information about the strength of ties besides the type of ties. Indeed, Bridge (2002) suggested that considering the frequency of ties emphasized the importance of the neighbourhood over the type of ties, based on his analysis of Barry Wellman's work (1979) in the *"The Community Question: The intimate networks of East Yorkers".*

Here, frequency of contact is associated to the place of interaction and provides even more complete information due to the relationship between intensity of interaction – regularity - and different levels of intimacy (table 3-3). In this way, as pointed in the previous section, further details about the "regular contact" ties - those with whom to socialize - is obtained. The dwelling is considered to be the place of greatest intimacy, given the distinct character of privacy acquired by this place over the last few decades in China. Also, meeting in the *jiedao* must entail a "close" relationship, since socializing outside the community must be done through an agreed date to go together out of the compound or due to multi-stranded ties. The courtyard building is the place representing the third degree of closeness. Socializing in the courtyard of the building unit, either with the building courtyard neighbours or with other residents of the community, involves a smaller and more restricted group of people interacting, generally, in a smaller and more enclosed space. Last of all, socializing in the shared spaces or amenities of the *xiaoqu* is associated with the weaker degree of intimacy since the possibilities of meeting by chance are greater and the interaction is likely to be within a larger group of people.

Table 3-3 Questions of the survey in relation to frequency of personal contact

Frequency with which you socialize with your courtyard building neighbours in…					
	Never	Rarely	Few times per month	More than once p/w	Everyday
Your dwelling					
Courtyard of your building unit					
Shared spaces of your *xiaoqu*					
Shops and services of your *xiaoqu*					
Your jiedao					
Other, specify_____					
Frequency with which you socialize with your *xiaoqu* neighbours (except those from your courtyard building) in…					
	Never	Rarely	Few times per month	More than once p/w	Everyday
Your dwelling					
Courtyard of your building unit					
Shared spaces of your *xiaoqu*					
Shops and services of your *xiaoqu*					
Your jiedao					
Other, specify_____					

Finally, different modes of contact such as telephone calls, email, videoconference or face-to-face are usually considered when studying frequency of interaction. However, given the clear physical delimitations of the boundaries of this study and the physical proximity of the participants, only face-to-face interaction has been considered.

3.2.2.2. Social sustainability and social standards

In this research, social sustainability focuses on the social capital and cohesion within Chinese residential communities. The conceptual boundaries of these terms are clearly developed in coming sub-sections.

Social capital

The concept

In general terms, social capital refers to the measurement of social collaboration between individuals or groups of people, which brings opportunities for its members. However, the flexibility and multi-dimensional character of the concept may lead to confusion. The causes, consequences and processes which constitute social capital can often be quite different, given its applicability to diverse social groups ranging from local to national spheres - family, colleagues, neighbours, friends, fellow university students, football teams, companies, organizations, cities, nations, etc. - and its adaptability to several scopes. For instance, the process of forming social capital at a local community such as the neighbourhood depends largely on the day-to-day interactions between residents, while at the country level it may be

more influenced by social and economic policies and other macro-social forces (Lochnera, Kawachia, & Kennedy, 1999, p. 269). Also, there are discrepancies about the use of social capital as a resource for public and common good, or for the benefit of individuals. Some authors consider social capital as a collectively produced and owned entity, from which a whole community may favour (Coleman 1990; Putnam 1995a; Putnam 1995b). An example is Putnam (1995b) who suggested that social capital in communities and nations might contribute to dealing with the social disorders of modern societies, such as crime, through cooperation and mutually supportive relationships between the members. On the other hand, other authors interpret social capital as a source of assets for the individual derived from his/her web of social relationships (Flap 2002; Lin 1999a; Lin 2002; Erickson 1996), which may be helpful for achieving personal goals (access to information, skills, power, support, etc.). In this sense, individuals use social capital to their own benefit rather than for the good of the community or group.

This last approach of social capital is associated to the concept of *guanxi* in China – explained in Chapter 2 -, which is defined like a "dyadic, particular, and sentimental tie that has the potential of facilitating favour exchanges between the parties connected by the tie" (Bian 2006, p.312). Such connection implies a specific code of behaviour with strong obligations between the persons involved and based on norms of affection and favouritism (Bian 2011; Huang 2018). In this sense, the extent of the social capital term can be less overwhelming in China due to its association to the well-known and delimited concept of *guanxi.* However, its straight association to social capital has also been indicated as partially detrimental (Huang 2018).

One reason is the tendency to associate social capital to instrumental benefits (Guthrie 2002; Bian 2008; Bian & Huang 2015), considering social networks as a means to obtaining individual prosperity such as getting a job, improving personal financial situations, or securing key information about certain benefits (Huang 2018; Lin & Dumin 1986; Bian 2008; Lu et al. 2013)**.** The other main reason for questioning the association of social capital to *guanxi* is because it limits the sources that provide social capital to personal ties (Huang 2018). For example, civic participation is one of the main aspects pointed as not considered in *guanxi* but relevant for social capital, particularly in urban areas (Huang 2018; Chen & Lu 2007; Palmer & Perkins 2011; Zhou 2000). However, this claim can be arguable, particularly at neighbourhood level, since civic participation is useful for understanding a possible source from where the individual is obtaining the benefits of social capital– personal, emotional and instrumental support - but not as a measure of it. Instead, measuring the frequency of meeting of a group of people – which is civic participation – and the benefits that they obtain from it provide direct information on the cohesiveness of the group and so it is intimately linked to social cohesion.

This ambiguity about the variables used to measure social capital and social cohesion within a community can be also identified in the use of the trust component (Bartolini & Sarracino

2015; Miao et al. 2019). The problem of such ambiguity is the difficulty in comparing different results which can result in confusing outcomes. For example, Fu & Yuan (2012) use the variables trust, acquaintances, help and involvement as variables to measure social capital across residential communities in China. Their results show that despite people trusting and knowing their neighbours, they rarely exchange help with them or involve themselves in the community affairs. Thus, the more objective variable for measuring social capital here as a personal benefit obtained from social relationships is help, however, the results could show certain levels of social capital through trust and acquaintances. For his part, Huang (2018) also looks at social capital and its relationship to social trust between four types of groups in China - urban locals, urban migrants, new urbanites and rural migrants – including social network support, neighbourhood attachment and type of associational membership as variables for measuring social capital. Meanwhile, Bartolini & Sarracino (2015) consider trust, civic cooperation and social participation for measuring it in their study of the relationship between social capital and life satisfaction in China.

Thus, it is hard to provide a clear and consensual definition and measurement of social capital due to the wide range of approaches and scales of analysis. Even within the same scale, for example the neighbourhood, different scopes and possibilities of covering a broader or more specific spectrum of aspects can lead to different conceptions. This research considers that the multi-dimensional nature of this concept naturally prevents the drawing of clear boundaries and the concept must be accepted as being wide-reaching and diverse although strictly defined within each piece of research. For such definition, it is essential to clearly delineate the boundaries of the concept within each research through its general or specific goal, the variables used to measure it and, also, the sources considered that can provide it (Flap 2003), understanding the source as such and not as a measure of the concept in itself. Indeed, considering the source is essential since not all the social spheres and individuals can provide the same kind of support. For example, Gaag & Snijders (2003) pointed out the diversity of alters within a network that could provide support for the achievement of personal well-being in the form of affection against the very specific members that could help another to find a job (Lin 1999b). Thus, *"in some situations…, social resources need to be very specific to be useful in attaining goals"* (Gaag & Snijders 2003, p.156). The possibility also exists that having social capital fails to materialise in an improved situation or that it can even acquire negative connotations. For example, Portes & Landolt (1996, p. 20) pointed out the existence of "*…considerable social capital in ghetto areas, but the assets obtainable through it seldom allow participants to rise above their poverty*" (Forrest & Kearns 2001).

In this case, social capital is identified with the concept of *guanxi* applied to the neighbourhood scale. Thus, social capital refers to the emotional and instrumental support that residents of a community receive from their neighbours through personal ties within the community. Social capital is, in this sense, considered in the contemporary Chinese context

to be essential for individual welfare since this *"social support improves well-being through prevention of isolation, being understood, being valued, and obtaining help and advice when needed that in turn have an effect on self-esteem, feelings of worth, and self-control"* (Morrow 2004, p.50; Power & Willmot 2007, p.25). Accordingly, the approach is primarily related to the individual, since the focus is placed on the personal affection and help that a person needs or desires to receive from other residents, this being an individual benefit. This individual approach does not mean that social capital cannot acquires a collective dimension. Indeed, the aggregation of this individual variable is used to infer a collective level attribute that sheds light on the actual social needs of the Chinese society and turn it into a measure of the cohesiveness between members of the community (Buckner 1988; Gaag & Snijders 2003). Therefore, social capital is both a private asset and a public good, yielding externalities that may promote social coherence and community well-being (Fu & Yuan 2012, p.2). However, local social capital may not always be beneficial for the collective, since a strong social capital between a few members associated, for example, with propinquity might reduce cohesion at community level. This is one of the reasons why both social capital and cohesion are studied and correlated at two physical scales; the building courtyard (BC) and the *xiaoqu* (X) (see result in Appendix C).

Measuring social capital and social standard

Social capital is assessed by two items based on principles of reciprocity: the sharing of private thoughts and concerns (OPINION) and the feeling of being helped (HELP). The former is related to emotional support and the latter to instrumental support. Both concepts have been largely used in the context of neighbourhoods to measure the social network support associated to social capital (Huang 2018; Anon 2005; Fu & Yuan 2012; Lochnera et al. 1999)**.**

Table 3-4 below shows the specific questions formulated for measuring social capital, including the relevance given to the variables by the participants (social standards). Reciprocity, which is the basic principle that sustains social capital and *guanxi*, is implicit in the questions, and the frequency – five-point Likert scale - reflects the intensity of affective and instrumental support. Also note that, as previously outlined, the variables are measured at both the building courtyard and the *xiaoqu* levels. This makes it possible to compare social capital at both physical levels and with social cohesion in addition to providing a deeper understanding of the formation of social capital in relation to the features of the built environment.

Table 3-4 Questions of the survey in relation to social capital

How often do you participate in activities (square dance, …) organized in your *xiaoqu*?

□ Never □ Rarely □ Few times per month □ More than once per week □ Everyday

How important is for you to have the chance of participating in those activities in the *xiaoqu*?

Unimportant						Important

How often do you speak with the people that you know from the following spaces to ask for their opinion or for sharing your concerns, and vice versa?

	Never	Rarely	Occasionally	Very often	Always
Courtyard building					
Xiaoqu					

How often do you and the people that you know in the following spaces help each other out? For example, picking up children, assisting the elderly, loaning items.

	Never	Rarely	Occasionally	Very often	Always
Courtyard building					
Xiaoqu					

How important is it for you to know neighbours you can count on in your *xiaoqu* for the kind of favours indicated in the previous question?

Unimportant						Important

Social cohesion

The concept

Likewise social capital, social cohesion is a term that has been defined and measured in different ways depending on the context and the conceptualization given by researchers (communities, cities, nations, etc.; nature of the network ...). In general terms, it could be said that social cohesion is the tendency of a group to stick together in order to achieve a common goal, either instrumental and/or emotional (Carron & Brawley 2000). Thus, cohesion of the community is associated with common values and commitment to certain objectives which contribute to social order and social control as well as solidarity and reductions in wealth disparities (Forrest & Kearns 2001). Conversely, a community lacking social cohesion is "*one which displayed social disorder and conflict, disparate moral values, extreme social inequality, low levels of social interaction between and within communities and low levels of place attachment*" (Forrest & Kearns 2001, p.2128).

When speaking about the cohesion of a group it is relevant to be aware of the primary shared reasons for being part of the group, the benefits obtained therefrom, and the evolution of the community as a whole (and of the individuals). This is closely related to the

multi-dimensional and dynamic character of the concept. On one side, multi-dimensionality represents the triggers for cohesion which can be of an instrumental and emotional nature while dynamism refers to the changing relevance that each one may have throughout the life of the group (Carron & Brawley 2000). As Carron & Brawley (2000) stated *"cohesion in a group can (and most likely does) change over time in both its extent and various forms throughout the process of group formation, group development, group maintenance, and group dissolution."* Thus, the group must be considered a living entity that adjusts to the evolution of its members and their relationships. In this sense, Chinese residential compounds have passed from very static communities in the work units to an aggressive process of change through the complete dissolution and new creation of residential areas - due to the relocation and migration process. Also, the dynamism of a settled gated community in large cities in China is high due to the floating population and renters (Huang et al. 2020)**.** The number of people renting a house is heighten in China despite about 90% of households being homeowners (Huang & Clark 2002; Clark et al. 2019)**.** The reason is that most of them have been found to be "owner-renters". This means that Chinese tend to invest in properties but many of them live in a rental house for investment reasons or disassociation between the place where they can buy and where they live. That disassociation can be based on financial reasons but also on the restrictions of *hukou* for buying a property, particularly in Chinese megacities. Thus, this high rate of renting results in an even higher rate of resident turnover within residential communities, which must be one more reason for the decreased cohesion in Chinese neighbourhoods (Forrest & Yip 2007; Farrer 2002; Hazelzet & Wissink 2012).

On the other hand, being instrumental or emotionally based is neither necessarily exclusive nor positively correlated. This means that groups are not purely instrumental or emotional and the presence of each dimension does not have to be equal and complementary. All groups form for a purpose, even those that could be initially considered uniquely social since there is always an instrumental foundation for their formation (Carron & Brawley 2000).

In the case of this research, social cohesion has been defined according to the analysis of the social context of the study. The two main initial causes considered for cohering are mostly instrumental but they may easily acquire an emotional dimension depending on the triggers for gathering. On one side, the collective ownership and management of the shared spaces of the community since the *Urban Housing reform* of 1998[15] brings residents together for a common purpose. The neighbours collectively hire a private management company for the tasks of maintenance, cleanliness, and security of the community. However, there is often discontent among the residents with the work done by the management companies - according to the residents´ opinion during the pilot study and field work - because they tend

[15] The Urban Housing reform of 1998 abolished the policy on the provision of welfare housing and resulted in the market-oriented urban housing provision system (Wang 2001). Since that moment, the residents of gated communities are the collective owners of the common spaces of the compounds and they are responsible of its maintenance – previously, they had been managed by the government.

to neglect some of their duties. This difficulty brings all residents together to fight for their common interests against the procedures of the management company, which turns into a reason for developing empathy and union with the rest. Also, sharing the same desires to maintain a shared space may introduces a certain sense of equality among residents which may reduce the distance between different demographic groups. This fact most likely affects the feelings of identity and sympathy towards the neighbours (Casakin & Neikrug 2012), so facilitating the development and strengthening of their ties (Lu et al. 2018). Thus, the initially purely instrumental purpose may become deeper and encourage the development of affective ties. On the other hand, and similarly, the hypothesised social needs of some residents encourage their participation in activities organised within the community and lead them to take the initiative to interact with other residents. The initial interactions are mainly instrumental to avoid isolation. However, these contacts are likely to become more affectional over time through the deepening of the relationship.

With regard to the benefits obtained from a cohesive community, these have often been related to safety, health, and overall well-being (Feng et al. 2020; Wen et al. 2010; Cheng & Smyth 2015; Zhang et al. 2020). For its part, safety is one of the more recurrent collective benefits of a neighbourhood´s social cohesion, since it has evident implications for the well-being of all residents - whether they participate actively in the community life or not - but also in the optimization of security resource investment in the community as a whole. The study of Sampson et al. (1997) is noteworthy as regards how it demonstrates this relationship - safety and cohesion. They defined and tested the term “collective efficacy” to describe the variation in violence in a neighbourhood when social cohesion and informal social control come together. The term was tested in a multi-level analysis of crime in 343 neighbourhoods of Chicago, where an inverse relationship was shown to exist between collective efficacy and the perceived neighbourhood violence, residential instability, violent victimization and homicide events (Sampson et al. 1997; Lochnera et al. 1999). Indeed, perceived and actual safety are essential aspects for developing a sufficient sense of trust and feeling of comfort in a space in order to interact with others (Mason et al. 2013; Ziersch et al. 2016; Meltzer et al. 2007), which is the first step towards neighbouring and cohering in a residential community. Also, developing a sense of community or feelings of attachment towards a group of people and a place leads to social inclusion and brings benefits for the health, both mental and physical, of individuals, and their well-being (Robinette et al. 2013; Feng et al. 2018; Zhang et al. 2020).

Lastly, measurement of community cohesion usually includes collective and individual dimensions, and deals with the collective behaviour of the members with respect to their participation within the group and to the personal feelings of attachment, identity and belonging towards the community. This approach seems reasonable since cohesion represents the collective performance of a group but the individual´s feelings toward the community are clear determinants of the formation of unions and the degree of cohesion

achieved. Carron & Brawley (2000), for instance, proposed a conceptualization of cohesion based on two constellations of social perceptions. One was related to group integration and reflects the individual´s perception of the similarity, bonding and unification of the group. While the other refers to the individual attraction to the group including the individual's personal motivations for remaining in the community and his or her personal feelings about the group. Also, Buckner (1988) measured the cohesion of a neighbourhood through the mean value of the concepts of *psychological sense of community* [16], attraction-to-neighbourhood, and social interaction within the neighbourhood, the two former being of an individual character and the latter collective. Along similar lines, Liu et al (2017) define social cohesion of urban villages in Guangzhou through neighbourhood interaction, community participation and neighbourhood attachment; the latter is of an individual nature as opposed to the collective nature of the former. These individual attribute variables provide information at the individual level but such information may be a characteristic shared by other members of the collective. Thus, the aggregation of these individual variables becomes a collective-level attribute which may facilitate collective-level analysis (Buckner 1988). *"By so doing we can better understand the context in which individuals experience a sense of community [and tend to cohere]"* (Buckner 1988). The following section explains in detail the measurements used in this research for community cohesion.

Measuring social cohesion and social standard

Social cohesion is assessed by collective and individual-level variables. The collective variables are always related to the promotion of common local interests which can be manifested in different forms such as the organization of a vigilante group to protect from 'undesirable' visitors, joint action to improve the conditions of the neighbourhood (local services, maintenance,…) or organization of events for enjoyment (Forrest & Kearns 2001). In this research, two collective variables are considered. The first is represented by the frequency with which neighbours gather to discuss community concerns or to celebrate events (national parties, wedding, BBQ, etc.) (MEETINGS). This variable encompasses the collective actions taken by the residents to defend the community's interests with a more instrumental basis, and the celebration of events which has a larger affectional side. Participation in these meeting/events may strengthen the residents' bonds and the whole community's social network can become more robust. This would reinforce the sense of community, togetherness and unity at the same time that it would provide links to widen their personal networks (Power & Willmot 2007). The second collective variable refers to the participation of residents in regular community activities (PARTICIPATION), which may

[16] *Psychological sense of community* is a term introduced by Sarason (1974) to measure the sense of belongingness, fellowship, "we-ness," and identity experienced within a functional (group) or geographically based collective. This concept has been widely used by several authors to measure both social cohesion and social capital (Carron & Brawley 2000; Lochnera et al. 1999).

contribute to the development of more select and intimate ties, given their specific tasks and daily or weekly frequency of contact. The cohesion of these smaller groups of residents is likely to be stronger and can affect the cohesion of the whole community in a positive and integrative way or, contrarily, it may lead to the fragmentation of the whole community due to the possible isolation or confrontation between groups (Forrest & Kearns 2001). The same interdependency may arise between the various socio-physical scales of the compound, the building courtyard and the community. This relationship, like for social capital, is analysed through correlations between scales in appendix C.

Meanwhile, the main individual-level variable related to social cohesion is trust (TRUST), although PARTICIPATION can also be considered to belong to this group, since it brings not only collective benefits but individual ones (emotional and instrumental). This variable was initially considered as only a collective measure of social cohesion, however, the relevance given to this variable for self-realisation by the participants during the pilot study suggested its significance for the final field work. The availability of spaces to develop shared activities and the organization of classes turned out to be considered essential for the well-functioning of a community by the residents and for their personal satisfaction within the community. The reason is that such activities are oriented towards the elderly, retired residents and middle-aged women, who usually spend most of the day within the community and have a substantial amount of free time. Thus, the activities essentially become an instrumental tool for residents to practise their hobbies and occupy part of their free time. But also, they turn out to be an important emotional component, since the activities are a perfect means to build affectional ties and the mere fact of not being lonely is already a way of emotional support. Moreover, the *psychological sense of community*[17] -formulated by Sarason (1974) and refined by McMillan & Chavis (1986) - implies a great emotional support since the person feels part of a group with whom to share an emotional connection. Although this *psychological sense of community* obviously has a collective component, it also provides an emotional individual benefit. Logically, the aggregation of this variable also reflects, to some extent, the cohesion of the community, since it is extremely localised within a specific group of people.

Additionally, safety and attachment are parameters highlighted here as influential aspects and relevant outcomes of social cohesion, particularly in a local environment such as a neighbourhood (Berkman 2000; Sampson et al. 1997; Lu et al. 2018). On one side, both physical and social attachments are relevant contributors to cohesion, since they represent the attraction and desire of the person to remain in a group of people or in a specific place (Wilkinson 2007). Being emotionally linked to a group (socially attached) is an indication of the likely cohesion of that community, considering that if most members have a similar

[17] Psychological sense of community was pointed out by Sarason (1974) as one of the major bases for self-definition. According to McMillan & Chavis (1986, p. 9) the psychological sense of community or sense of Community *"…is a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together."*

feeling, it means that there is a significant union between them. On the other hand, the desire of remaining in a place (place attachment) can be related to the objective adequacy of the physical features of the built environment, but it can also be a sign of place identity, which is subjective and linked to individual perceptions, meanings and to activities performed in the place. That is to say, personal feelings and experiences (Relph 1976; Forrest & Kearns 2000; Anquetil 2009). As far as feeling safe and trusting neighbours are concerned, they are intimately related since trusting other residents strengthens the local feeling of safety and vice versa. Both contribute to avoiding the restriction of use of the public space due to fear (Forrest & Kearns 2001) and set the basic foundations for initiating a relationship.

Table 3-5 below shows the questions formulated in the surveys in relation to social cohesion, and safety and attachment. It can be observed that the importance given to the participants holding community meetings and events, which is a key question in order to measure cohesion, is included to obtain information regarding the residents' preferences in relation to community cohesiveness (social standard). This consideration is crucial to combine social theory with the evolution of the changing Chinese society and get an idea of the desired level of cohesion, since very cohesive neighbourhoods might result in oppressive atmospheres - lack of freedom and privacy- while loose communities might tend towards fragmentation, isolation and adversity (Beumer 2010; Forrest & Kearns 2001).

Table 3-5 Questions of the survey in relation to social cohesion

COMMUNITY COHESION

How often do you participate in activities (square dance, …) organized in your *xiaoqu*?

□ Never □ Rarely □ Few times per month □ More than once per week □ Everyday

How often do the residents of your *xiaoqu* get together to discuss community concerns or to celebrate events (national parties, wedding, BBQ, etc.)?

	Never	Rarely	Occasionally	Very often	Always
Courtyard building					
Xiaoqu					

How important is it for you to have community meetings or activities with your *xiaoqu* neighbours?

Unimportant						Important

In general, the people that you know from the following spaces can be trusted.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Courtyard building					
Xiaoqu					

SAFETY AND ATTACHMENT

In general, you feel safe in your…

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
Courtyard building					
Xiaoqu					

How sorry would you feel if you had to move from your *xiaoqu*?

Not at all						Very sorry

Please indicate the reason/s why you would feel sorry and rank them in order of importance.

□ I like my flat-building □ People □ Proximity to Services □ Proximity to Work

□ I like my *xiaoqu* □ Other, please specify_____

3.2. Methodology and methods of analysis

3.3.1. General procedure

The conceptualization and operationalization of the proposed transferable framework have been tested through a pilot study in two communities in Ningbo with 159 samples (147 samples for the survey and 12 samples for the interviews), and a field work in nine gated communities in Shanghai with 1.066 samples (767 samples for the main surveys – social and environmental -, 230 samples for the quality surveys on aesthetics and maintenance, and 69 samples for the interviews) (table 3-6). The pilot study was essential in order to redefine the methods and methodology of this investigation, while the field work has produced valuable results. In general, obtaining the permission to conduct the study in the communities was remarkably harder in Shanghai for the field work than it was in Ningbo for the pilot study, with around 50% positive responses.

Table 3-6 Summary of methods and data collected in the pilot study and field work

Pilot study	
Quantitative method	**Qualitative methods**
Survey (147 samples)	Individual semi-structured Interview (12 samples) Digital documents
Refinement the surveys and interview questions, and the methods of collection data.	
Field work	
Quantitative method	**Qualitative methods**
Social survey (767 samples)	Individual semi-structured Interview (69 samples)
Quality survey on aesthetics and maintenance (230 samples)	Observation analysis and mapping Digital data (video, pictures and audio)

The choice of Shanghai as the place to conduct the field work was based on several reasons. On the one hand, a national statistical analysis of the current and expected migration flows and investments in urbanization has been carried out as part of this research

and has been partially shown in Chapter 1. They indicated that the East Coast continues to be the area of China expecting a stronger process of urbanization. Also, Shanghai is one of the largest megacities in China with more than 27 million inhabitants, and this made it a good option for the required context of the study. On the other hand, the School of Architecture of the University of Tongji – an institution of recognised prestige - was willing to cooperate in this investigation through the assistance of some of their students for translation purposes, and at the same time they provided the necessary documentation to facilitate access to the communities.

Once the city had been chosen, it was necessary to select the area where the communities should be. To this end, different areas of the city were visited during the first week of the field work, however the selection was limited by the student assistants who were not willing to travel long distances from the University of Tongji. Thus, once the area was delimited, the selection of the specific communities was based on their population size, building height and density. The standard of living in all the communities was similar and within the range of the medium class since they are the most abundant cases in the urban landscape. Data was also collected in two traditional communities with low-rise buildings and a lower economic level – it was not possible to find a traditional community with the same economic level as the others - to enrich the investigation with a wider spectrum of results. One of these two communities (CSL_2) could not be included in the study due to the falsification of answers in questionnaires – see community CSL_2 in section 3.4. The other community (CSL_1) has been included to provide a comparison with a low-rise community and also with a completely different model. The difference in economic level is considered though the variable incomes, avoiding possible misleading results.

The case studies of the field work are shown in table 3-7 bellow and coded by their population size and building height. Thus, C means community, S small size, B big size, L low rise, M medium rise, MH medium–high rise, and H high-rise, according to the groups defined for the independent variables in relation to urban form - section 3.2.1.1.

Table 3-7 Coding of selected communities for the field work

	Low rise (below 6 storeys)	**Medium rise (6-12 storeys)**	**Medium-high rise (12-20 storeys)**	**High rise (20-30 storeys)**
Small size	Shikumen, 1930 (CSL_1)	Lanxinyayuan, 2003 (CSM)	Shuxiang apartment, 2003 (CSMH)	Mingjia commun., 2004 (CSH)
	Jianshe xincun, 1954 (CSL_2)			
Big size		Huangxing garden, 2002 (CBM)	Modern star, 2002 ($CBMH_1$)	Jialimingzhu commun., 2005 (CBH)
			Garden commun., 2004 ($CBMH_2$)	

In relation to the methods employed to gather data, both qualitative and quantitative methods have been used to provide a more comprehensive view of the results. Meanwhile, the research instruments for collecting such data have been surveys, interviews and observational analysis. The strategies used for data collection and the challenges and difficulties encountered are explained in section 3.3.3.

Finally, a matrix table is used to summarise and visualise the impact that the independent variables defining the built environment can have on the social network of a gate community in China - the built environment criteria is listed horizontally along the top of the matrix. Their relationship is represented through a four tone colour scale, a favourable relationship is represented with the darker colour while an unfavourable relationship with the lighter one – for more information see section 4.4.2.

3.3.1.1. Design of the research

The feasibility of the design of this study was tested through a pilot study before the final field work in order to adjust the methods and limitations of time, costs, accessibility to data, and collaborators for translation and interpretation of data.

The research design is descriptive, seeking quantity and association/correlation of facts. The limitation of this kind of analysis is the lack of evidence to demonstrate causation between the variables considered. However, the use of a methodological triangulation, mixing qualitative and quantitative methods to gather data (interviews, observations, questionnaires, and digital documents), is used to arrive at a more comprehensive and discernible understanding of the outcomes (Neuman 2006; Denzin 2006). Thus, while the quantitative method follows a linear research path, the non-linearity of the qualitative research is extremely effective in creating a feeling for the whole and bringing together divergent information (Neuman 2006, p.152). The use of this methodology during the pilot study was essential when it came to refining the surveys and interview questions in accordance with the feedback from the residents, the analysis of data and the outcomes obtained. To do this, the participants where asked at the end of the surveys and interviews about the difficulty of filling the questionnaires or understanding the questions, and their opinion was sought regarding the relevance of the study. Also, the statistical analysis of the data collected during the pilot study showed a central tendency bias in certain questions - particularly in the questions related to density of ties - which had to be modified and re-tested before the final field work. At the same time, using qualitative methods might provide insights into the causality of the associations established through the quantitative data of the surveys. Table 3-8 shows a summary of the quantitative data collected though surveys, the relationship stablished between variables and the statistical analysis methods used in each case to give an answer to objective 1 and 2.

Table 3-8 Summary about the analysis of quantitative data

Group of data collected in social survey	
Personal information, demographic data and time use	
Social network: density and strength of ties, and standards	
Social capital and social cohesion: involvement of residents in the community and standards	
Safety and attachment	
Environmental satisfaction and standards	
Group of data collected in quality survey	
Satisfaction with the aesthetic	
Satisfaction with the maintenance	
Analysis of quantitative data	
Objective 1	
Variables	*Statistical methods*
General tendency for social network, social capital, social cohesion and social standards	Descriptive statistics Correlation
Comparison of social network variables between different demographic groups	Mann Whitney and Kruskal-Wallis tests for non-parametric data (ordinal data) Contrast of inference statistics (nominal data)
Objective 2	
Variables	*Statistical methods*
Comparison of social network, social capital and social cohesion between all the communities	Kruskal-Wallis test Mann-Whitney test (paired community comparison for statistically significant differences)
Further analysis to better understand the results for objective 2	
Comparison of social network at different physical levels (BC and X) for the whole population and within each community	Wilcoxon test and effect size
Time use, environmental and quality variables for each community	Descriptive statistics
Correlation between social ties and time use, environmental and quality variables considering the whole population	Spearman correlations for non-parametric data
Regression analysis between the dependent social network variables and all the independent variables	Binary logistic regression

3.3.1.2. Approach to the context of the study

It is particularly important to highlight that the definition of the conceptual framework and, particularly, the refinement of the methods of investigation has occupied the bulk of this investigation. The lack of familiarity with the particular nature and context of the investigation (China), the cultural differences, language barriers, the heterogeneity of the participants, and the rapid and recent evolution of the Chinese cities and urban areas - limited access to previous research findings - have made necessary a gradual process of definition, testing and redefinition of both the conceptual framework and the methods of investigation. To achieve this, four trips to China were necessary. The first two visits (Beijing, May 2013; Ningbo, July 2013) contributed to deepening the understanding of the Chinese (social, cultural and environmental) context . The third visit to China (June to July 2014) was focused

on carrying out a pilot study in Ningbo to consolidate the research objective of this investigation, in addition to testing the procedures for data collection and analysis. Finally, the last visit (Shanghai, April to July 2015) was to initiate the field work (further information about the work developed during the trips and their outcomes can be found in appendix D).

Finally, it should be mentioned that the conceptualization and operationalization of this study had been reviewed exhaustively, not just during the pilot study and the field work but through the feedback of Chinese PhD students from the Department of Architecture and Built Environment of the Campus of Ningbo (China) and Nottingham (UK) at the University of Nottingham. These reviews were carried out through the individual distribution of the surveys followed by a personal meeting for detailed feedback about the semantic relevance of the questions in the Chinese context according to the requirements of the research and the accuracy of the translation from English to Chinese. Before the field work, a final group meeting with visiting students from the Campus of Ningbo in Nottingham was held in order to discuss the formulation of certain questions that presented particular discrepancy between the participants and students. Additionally, academics from the Campus of Ningbo and from the College of Architecture of the University of Tongji have contributed to reviewing the conceptualization and operationalization of this study and providing the tools required to actually conduct the study. Of particular interest for further research is the imperious need to be extremely systematic, scrupulous and persistent in testing the adequate translation and adaptation of western concepts to Chinese culture. Indeed, despite the intense work done for a correct translation, the question regarding socialization for density of social ties still acquired a different meaning for the participants and Chinese students contributing to the field work. Thus, the exact meaning of the question was “you take the initiative to socialize with some neighbours…” instead of “you socialize with some neighbours…”. This misinterpretation has had no significant impact on the results, since measuring the strength of ties through the “frequency of socializing” take this information into account.

3.3.2. Research questions and hypothesis

Three are the main research questions of this investigation. Among the following, the first two are related to objective 1 and the third to objective 2:

- How are the social relationships between the residents of a medium economic level gated community in a large city in China?
- How would residents like the social relationships to be within their gated communities in megacities in China to improve their social quality of life?
- How does the built environment of a gated community, particularly its density, building height and population size, affect the social relationships between its residents?

The hypothesis related to the first question is:

- The social relationships between the residents of a medium economic level gated community in a megacity in China are weak with low density and strength of ties.

The hypothesis related to the second question is:

- The residents of megacities in China wish to have close social networks within their gated communities in order to obtain emotional and instrumental support – through social capital and cohesion - to achieve social quality of life in this context.

The hypotheses related to the third question are:

- High-rise gated communities weaken the social network between residents at both levels of analysis, the building courtyard unit and *xiaoqu* levels.
- The increase in plot ratio and site coverage above a certain limit weakens the ties between residents of a gated community in China.
- Small-sized communities tend to have stronger social networks between residents at both levels of analysis, building courtyard unit and *xiaoqu* levels, than larger ones.

The foundations for the formulation of these research questions and hypotheses are developed in Chapter 1 and 2.

3.3.3. Data collection

3.3.3.1. Sample

Firstly, the location of the communities in Shanghai has been based on a national statistical analysis of the migration flows and investments in urbanization, and pragmatic reasons – explained in section 3.3.1.

The population targeted is perfectly defined by physical boundaries – the walls and gates of the communities - since all the residents of the selected communities are potential participants except people under the age of 16. This age group was excluded from the research given the requirement of a signed consent of a parent, guardian or 'responsible other' to sanction the participation of minors according to the ethics procedure of the Faculty of Engineering of The University of Nottingham when conducting any research study involving human participants. This constraint hindered the process of collection of data for this age group since many surveys/interviews were done in the outdoor spaces by approaching the residents and they might have been alone at that moment. Other than this age limitation, there are no demographic restraints.

Initially, the research aimed to cluster the sample attending on one side to age group and on the other to the physical characteristics of the building and building courtyard where residents live within the same community.

In the case of the age group strata, the sampling technique used for the quantitative methods is a disproportionate[18] stratified random sampling. All residents over 16 are suitable participants for the research but they have to be grouped by age (≤35, 35-60, >60) - also paying attention to gender diversity – in order to obtain a representative sample of each group - minimum 20% of the respondents must belong to each group[19]. The reason for grouping by age group is because this variable is quite relevant for defining the life-style of the residents within the community and the use of their time. Consequently, the age ranges are set according to the probable different life styles, needs and requirements that each group[20] may have, and whose satisfaction is partially related to the design features and facilities of the compound.

On the other hand, apart from the demographic clustering, the research originally aimed to select specific groups of residents in relation to the physical characteristics of the building and building courtyard where they lived. In this way, comparisons between residents of the same community but living in spaces with different physical features could be made, at the same time as reducing the resources and time invested. However, this technique failed and had to be changed during the field work since the cooperation of the administration officers and, particularly, the residents in Shanghai was remarkably lower than the expected - according to the experience of the pilot study in Ningbo- and the freedom for the distribution of the surveys limited. For example, in Shanghai, door-to-door distribution was forbidden in all communities, which hindered the success of focalizing on a few buildings. Nevertheless, this strategy was replaced by mailbox distribution - with collection in the gatehouses or social administration office -, initially targeting only the selected buildings but the response rate was very low. Finally, surveys had to be delivered in the mailbox of every household to obtain a minimum sample size of responses encompassing the whole population. Thus, no further sampling techniques were used to select specific samples within each community but only the stratified random sampling by age groups.

In relation to the sample size, an initial calculation was made for each community in order to maximize the statistical power[21] of the study considering a confidence interval of 0.95 and a margin of error of 0.05 in accordance with the values commonly used in sociological research - rule of thumb. The population size of each community is estimated through the

[18] The use of disproportionate and not proportionate stratified random sampling technique is due to the impossibility of getting access to the census of the whole population of the communities.

[19] Despite the average percentage of people living in urban areas varying for each group - 31.04% for people ≤35, 37.7% for the middle age group (35-60), and 11.06% for the elderly (>60) - according to the Chinese Census 2010 (National Bureau of Statistics of China 2010) the relevance of all groups is considered equal to avoid social exclusion.

[20] Residents between 20 and 35 years old are likely to focus their life on working hard and taking care of their children, while the middle-aged group are certain to have more stable jobs and live with adolescent children or alone, and the elderly should be retired with enough free time for leisure and, in many cases, taking care of their grandchildren.

[21] Statistical power is defined as the probability of identifying a statistical effect when it occurs. It is determined by the combination of sample size, confidence level, margin of error, and the data itself resulting from the research. The sensitivity of the research to identify this statistical effect can be increased by enlarging the sample size. Thus, for cost and other practical considerations, the sample size is determined through an a priori power analysis (Davis et al. 2012, p.168).

amount of families per community - data provided by the social administration offices -, considering an average of 3.1 people per family[22] according to the Chinese Census of 2010 (National Bureau of Statistics of China 2010). Additionally, the data from the National Bureau of Statistics of China (2010) is used to make an approximate calculation of the population who might be under 16 years old[23] to be subtracted from the whole population - since this age group is not targeted in this research. Table 3-9 below shows the communities with the larger and smaller population size and the sample size required for each one according to the pre-requisites set. The formula for these calculations corresponds with that used for the estimation of the sample size when the population size is known and small (Morales Vallejo 2008):

$$n = N / 1+[\alpha^2 (N-1)/z^2pq]$$

where,

n= sample size

N= population size

α = error factor or margin error

z = z-value corresponding to the confidence interval

pq = variance

The value of the variance of the population is considered to be .25 (P=Q=50) using the most conservative estimation of proportions[24].

Table 3-9 Sample size required for smaller and larger communities in the field work with 5% margin error

	Population size (N)	Confidence interval	Alpha (α)	z-value	Variance (pq)	Sample size (n)
Smaller community	999	0.95	0.05	1.96	0.25	277
Bigger community	5486	0.95	0.05	1.96	0.25	359

However, collection of such sample sizes was unattainable with the resources available. The collection of data after 4-5 days in the same community was extremely difficult with a very high refusal rate. Despite using different methods for collection, little gifts to encourage and show gratitude to the residents for their participation and, in some cases, counting on the

[22] The consideration of three people per household, on the one hand, is based on the single child policy which very likely set to three the number of members in a typical family. Also, the elderly on many occasions have a care assistant or their grandchild living with them since their son or daughter is very busy at work and cannot take care of them. On the other hand, residents living alone, such as single people and some of the elderly, are compensated by larger families such as those where the grandparents live with their children in order to receive assistance or to help take care of their grandchildren.

[23] *The census of 2010 shows that 20.2% of the population living in urban areas is under 16 years old* (National Bureau of Statistics of China 2010)

[24] The variance of the population (pq) is an unknown value until the data are collected and analysed. Thus, the largest variance possible in the responses of the population is usually considered placing ourselves in the worst of cases (larger variance requires larger sample size). The pq value is often estimated based on dichotomous answers, although they may not be so. Hence, p=50% of the population that answer yes and q=50% of the population that answer no, which results in a value of pq=(.50)(.50)=.25 (Morales Vallejo 2008).

active cooperation of the administration offices, getting more than 100 responses was beyond reach and not cost efficient. Thus, the margin of error had to be increased up to 10% (table 3-10) and the sample size was decreased to around 100 people per community.

Table 3-10 Sample size required for smaller and larger communities in the field work with 10% margin error

	Population size (N)	Confidence interval	Alpha (α)	z-value	Variance (pq)	Sample size (n)
Smaller community	999	0.95	0.093	1.96	0.25	100
Bigger community	5486	0.95	0.097	1.96	0.25	100

Table 3-11 bellow shows the final distribution of surveys for each community included in the study.

Table 3-11 Distribution of main surveys and quality surveys per community

	Low rise (bellow 6 storeys)	**Medium rise (6-12 storeys)**	**Medium-high rise (12-20 storeys)**	**High rise (20-30 storeys)**
Small size	Shikumen, 1930 (CSL_1)	Lanxinyayuan, 2003 (CSM)	Shuxiang apartment, 2003 (CSMH)	Mingjia commun., 2004 (CSH)
	Ms = 83	Ms = 105	Ms = 72	Ms = 100
	Qs = 15	Qs = 39	Qs = 25	Qs = 25
Big size		Huangxing garden, 2002 (CBM)	Modern star, 2002 ($CBMH_1$)	Jialimingzhu commun., 2005 (CBH)
		Ms = 115	Ms = 86	Ms = 103
		Qs = 43	Qs = 16	Qs = 27
			Garden commun., 2004 ($CBMH_2$)	
			Ms = 103	
			Qs = 40	
Ms = Main social and environmental survey; Qs = Quality survey about aesthetic and maintenance				

On the other hand, for the qualitative research in relation to the interviews a combination of two non-probability[25] sampling techniques are used. Firstly, a minimum "quota" of two people for each age category (≤35, 35-60, >60) is set, and once the quota sampler is satisfied in each category, sequential sampling is used. That means, looking for as many relevant cases as possible until the period set to stay at that community finishes. Additionally, it is interesting to comment that the snowball sampling technique[26] had to be used in the

[25] Non-probability or non-random samples are usually used in qualitative research since they rarely determine the sample size in advance and have limited knowledge of the larger group or population from which the sample is taken (Neuman 2006).

[26] *Snowball sampling: the researcher begins with one case, and then based on information about interrelationships from that case, identifies other cases, and repeats the process again and again. The crucial feature is that each person or unit is connected with another through direct or indirect linkage* (Neuman 2006).

traditional community, not for conceptual research purposes but because this method facilitated the contribution of the residents. The residents living in the *shikumen* were more suspicious of the purposes of this investigation and less willing to collaborate, particularly for interviews - they are worried that some information can be used against them and many of them literally said that *"there is no need to collaborate"*. Thus, being referred by other residents provided them enough confidence as to open up a little more to the researcher.

3.3.3.2. Research instruments: surveys, interviews and observation analysis

The methods used for the collection of data have been questionnaires, individual semi-structured interviews, observation analysis and mapping, and digital data (video, pictures and audio). The combination of all of them is crucial to having a comprehensive and more objective interpretation of the data since the self-report responses/questionnaires are useful to measure beliefs or feelings, the interviews to better understand the results, and the behaviour measures - though observation and mapping - can corroborate some of the beliefs expressed though surveys and interviews.

Survey

Two types of survey were designed for this social study, one focused on social and environmental aspects and the second on the use and quality of the shared space in relation to their aesthetic and maintenance. The first type included demographic data, social ties between residents, involvement in the community, safety and attachment, and environmental aspects. All these variables had necessarily to come together in the same survey to establish direct associations between them. Thus, controlling the length of this survey was particularly challenging and two sub-types of the questionnaire had to be implemented during the field work to adjust to the demands of the participants: a full version of two pages printed on both sides and a simplified version of one page and a half. Both surveys were used in all the communities to achieve a minimum amount of responses to the elementary questions of the research (overall 147 samples during the pilot study and 767 samples during the field work). On the other hand, the survey in relation to the quality assessment of the shared spaces of the community was used independently from the social questionnaire (i.e. different residents of the same communities). This quality survey consisted of two parts: the first section focused on the perception of appropriation of the shared spaces by the residents and the second on the evaluation of the quality of the space (overall 230 samples in the field work). The inclusion of the assessment of place quality in the social survey would have been more appropriate but this was unmanageable due to its length. However, collecting this data separately is still very useful for comparing the communities in this regard and establishing associations between perception of place quality and use of the space and social interaction.

The questions of the main social survey are structured in line with the framework proposed in this research - explained in section 3.2. Thus, there are three main groups of questions to relate social behaviour of residents, their standards for the social variables and their

demographic characteristics (Campbell 1996; Marans 2003; Neuman 2006). Each group encompasses the following:

- Behaviour: focus on identifying how often, why and when the residents make use of the space at each scale of analysis and their interaction with the other residents. This includes the variables of social network, social capital and social cohesion.
- Characteristics: Dealing with the socio-economic and ethnic (origin) characteristics of the residents to consider the heterogeneity of the neighbourhoods, and whether behaviour is different depending on the social group.
- Expectations or standards. This third category of questions deals with the expectancies of the residents in relation to the various aspects of the study and their satisfaction with the current conditions.

The surveys were presented with a cover letter to explain the aim of the research and the extent of the participation required of the residents, together with the consent form. The participants were identified by building number and community and personal identification was not required to avoid the participants feeling uncomfortable. The layout of the questionnaire was clearly organised into five sections, visually separated by headings to avoid confusion and so reduce the time needed to complete it. The quickest and easiest section to complete was placed first in order to motivate the participants and avoid them withdrawing. The sections are in this order:

- Personal information, demographic data and time use;
- Social network: density and strength of ties, and standards;
- Social capital and social cohesion: involvement of residents in the community and standards;
- Safety and attachment;
- Environmental satisfaction and standards.

On the other hand, the quality survey includes satisfaction with the aesthetics and maintenance.

Extra care was taken to avoid ambiguity, confusion, vagueness, emotional language and social desirability bias[27] in the formulation of the questions by attempting to use neutral language and express things clearly. This was particularly important, not only due to the mentioned language barriers and cultural differences between participants and researchers, but also for those between residents. The “recent” heterogeneity of the Chinese population, since the relaxation of migration and the market economy, has brought together people with

[27] Social desirability bias “*occurs when respondents distort answers to make their reports conform to social norms”* (Neuman 2006, p.285). This is particularly relevant for social studies with the Chinese population, due to the relevance given to the social spheres and their tendency to take neutral positions and preserve their personal intimacy.

very different habits, life styles and even languages - to the point where communication is impossible between them – depending on their background (rural-urban), origin, and educational and socio-economic status. Thus, the formulation of the questions had to be very clear, simple and understandable for all or at least most of the potential participants to avoid confusion and meaningless answers. On the other hand, for clarity, each question was asked about a single topic. However, some questions included several physical levels in order to reduce the length of the survey and make it more attractive and organized for the participants.

Most of the questions of the main and social survey are closed with a standard-format - not offering a “don’t know” option - (Neuman 2006) and measured using a five-point Likert scale. Some other questions are rank multiple choice and partially open (i.e., a set of fixed choices with a final open choice of “other”), which allows respondents to offer an answer not included by the researcher. On the other hand, the questions of the quality assessment survey includes two types. The section focusing on appropriation of the space is made up of open-ended questions, while the evaluation of the quality of the space is made through closed and open-ended questions for each item to arrive at a closer understanding of their standards in relation to place quality. The non-response rate of the social survey was of between 5-10% while for the quality assessment it was 0%. The direct contact with the participants for the quality survey, and its shortness, contributed to greatly reducing the non-responses.

The Likert scales used are related to ordinal-level categories of opinions and attitudes (level of agreement), frequency, quality, and importance. The number of levels has been set to five because a smaller number of categories would provide limited information, while a larger number might be confusing for the participants in this context and exacerbate the effect of the survey´s length and become tedious. However, particular attention has to be paid to the correct formulation of the questions when using an odd level scale in China, since it can present difficulties given the tendency of the Chinese population to show neutrality and avoid taking any position. This effect was observed in the outcomes of the pilot study in some questions - particularly those related to social ties and qualities of the built environment - and their formulation had to be reviewed for the field work.

Interviews

The interviews are semi-structured, with open questions allowing the participants to develop their answers and sometimes change the direction of the interview. The duration of the interviews ranges between 10 minutes to more than an hour depending on the resident’s willingness to talk. The research defines different kinds of interviews depending on the topic covered and on the interviewee (residents, social administrator or administrator of the management company). There are three types of interview for the residents, depending on the topics covered:

- Type 1: life in a mega-city and the *jiedao* is the first interview type and includes positive and negative aspects of living in a large city; accessibility to services and amenities in the *jiedao*; travel needs; and the walkability of the *jiedao*, including the relevance given to environmental quality.
- Type 2: life in the *shequ* is the second type and comprises a comparison with the traditional *lilong* and *danwei*; exploration of the social life in the community and use of the shared spaces throughout the year; privacy, appropriation and social life of the courtyard building; standards for an ideal *shequ*; and satisfaction with the social and management company work.
- Type 3: the last interview type embraces the meaning of neighbourhood and concepts of friendship; daily community life; and identity and attachment.

Often, all the topics included in each interview type could not be covered in a single interview so they were explored over several. As shown in table 3-12, a total of 12 interviews were carried out during the pilot study and 69 during the field work. They could not be recorded given the rejection of the residents to doing so. Most of them felt worried that some information could be used against them, so the translation of the answers was done directly by the student translator during the interview and notes taken by the researcher. A second interview was carried out by the researcher with the student immediately after the conclusion of the resident´s interview, in order to go through all the questions once more and recover any possible missing information.

Table 3-12 Distribution of interviews per community during the field work

	Low rise (bellow 6 storeys)	**Medium rise (6-12 storeys)**	**Medium-high rise (12-20 storeys)**	**High rise (20-30 storeys)**
Small size	Shikumen, 1930 (CSL_1)	Lanxinyayuan, 2003 (CSM)	Shuxiang apartment, 2003 (CSMH)	Mingjia commun., 2004 (CSH)
	I type 1 = 4	I type 1 = 4	I type 1 = 3	I type 1 = 2
	I type 2 = 3	I type 2 = 3	I type 2 = 3	I type 2 = 1
	I type 3 = 2	I type 3 = 3	I type 3 = 2	I type 3 = 1
	Jianshe xincun, 1954 (CSL_2)			
	I type 1 = 3			
	I type 2 = 3			
	I type 3 = 2			
Big size		Huangxing garden, 2002 (CBM)	Modern star, 2002 ($CBMH_1$)	Jialimingzhu commun., 2005 (CBH)
		I type 1 = 5	I type 1 = 2	I type 1 = 3
		I type 2 = 5	I type 2 = 2	I type 2 = 2
		I type 3 = 4	I type 3 = 1	I type 3 = 1
			Garden commun., 2004	

			($CBMH_2$)	
			I type 1 = 2	
			I type 2 = 1	
			I type 3 = 2	

The other two types of interview, directed at the social administrator and the management company administrator, explore the tasks and responsibilities of each organization as well as their structure, number of workers, and dynamics of functioning. The opinion of the administrators in relation to the limitations and opportunities of the new gated community model for its management and the social life were also discussed.

Observation analysis

The collection of data by observation aims to complement the data obtained in the surveys and interviews through two methods: direct surveillance of the behaviour of the residents in the shared spaces and digital recording (videos and pictures) of the environment.

The first method consists of mapping the flow of people through the community in different areas and at different times of the day. The sex, approximate age range and the activity carried out by each individual was mapped through the codes shown in the table 3-13 and table 3-14 below.

Table 3-13 Gender and age groups and codes

Gender	Male (M)
	Female (F)
	Child (C)
Age approximately	Less than 10 y.o (1)
	Between 10-20 y.o (2)
	Between 21-40 y.o (4)
	Between 41-60 y.o (6)
	Over 60 y.o (+)

Table 3-14 Activities and codes

Activities	Standing (S)
	Sitting (SE)
	Walking (W)
	Doing exercise (E)
	Chatting (C)
	Playing cards (PC)
	Dancing (D)
	Riding bike (B)
	Motorbike (M)
	Car (car)

The collection of these data was done for at least four days in each community in the morning (8-9 am), afternoon (2:30-3:30 pm) and evening (6:30-7:30 pm). The time spent in each area of the community per mapping session was 10 minutes. The schedules selected are based on a previous observational analysis of the daily routine in the communities. Usually, early in the morning (from 7:00 till 8:30 am approximately) the residents, particularly the elderly, do exercises and activities such as *taichi* or dancing in the shared spaces of the communities. Other residents, during the same interval of time go to work or shopping for groceries. After that, between 9 and 11 am, the communities are quieter and some residents join the activities organised in the indoor shared spaces (reading group, knitting, ping-pong, playing cards, etc.) or go to the outdoor shared spaces and meet with neighbours. Usually, the people meeting at that time are grandparents and babysitters with children and the elderly with their care assistants. The children play together while the elderly and adults chat and look after the children. From 11 am till 2-3 pm the activity in the communities is very limited, since people are cooking, eating and resting during that period. From 3 to 5 pm more activity can be observed once more, since some residents return from work, other adults pass by with their children or stay in the outdoor space to play for a while before dinner, and the elderly chat with other residents or simply take a walk around. Finally, from 5 to 6:30 pm approximately, activity decreases once more since it is dinner time, and after that many residents come out again particularly to do exercise (walking quickly inside the community, using the training machines or playing badminton), do the square dance or children to play. Depending on the community´s social atmosphere and the night lighting quality, the elderly use the shared outdoor spaces after dinner or remain at home.

Thus, the selection of the schedules for mapping was aimed primarily at catching moments of high activity to capture the interaction between residents but also moments of less movement to show the dramatic changes and choice of activity during the day, this being a fair representation of reality. Below, there is an example of the mapping done on site (Fig. 3-9).

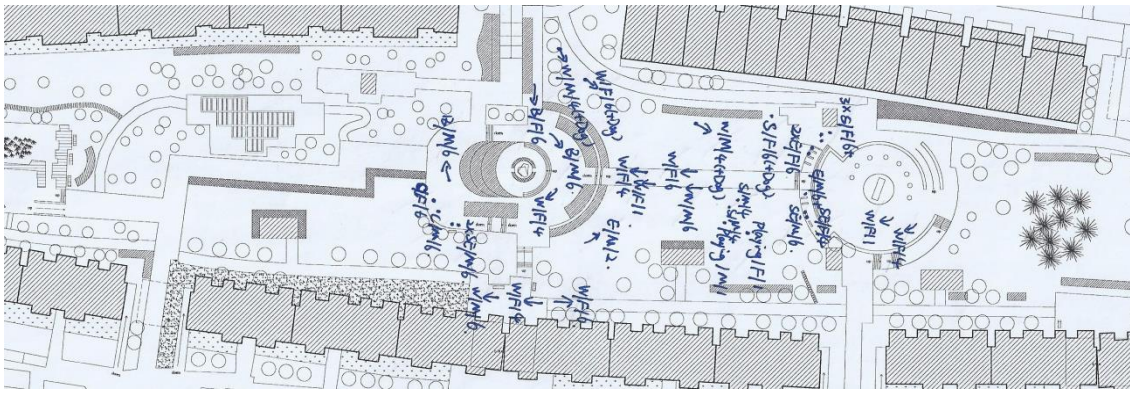


Fig.3-9 Example of mapping of people´s flow in the central space of a community (CBM)

Also, the level of appropriation of the shared spaces of the communities by the residents is analysed by observation (mapping) and through short, open questions in the survey for quality of the space. The comparative analysis between communities of this aspect in some way reflects the use that the residents make of the open space and the level of attachment and familiarity with the place. Table 3-15 below shows an example of the questions asked in relation to this aspect.

Table 3-15 Questions in relation to space´s appropriation

1. Do you think that your courtyard is very much occupied with personal belongings of other residents?
2. Do you mind?
3. Do you feel that the courtyard is something private that belongs to all the neighbours around it?
4. Do you mind if people external to your courtyard (including your neighbours in the *xiaoqu*) make use of your courtyard?
5. Would you say that the level of appropriation of your courtyard by the residents is low - high? Why? Would you prefer residents not to bring their plants or armchairs down to the courtyard?

	LOW	AVERAGE	MEDIUM	HIGH	VERY HIGH
LEVEL OF APPROPIATION					

Finally, the collection of digital data (videos and pictures) has been used within the community and at the *jiedao* to provide a fair representation of the environment. On the one hand, digital data were collected in the *jiedao* following a route from the nearest tube stations to the community and in the surrounding streets, to get an idea of the social atmosphere and the availability and different kinds of services, amenities and facilities in the area surrounding the communities. On the other hand, the same data were gathered inside the community to capture the environment in which residents meet and live although the videos or pictures of the residents were very rarely taken directly to preserve their privacy and avoid them feeling uncomfortable. Additionally, the digital documentation inside the community was essential so that it could be contrasted with the residents' quality assessment survey to better understand the standards of Chinese population in this regard. Finally, the transition between the *jiedao* - noisy and chaotic - and the *shequ* atmosphere - peaceful and relaxing - has been recorded on video and also only on audio in an attempt to transmit to the readers of this thesis the significant difference between them .

3.3.3.3. Validity and reliability

Validity refers to *"how well an idea "fits" with actual reality* (Neuman, 2006, p. 188). The validity of quantitative research deals with the meshing between conceptual and operational definitions and seeks the idea of a single version of truth, while qualitative research seeks authenticity to provide a *"fair, honest, and balanced account of social life from the viewpoint of someone who lives it every day"* (Neuman 2006).

For quantitative research, the validity types of the items used to measure the dependent variables -social network, capital and cohesion - and independent variables - place quality, environmental quality, safety and attachment - are content, criterion and construct validity. Content validity refers to the degree to which the items of the survey are representative and directly related to the construct measured (Field & Hole, 2003, pp. 45). The required exploration of multiple variables in this research has limited the amount of questions related to each construct to just a few, leading to very specific and direct questions, each item capturing by necessity the entire meaning of the construct. Nevertheless, the validity of these questions was corroborated using the feedback of local and western academics from the University of Nottingham. On the other hand, the validity criterion refers to whether the questionnaire is measuring what it claims to measure, which here is reinforced by the use of solid items widely employed in other research to measure constructs of the same nature. Finally, the construct validity is assessed by checking how well the items measuring the constructs correlate with each other (Field & Hole, 2003, pp. 46).

Also, the validity of qualitative research is more difficult to demonstrate, since it depends on the capability of the researcher to isolate his/her personal beliefs, morals and principles as much as possible to conciliate the understanding of the social world analysed with what is actually occurring in it (Neuman 2006). With this purpose, the researcher has attempted to disengage with her culture and situation, taking on the field work with an open mind to avoid judgements and learn and adapt to a new life style and principles. A full immersion was required to capture an inside view of the previous - pre-socialist and socialist periods - and current life styles as well as the Chinese people's understanding of different type of ties such as family, neighbours, friends and colleagues and their implications. To do this, the researcher spent the whole day (from 8 am to 8 pm) within the communities studied almost every day for the four months of the field work, applying the research methods explained or simply observing the residents' behaviour and taking notes. Additionally, the researcher joined in the activities often performed by the Chinese population - within the communities studied or in other areas - such as the dancing in the square or walking quickly around a park early in the morning (from 6 am) and after dinner. Sharing the accommodation with a Chinese woman, avoiding interaction with western citizens and minimizing communication with the researcher´s family, friends and colleagues also contributed to the isolation needed to live within Chinese culture as much as possible.

Finally, the reliability of the methods used for data collection was tested during the pilot study by using various techniques and adjusting them to the requirements of the participants. As regards the surveys, three methods were employed: door-to-door distribution and collection, approaching the participants in the outdoor spaces and letting them complete the surveys by themselves or helping them to read and answer the questions. The results showed that the door-to-door technique was the most efficient in obtaining lower non-response rates and avoiding arbitrary answers and withdrawal. People at home are more relaxed and take the

time to complete the questionnaire, while in the outdoor spaces residents are walking or want to chat with the neighbours sometimes being in a hurry to finish the survey, and occasionally withdrawing. The least efficient method is when the participants complete the survey by themselves in the outdoor spaces since in many cases they provide random answers (the same level on the Likert scale for all questions or skipping questions). Thus, during the field work, the only two successful techniques - door-to-door or mail box delivery, and filling the surveys under the researcher´s guidance in the outdoor space - were employed. Regarding the interviews, they were conducted in most cases individually in the indoor and outdoor shared spaces of the community, although some group interviews were conducted by chance. The interviews made in the indoor shared spaces were encouraged by the social administrator, and consequently the residents were more willing to collaborate. However, no great differences were found in relation to the methods of initiating the conversation and it mainly depended on the person.

3.3.3.4. Procedure of data collection: barriers, opportunities and tips

Gaining access to the communities

Obtaining permission to conduct the research in the communities selected can become the toughest, most frustrating and time-consuming part of the field work, due to the marked hierarchical bureaucracy in China and the Chinese tendency to reject taking responsibility for any decision that might bring problems. The communities are managed by three bodies: the social administration office, which belong to the government; the management company, hired privately by the residents; and the residents committee, which is a group of neighbours that take care of the general well-being of the residents and usually have a close relationship with the social administration office. The management company is the most difficult body to take on board since they are in charge of security within the community, guarding against intrusion by strangers so as not to disturb the residents. Every attempt to obtain their access permission has failed at the first try, with them sometimes even becoming rude and, literally, pushing us out of their office. Paradoxically, the resident committee in most cases gave their approval with pleasure, although they requested us to obtain the authorization of the social administration office too. For his part, the social administrator does not want to take this responsibility and requires the consent of the administrator of the street committee - his immediate superior. The latter will either recommend asking for permission from the administrator of the *jiedao* - the administrative body above - or once again refer the decision to the social administrator of the community by sharing the responsibility *("If the social administrator of the community gives his permission, for me there is no problem"*). Simultaneously, despite none of the three bodies wanting to take the responsibility, all of them want to be valued and to be asked for permission (particularly the social administration office and the management company). Thus, according to the experience of this research, the following are the steps recommended to obtain access to the communities in China:

- Get the approval of the resident committee
- Once the residents' committee's consent has been obtained, visit the social administrator of the community. He will lead you to follow the whole process explained above (visit administrator of the street committee and maybe that of the *jiedao*).
- Whether explicit consent from the administrator of the street committee/jiedao is obtained or not, if they do not forbid access, go back to the social administration office to let him know the result of the meeting. Surely, they will be willing to help or at least allow access.
- Once the consent from the social administrator is obtained, one has to decide whether to risk visiting the administrator of the management company to obtain their permission too, or go ahead with only that of the social administrator. Sometimes, the methods used for collection of data require the collaboration of the management company as is the case with this research and the approval of the management company is compulsory.

This process was notably more difficult in Shanghai than in Ningbo.

Methods of collection

The collaboration of the social administrator and the management company were crucial for collecting data. The social administrator is a key person since he/she can introduce us to some of the residents, invite us to participate in indoor activities, and even help to distribute and collect surveys or lend us furniture or rooms to perform our tasks. On the other hand, the administrator of the management company is the last person who can give permission to place a stand in the outdoor space of the community and also can allow the guards to collaborate with the researcher by collecting the filled surveys. Thus, different methods were used during the field work, depending on the willingness of each body to collaborate in the communities analysed:

- Questionnaires distributed and collected door-to-door. This has been the most effective method but it was only allowed in Ningbo and not in Shanghai.
- Questionnaires distributed in the mailbox and delivered to the gatehouses of the guards where the resident was rewarded with a little gift. This method had the highest cost and lowest response.
- Questionnaires distributed and completed in situ using a stand set up inside of the community or outside, next to the gates (Fig. 3-10). This method had a good response in most of the communities. However, the alternative method, in which the residents were approached in the shared public spaces inside the community and without a stand was less successful.
- The success of the three methods used for conducting interviews was more irrelevant than for the surveys. Two methods required the collaboration of the

social administrator, who asked some residents to do the interviews in the social administration office or invited us to attend some shared activities, where a short introduction about the investigation was presented and the residents were asked to participate. The third method consisted simply of approaching the residents in the common outdoor spaces and asking for their participation.

Fig. 3-10. Collection of data (gifts provided to the residents are on the table of the image)

These techniques were complemented with a direct approach to the residents in the outdoor shared spaces to remind them to complete the survey delivered to the mailbox in their properties for the communities where the response rate was lower.

3.3.4. Processing and analysis of statistical data

Quantitative data

The quantitative data collected has been processed by coding the responses and entering them into SPSS software. Firstly, the data has been analysed considering the whole population, looking for a general trend for objective 1. Secondly. comparisons between the communities are done to explore the impact of the building height, population size and built density on the dependent variables to find the answers to objective 2. Finally, a regression analysis is done to get a glimpse of the weight that each variable may have on the dependent variables.

The statistical tests used for each analysis are indicated below:

Objective 1. Considering the whole population (responses of participants from all communities)

Firstly, the general tendency for social network, social capital, social cohesion, and the social standards of the residents are analysed through descriptive statistics. The graphical representation is done using bar-charts, while the inference statistics used are the median, mean, interquartile range, and frequency in percentage. This analysis is supported through the correlation between social network, social capital and social cohesion. Thus, the analysis of these three variables and social standards make it possible to establish a relationship between them to clarify the social needs of the residents within their community and the meaning of social quality of life in the neighbourhood. The use of descriptive statistics and correlations in this case, instead of using regression analysis as in the Social Quality Model, is based on the use of the social standards variable for each dependent variable – social network, capital and cohesion - instead of a general variable for social satisfaction or social well-being – reasons explained in section 3.2 - to obtain a deeper understanding of the concept of social quality of life.

Secondly, the density and strength of ties are compared between different demographic groups. This analysis is crucial to going in to more detail as to the daily social life of the residents within the community and to spotting the barriers/ease and/or willingness for socializing of each group according to their personal characteristics. The data, within the demographic variables, are continuous, ordinal and nominal. For ordinal data, the Mann Whitney and Kruskal-Wallis tests for non-parametric data and unpaired groups are used to establish a comparison between two or more groups respectively. The continuous data are grouped to be analysed as ordinal variables, whereas comparison between groups for nominal data such as family type, is done through contrasting inference statistics (mean, median and interquartile range).

Objective 2. Comparison between communities

To clarify objective 2 and find out the impact of the urban form variables – building height, density and population size – on the dependent variables, social network, social capital and social cohesion are compared between all the communities through the Kruskal-Wallis test. The results with statistically significant differences are further analysed by paired community comparison using the Mann-Whitney test -seven pair comparisons for each community. To counterbalance the probability of making a Type I error caused by the significance level inflating across the multiple pairwise comparisons[28], Bonferroni corrections are applied. Also, the effect size is calculated for comparisons that are statistically significant. In this study, the

[28] The probability of making a Type I error - reject the null hypothesis when it is not false - increases when conducting multiple paired comparison in the proportion of $1 - 0.95^{n,}$ where n is the number of Mann-Whitney tests carried out on the same data. In this case, each community could be compared with a maximum of seven other communities, increasing the probabilities of committing a Type I error in $1 - 0.95^{7} = 0.30$. Thus, the probability of making at least one Type I error would be 30% instead of 5%.

effect size was calculated by making use of equivalence between the standardised measure of the observed difference and the Pearson's coefficient r, extracting the z-score test-statistic from the Mann-Whitney tests according to the following formula (Field 2009):

Effect Size= Zscore/ √N

where N is the number of participants

The interpretation of the outcome was derived from the tables provided by Ferguson (2009), where conventional values have been proposed as benchmarks for 'small' (RMPE, recommended minimum effect size representing a practically significant effect), 'moderate', and 'strong' effects sizes (r≥ 0.20, 0.50, and 0.80, respectively).

Secondly, the variables measuring the social network are compared between the different physical levels (building courtyard BC and *xiaoqu* X) for the whole population and within each community. These makes it possible to achieve a better understanding of the bonds between residents in association with the place and about the influence that the ties at one level may have on the other. The Wilcoxon test is used to conduct these comparisons - these are made within the same population - and the effect size is also calculated to discover the relevance of the significance differences found.

Lately, time use, environmental and quality variables are analysed for each community using descriptive statistics and Spearman correlations for non-parametric data conducted between them and social ties considering the whole population. The results are useful to further understand the outcomes of the social ties comparisons between the communities.

Regression analysis

The last step is to carry out a regression between the dependent social network variables and all the independent variables considered. The regression analysis has been done by binary logistic regression since multi-nominal regression could not been used given the large number of variables and the sample size of the data. The solution adopted consisted of reducing the scale of the dependent variables to dichotomous by suppressing the neutral option of the scale and grouping strongly disagree and disagree within "disagree", and strongly agree and agree within "agree" (table 3-16). Thus, the scales of the dependent variables have been modified as follow:

Table 3-16 Modification of the scale of the dependent variables

Former scale	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
New scale	Disagree		Deleted	Agree	

It must be clarified that the regression analysis does not aim to reduce the social bonds between people to a formula but merely to arrive at a comparative estimation of the weight of each independent variable on social ties.

3.3. Field work - Case Studies

This investigation has conducted a pilot study in two communities in Ningbo and the field work was carried out in nine communities in Shanghai. The pilot study was essential in order to redefine the methods and methodology of this investigation, while the field work has produced valuable results. The choice of Shanghai as the place to conduct the field work has been explained in section 3.3.1.

First of all, this chapter briefly describes the whole area where the case studies are located to later goes on to introduce each one of them in turn. A brief description of their main characteristics supported by plans and images of their surroundings in addition to the spaces inside the communities are presented.

3.4.1. Community location

The maps in figure 3-11 aim to provide an overview of the area where the communities are located. The upper map differentiates residential areas from the others and the presence of greenery is highlighted, together with the distribution of parks throughout the area. Then, the lower plan shows how most of the spaces within the city are walled, both for residential and other uses. This fact increases walking distances in the city although it provides other social benefits described in this thesis. Also, the red lines adjacent to the walls represent the commercial areas, showing a fairly equal distribution throughout the city and the easy access to them from all the selected communities.

Fig. 3-11 Location of case studies and structure of the urban area

3.4.2. Case studies – description of gated communities

The communities selected are presented in table 3-17. The bulk of the research is based on the analysis of the communities with medium economic level which are divided into three main blocks according to the height of their buildings: medium (CM), medium high (CMH),

and high-rise communities (CH). A second division is made according to their population size: small for communities between 450 and 650 families (CS) and large or big for communities with a range of 700 and 2200 families (CB). On the other hand, data is also collected in two traditional communities with low-rise buildings (CL), small size with around 500 families (CS), and a lower economic level – it was not possible to find a traditional community with the same economic level as the others - to enrich the investigation with a wider spectrum of results. One of these two communities (CSL_2) has not be included in the study due to the falsification of answers in questionnaires. The other community (CSL_1) has been included to provide a comparison with a low-rise community and also with a completely different model. The difference in economic level is considered though the variable incomes, avoiding possible misleading results. Table 3-17 provides some basic parameters for each community in relation to their population size obtained from the number of families living there, the proportion of green areas, parking space, rental rate and average price of the properties. These data give a quick overview of the public space of each community, their economic level and the heterogeneity of the communities in terms of ownership in order to make them comparable. Table 3-18 shows the low rise communities.

Table 3-17 Characteristics of communities with medium economic level

	Medium rise (6-12 storeys)					**Medium-high rise (12-20 storeys)**					**High rise (20-30 storeys)**				
S	Lanxinyayuan, 2003 (CSM)					Shuxiang apartment, 2003 (CSMH)					Mingjia commun., 2004 (CSH)				
	F	GR	PS	RR	P	F	GR	PS	RR	P	F	GR	PS	RR	P (K)
	469	35%	121	57%	40.6	630	40%	150	64%	48.5	404	40%	400	80%	50.1
B	Huangxing garden, 2002 (CBM)					Modern star, 2002 ($CBMH_1$)					Jialimingzhu commun., 2005 (CBH)				
	F	GR	PS	RR	P	F	GR	PS	RR	P	F	GR	PS	RR	P
	1182	51%	400	34%	43.5	711	40%	227	59%	46.0	2218	40%	350	67%	43.1
						Garden commun., 2004 ($CBMH_2$)									
						800	38%	140	39%	50.2					

F-number of families; GR-green rate; PS-Parking space; RR-rent rate; P-price

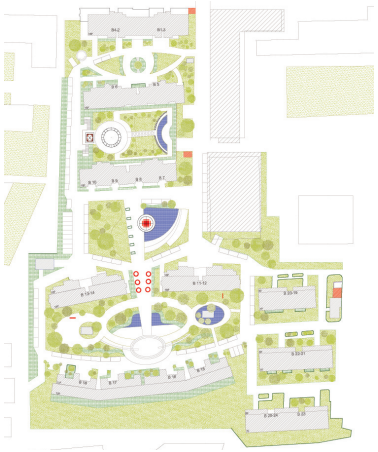
Table 3-18 Characteristics of communities with low-medium economic level

	Low rise (2-5 storeys)									
S	Shikumen, 1930 (CSL_1)					Jianshe xincun, 1954 (CSL_2)				
	F	GR	PS	RR	P	F	GR	PS	RR	P
	~500	0	0	unknown	unknown	~500	Not included	Not included	Not included	Not included

Bellow four set of images are presented to have a comparative and quick overview of the different communities at once. They include the plans, surrounding of the communities, the main squares and the space between buildings. Pictures of CSL_2 are not included here since this community has not been taking into consideration in the statistical analysis. However, plans and further pictures of all the communities, including CSL_2 – some references are done through chapter 4 to this community -, can be found in appendix A.

Plan of CSM

Plan of CBM



Plan of CSMH

Plan of $CBMH_1$

Plan of CSL_1

Plan of $CBMH_2$

Plan of CSH

Plan of CBH

Fig. 3-12 Plans of case studies (there is no a common graphical scale - for scaled plans see appendix A)

CSM

CBM

CSMH

$CBMH_1$

CSL

$CBMH_2$

CSH

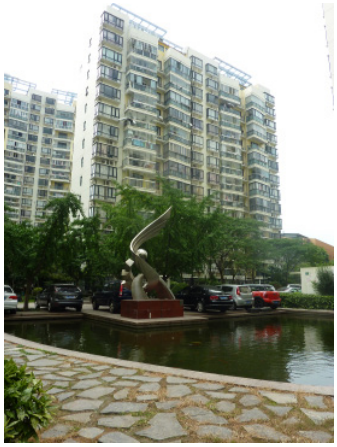
CBH

Fig. 3-13 Views of the surrounding of the case studies

CSM

CBM

CSMH



$CBMH_1$

No central squarre

$CBMH_2$

CSH

CBH

Fig. 3-14 Central common spaces of the case studies

CSM

CBM

CSMH

$CBMH_1$

CSL

$CBMH_2$

CSH

CBH

Fig. 3-15 Space between buildings or building courtyards of the case studies

The following section provides a brief description of each community and more detailed images of each one can be found in appendix A.

Communities with low-medium economic level

CSL_1

CSL_1 is the only traditional community analysed as part of the field work. It is located in a central area but, like many other *shikumen* or traditional communities, it is about to be demolished, since the government has initiated an expropriation process to modify the infrastructure of the area and widen the train rails. Currently, there is a rich mix of elements, since high-rise buildings have been built in the surroundings of this shikumen, while other low-rise developments are still present. Consequently, the street life is very diverse ranging from wide avenues with heavy traffic to small streets where shops and residents still occupy the outdoor areas with personal items, considering the pedestrian routes as extensions of their properties.

The community inside is composed of narrow streets and courtyard houses (2-3 storeys) which open onto two parallel streets. These streets acquire a private character given their small size and the proximity of the houses to each other. Indeed, they have strong signs of territorialisation, as residents occupy them with personal belongings, such as chairs, tables, shoes, and also use them to hang out their clothes, take a nap or prepare food for cooking. Moreover, some houses have their facades covered with plants, just as if they had a garden there.

The layout of the community is completely orthogonal and connected to the outside by way of four gates. This orthogonal layout, together with the lack of squares or indoor shared spaces, and the private nature of the streets, hinders casual encounters between residents. Also, this community has only a few training machines and a small parking lot for bicycles.

On the other hand, the houses are designed to be accessible from two streets, one has the main entrance to the dwelling while the other the entrance to the back yard of the house. They were built during the war by the Japanese and later re-occupied by the Chinese. During the Mao Zedong period, several families (one or two families per storey) would live in these individual houses, sharing the kitchen and toilet. Currently, some houses still maintain these divisions and several families live together, but the maintenance levels of their shared spaces are quite low. The reason is that these houses were provided by the government and the residents consider that the common spaces are still the responsibility of the government. Thus, the living space is smaller than for the other communities studied and their conditions are poorer, which encourages a remarkably more intense occupation of the street. In short, the life style in this community is completely different and, despite the trust between neighbours being lower than some decades ago, neighbours here still keep their front doors open and a closer relationship with each other on a daily basis can be observed.

CSL_2

The layout of this community is marked by a central square located in front of the main entrance and three semi-open courtyards. The central square is organised into two main areas to spend time in. One is provided with benches and shadows while the second has training machines. The rest of the square is made up of inaccessible greenery zones and trees.

The courtyards, on the other hand, have beautiful green areas and facilities for resting. However, the territorialisation of these courtyards by the occupants of the ground floor flats is such that residents do not use them. This may be enhanced by their enclosed physical shape, which gives them a more private character.

The signs of territorialisation in this community can be seen almost everywhere, although mainly in the less exposed areas.

This community could not be included in the statistical analysis because the answers to the questionnaires were not valid. The social administration officer offered his help to distribute and collect the questionnaires throughout the whole community. He was extremely cooperative and allowed us to spend the required time within the community. However, all the questionnaires were completed using the same ink and all of them had the same answers. Therefore, the social administration office took the time to complete more than 100 questionnaires in order to provide whatever view of the community they wished. This shows the importance that some communities give to having a good image of their residential units and its management.

Communities with medium economic level

Medium rise communities (6-12 storeys)

CSM

CSM has an integrative layout reinforced by the existence of only two gates that give access to the community. This design encourages the flow of residents through the outdoor shared spaces of the community and, particularly, through the central square.

In relation to these shared spaces, there are three outdoor shared areas and one indoor area. The main square has a central location within the community and it can be seen from the main gate. Its design includes a small lake and very well-maintained green areas with sand paths in between. There is also a covered area with benches and a table where residents usually interact and meet at night to sing. The whole square is divided into several zones by crossing paths although it is visually connected. Additionally, there are two secondary shared outdoor spaces. One at the south of the community with only a few benches and a large green area, which is always empty. The second is located at the very south of the community and divided into two, one part being a small playground and the

other being fitted with training machines. Finally, there is one indoor shared space where residents meet to play cards and other board games.

The spaces between buildings do not function as courtyards but rather only as streets, with parking lots on one or both sides. Also, the entrances of the buildings are not facing each other, which hinders encounters between residents.

In this community there are some signs of territorialisation, particularly at the very south of the community, where the residents living in the ground floor have extended their backyards to take up the outdoor shared green space of the community and have planted a number of vegetables. Also, at the very east side of the community, there are signs of territorialisation also by planting vegetables and keeping hens. It is important to note that the two areas with signs of territorialisation are those sides which have no gates and are therefore more isolated.

CBM

The layout of CBM is intended to integrate the various areas of the community through four gates – controlled by guards - and mainly longitudinal paths or roads that cross the whole community. This residential unit is divided into four quadrants while the central square divides the community into two. The disproportionate size of the central space and the scarcity of transvers connections hinders circulation from one side of the community to the other, partially dividing the neighbourhood.

Regarding the shared spaces, this community has the central shared space, one secondary square within each of the four quadrants, and one indoor room. The main square has four plazas distributed along its longitudinal axis, while the rest is all grass and greenery. The first plaza is provided with training machines, the second – located in a central position - has a central sculpture and free space for children to play, the third has benches and shaded areas, while the last one has a large fountain with a few benches to where one can sit. The whole park is slightly elevated from the ground further reinforcing its presence, while worsening the transverse circulation of residents. On the other hand, the secondary squares located in each of the quadrants are small plazas with only a few benches to sit on, except for one of them, which also boasts a playground for children to play in. This space with the playground is where residents meet more often given its facilities and the human scale. Finally, there is a large room where indoor activities can take place and where the social administration office organizes a variety of classes, such as dancing, reading, singing or even playing ping-pong.

In this community the building entrances face each other and are separated by a road open to car traffic. Meanwhile the space between the backyards of the buildings is carefully designed with green areas, benches, sand paths and water elements. These are very

comfortable and peaceful spaces more adapted to the human scale in comparison with the large central square.

Finally, this community hardly shows any signs of territorialisation, only for a couple of flats on the ground floor that occupy part of the grass of the common space with their personal belongings.

Medium-high rise communities (12-20 storey)

CSMH

The layout of this community, together with the position of its two entrance gates, results in certain areas of this residential unit becoming isolated. The gates are located next to each other, one being for pedestrian access and passing through the entrance of one of the buildings, while the other is for cars, although it also used by pedestrians. Most of the residents access the community through the second entrance and usually only the residents of buildings one to six use the first one, a fact which partially isolates the residents of these buildings.

This community has two outdoor shared spaces, the main one being located in a central position while the secondary space is situated on a first-floor level. The main square is composed of two areas joined by a wide corridor with benches shaded by trees. On one side of the square there is a small lake and a playground, while on the other there is a dome with benches and a table where residents usually meet to chat. The composition of this square, divided in different areas, reduces the chances of the neighbours to perform the typical dance of the square or other kinds of sports, due to its small size. Regarding the secondary plaza, it has benches, a small pool, greenery and some shaded areas but it becomes a residual space since it does not contain a building entrance. Finally, this community lacks an indoor shared space and the social administration office does not organise activities for the residents.

In this community, there is no sign of territorialisation anywhere.

$CBMH_1$

The layout of $CBMH_1$ is marked by a central street connecting the two gates of the community. This central street has ramifications towards both sides, giving access to the building entrances. The layout is interesting as it forces every resident to pass along the central street to gain access to their buildings.

In relation to the shared spaces, there is no main square, but instead three smaller plazas distributed throughout the community. Meanwhile, the distribution of the buildings is similar to that of CBM with roads providing access to the buildings at both sides, while the space between the back yards facades is covered with greenery making them peaceful areas within the community.

Access to this community was more restrictive than in the other cases and the behaviour of residents within the community could not been observed.

$CBMH_2$

This community has an integrational topology, with three gates, and roads surrounding every building. Several small shared spaces are distributed throughout the community, while a larger one is located at first floor level. In a similar way to the case of CSMH, the square located in the first floor is isolated and hardly any residents use it and it is invariably empty. It is the largest square of the community and it was probably conceived to be the main one since it has greenery, trees, benches, and shaded areas. However, nobody has to pass through this space to access their buildings and it ends up being a somewhat lonely part of the community. On the other hand, the location of the secondary shared outdoor plazas has been well thought out and seems to perform rather well. There is one small plaza next to the north-west gate with a few benches and a table. This plaza is surprisingly successful since it is located next to a heavy traffic road and the noise can be extremely disturbing. However, most residents gain access through this gate and there is an important flow of people through the area throughout the day. Additionally, the road on the east side of the community, connecting the north-west and south-east gates, has been provided with benches and training machines at the junction of two building courtyards. The provision of such facilities turns this part of the road into the community's second most used outdoor space. Finally, another noteworthy aspect is that of the two indoor common rooms available for the residents to meet. These spaces are quite successful and women meet there every day for knitting and chatting.

Regarding the relationship between buildings, some of them have their entrances facing each other, while others does not. In any case, as in most of the communities, the courtyards or spaces between buildings are occupied by cars and are used as parking lots.

There are a few signs of territorialisation in some buildings where people have extended the backyards of their flats on the ground floor.

High-rise communities (20-30 storey)

CSH

The layout of CSH hinders encounters between residents from different building units due to its divided access. The community is almost divided into two, due to the location of its two gates, which are placed next to each other. Additionally, the buildings have a different character since one of them is occupied only by renting tenants, while the other two are occupied by owners but with flats of different sizes and qualities.

This community lacks a central square, although it has a small playground and a small green area with benches. Residents do not use the outdoor shared spaces due to their small size. Furthermore, the division of the community into two is such that some residents were not

even aware of the existence of the playground. There is no indoor shared space and the social administration office does not organise events for the residents because there is no space in which they can take place. The result in this case is that residents make use independently of the park situated at the front of the community.

The space between buildings is mainly used for car access and functions as a car park.

There are no signs of territorialisation in this community.

CBH

This high-rise community has an integrational topology and four gates, although only three of them are working, since the east gate is kept closed. There is a continuous road surrounding the whole community and providing access to every building unit, while the two main squares occupy most of the outdoor space.

There is a large, central square surrounded by greenery with walkable sand paths and some trees. This square has three areas organised around a lake and visually connected. One of them is composed of three domes around an empty area where children usually play. The domes have benches and neighbours often use them to rest in the shade. The second zone making up the central square is circular in shape and has a long bench surrounding it. The shape of this spaces is favourable for children to play while parents can easily watch them. Finally, the last part of the central square is reminiscent of a dock and is used only for people to relax and admire the lake or play with aquatic toys.

Additionally, there is a secondary square located in the north-eastern part of the community. This square is composed of concentric circles and is usually full of residents. Its shape favours visibility between users at the same as time that offers the possibility to be used for various activities at once. This is one of the most socially successful squares of all the communities.

On the other hand, the buildings do not have their entrances facing each other but rather they overlooking the backyards of the building in front. There are large inaccessible green areas at the back of the buildings, which are sometimes used for hanging out clothes. The remaining space is used for parking or car traffic.

There are signs of territorialisation in the south-eastern part of the community, where residents do not need to pass through. Some vegetables are planted in these green areas and clothes and furniture, such as chairs and tables, can be seen there.

CHAPTER 4

ANALYSIS OF DATA AND RESULTS

4.1. Introduction

The results of this investigation are structured in four main groups: contextual conditions, general trends, comparisons between communities, and regression analysis.

The first section aims to provide a general view of the influence of the independent variables related to environmental quality, the aesthetics and maintenance of the built environment and demographic variables on social network. This facilitates the interpretation of the results for objective 1 and 2 in the subsequent sections 4.3 and 4.4 by having a previous understanding of the context. Thus, it first provides a comparative study between the groups within each demographic indicator in relation to social ties to find out which factors are more influential and what the differences are between groups. This analysis successfully supports the hypothesized social needs of certain demographic groups for developing ties in the context of this investigation to achieve social quality of life within the community – hypothesis on which the framework of this research is partially built. Secondly, the influence of environmental quality and aesthetic and maintenance of the built environment on social ties is analysed. Finally, the relationship between time use of the outdoor spaces of the communities is analysed in relation to the social bonds.

The second section is centred on clarifying the two hypothesis set by objective one. Thus, it provides an overview of the tendency of dependent variables - social ties, social capital and social cohesion - through descriptive statistics considering all the participants (sample of all communities). Also, the participants´ standards for social ties, social capital and social cohesion are analysed to understand whether their requirements for social quality of life within the community are in line with the principles commonly associated with a socially sustainable community. This analysis is supported by the correlation between the dependent variables - social ties, social capital and social cohesion - to better understand their relationship and therefore the requirements for social quality of life in this context.

The third section focuses on the second objective of this research though the comparison between communities to answer the three hypotheses set out in relation to the impact of building height, building density and the size of the community on the compounds´ social ties. The results are contrasted with the indicators relating to demography, safety, environmental satisfaction and quality of the space to point out their possible influence on the dependent variables. Additionally, the topology and certain design features of each community – particularly those of the courtyards between buildings and central squares - are

analysed and they make a valuable contribution to explaining the outcomes. Lastly, a comparison is made between the two physical levels – building courtyard, BC, and *xiaoqu*, X- for the whole population and within each community in order to clearly identify if the formation of ties is associated to a specific physical level and to study the correlation between them[29].

The last section consists of a series of regression analyses between the dependent and the independent variables including the physical (building height, community size and density), demographic and environmental ones. This set of regressions provides the estimated standardised beta weights of each independent variable in relation to social ties. Nonetheless, it is important to clarify that this research does not try to simplify the complexity of social behaviour in a few formulas that have been built within the limitations of the data in this investigation. However, the purpose is to provide insights into the standardised influence that each independent variable may have on social ties.

4.2. Influence of demography, environmental quality and the aesthetics and maintenance of the built environment on social network

4.2.1. Influence of demographic variables on social network (including the whole population)

The demographic variables considered are age, length of residence, family type, family income, ownership, background (rural or urban) and educational background, which are included in most of empirical studies (Bonnefond & Mabrouk 2019; Dolan et al. 2008; Organisation for Economic Cooperation and Development 2013). Place of work is also included within this group, despite not being a demographic variable - it could be considered a personal characteristic, given its impact on people´s use of their time and thus their ties within the community. All the demographic indicators show statistically significant differences between their choices in relation to the extent of their social ties. Overall, in this research, the demographic groups with more ties within the community are the elderly (Forrest & Kearns 2001), long-term residents (Hazelzet & Wissink 2012; Bridge 2002; Kasarda & Janowitz 1974), low incomes (Hazelzet & Wissink 2012; Bridge 2002; Forrest & Kearns 2001), low educational background (Wu & Logan 2014), family with children (Logan & Spitze 1994), owners (Brown et al. 2003; Manturuk et al. 2010; Woldoff 2002; Lu et al. 2018), residents from Shanghai and/or urban people; while migrants and/or rural usually have fewer but stronger ties (Huang et al. 2018). Among all of the above, the most influential are age, length of residence, ownership and educational background.

[29] This comparative analysis between physical levels sheds some light on the reasons upon which the ties are built. On one side, the relationships built mainly in the BC may be influenced by proximity and identity with a subgroup. On the other hand, stronger ties at the X may reflect a more intensive participation in shared activities and greater use of the central shared spaces where the facilities usually are. Finally, the correlation between both variables contributes to understanding whether or not they tend to feed back to each other–e.g., very strong subgroups may restrict their integration with the rest and lead to their volunteer isolation; however, at the same time, familiarity between BC residents may increase the comfortability and confidence of the residents to use the shared spaces of the community and join in certain activities.

The following subsections provide a short analysis of each demographic variable according to the quantitative and qualitative data collected. This analysis might appear to be very detailed but it is worth conveying the specifics to the reader, and the observed life-style of each group within the community – particularly to those researchers who are not too familiarized with this context yet. This information is also essential for a better understanding of the results related to the objectives of this research shown in subsequent sections 4.3 and 4.4.

Age

In general, the elderly is the group with more and stronger ties at the BC and X levels, while the younger (≤ 35) are those with fewer and weaker bonds (table 4-1, for further detail see table B-1 in appendix B). These results are in line with some authors (Bridge 2002; Forrest & Kearns 2001; Forrest & Yip 2007) although there have been others who dissent. For example, Hazelzet & Wissink (2012) indicated no significant difference between the age group in relation to social ties within the gated communities holding that older people might be travelling further to meet their old neighbourhood friends before relocation. However, in this case, there are statistically significant differences with small effect sizes between the elderly and the other two groups, particularly, for R (for BC $r_{y\text{-}e}$=-0.19; $r_{m\text{-}e}$=-0.13; for X $r_{y\text{-}e}$=-0.27), TS (for BC $r_{y\text{-}e}$=-0.22; $r_{m\text{-}e}$=-0.15; for X $r_{y\text{-}e}$=-0.31; $r_{m\text{-}e}$=-0.16) and amount of friends ($r_{y\text{-}e}$=-0.31; $r_{m\text{-}e}$=-0.14) (table 4-1); while the mean ranks are similar for TI. These results correspond to the usual life-style of each age group observed and their social needs.

On one side, the elderly are generally less mobile and have more free time than the other two age groups, spending most of the day inside the community or shopping in the surrounding amenities. Additionally, Chinese society is very active and social. The elderly like to keep a dynamic daily life by doing exercise in the morning and in the evening, joining activities (such as singing, reading, knitting, dancing, etc,.), gardening, cooking, and socialising with others, etc. Particularly, those living alone or with personal care assistance enjoy spending time in the shared spaces of the community where they randomly meet their neighbours. This “random daily meet-up” ends up becoming a habit since most residents follow a daily routine, going to the same place at the same time and meeting the same people. Also, there are elderly people living with their partner and/or grandchildren or with their son/daughter´s family. It is quite common in large cities to find this new model of family consisting of children living with their grandparents. The reason is that nowadays young couples usually work in other cities or are very busy at work so they do not have time to take care of their children in a daily basis. Thus, the children go to live with their grandparents or the grandparents move to live with their son/daughter´s family. This situation can be quite dramatic for the parents living apart from their children but also for the elderly since they have to change their life-style to take care of a child at their advanced age. Some of the grandparents explained during the field work that they had to move to Shanghai from some rural area or small town, leaving their friends, neighbours and part of their family. The

change of the social and built environment is brutal, passing from a rural context probably to a high-rise building compound in a mega-city such as Shanghai, where also, their social integration is difficult due to language and social status barriers. Nevertheless, leaving aside this “social drama”, this situation results in many grandparents spending a substantial amount of time in the shared spaces of the community so that their grandchildren can play with other neighbours. In this way, children become a basic connecting element between residents. Thus, all these reasons together with the organization of activities within the community mainly focussed on the elderly, lead this group to be the one with more and stronger bonds.

On the other hand, the younger and middle-age group are at work most of the day. They also have greater mobility and are likely to have more groups of friends outside the community (colleagues, friends from hobbies, university, etc.). This life-style dramatically reduces the amount of time that they spend within their compound and the chances of interaction with the neighbours.

Table 4-1. Mann-whitney U test for age groups and density of ties and frequency of meeting in relation to place of encounter

Variable and groups	*N* (x0, x1)	ΔMnd NHST	Mean Rank (x0)	Mean Rank (x1)	*U*	Effect size *(r)*
Recognition (R)						
Building courtyard						
Y - E	(194.228)	***	186.99	232.36	17360.5	**-0.19**
M -E	(284.228)	**	240.47	276.47	27823.0	-0.13
Xioaqu						
Y - E	(195.225)	***	176.66	239.83	15338.5	**-0.27**
Talk Sporadically (TS)						
Building courtyard						
Y - E	(193.226)	***	183.04	233.02	16605.5	**-0.22**
M -E	(281.226)	**	235.73	276.71	26620.5	-0.15
Xioaqu						
Y - E	(195.223)	***	171.55	242.69	14342.0	**-0.31**
M -E	(279.223)	***	231.61	276.38	25560.0	-0.16
Take the initiative (TI)						
Xioaqu						
Y - E	(193.220)	**	187.20	224.37	17409.5	-0.16
Number of friends in the *xiaoqu*						
Y - E	(184.207)	***	159.48	228.46	12324.5	-0.31
M -E	(257.207)	**	215.12	254.08	22132.0	-0.14
Frequency of meeting with residents of the BC						
Dwelling						
Y - E	(26.48)	*	**30.92**	**41.06**	453.0	**-0.24**
M -E	(61.48)	*	**50.07**	**61.27**	1163.0	**-0.19**
Courtyard						
M -E	(58.47)	*	**47.82**	**59.39**	1062.5	**-0.20**
Common xiaoqu						
M -E	(62.49)	**	47.52	66.73	993.0	**-0.31**
Frequency of meeting with residents of the X						
Courtyard						
Y - E	(187.207))	***	159.08	232.21	12170.0	**-0.33**
M -E	(251.207)	**	212.97	249.54	21829.5	**-0.14**

Common xiaoqu						
Y - E	(189.203)	***	163.51	227.22	12947.5	**-0.29**
M -E	(259.203)	**	215.19	252.30	22065.5	**-0.14**
Jiedao						
Y - E	(183.183)	***	165.52	201.48	13453.5	**-0.19**

Y = young, M= middle-age, E = elderly

*Only shown the result with difference statistically significant. For further information see table B-1 and B-2 in appendix B

In consonance with the results of R, TS and TI, the elderly meet more frequently with their X´s neighbours at the BC (r_{y-e}=-0.33; r_{m-e}=-0,14), X (r_{y-e}=-0.29; r_{m-e}=-0.14), and jiedao (r_{y-e}=-0.19) than the other two age groups (table 4-1, for further detail table B-2 in appendix B). However, it is worth comparing the tendency of each age group for meeting at home with the BC and the X´s neighbours respectively. While the elderly is the group that more frequently meet with their BC´s neighbours at their home, this trend changes when it comes to meeting with the X´s residents. The younger and middle-age groups become those that gather more often at home with X´s residents than with the BC ones (the difference is not large but it is worth noting this trend). This result suggests that the elderly, despite meeting often with residents of the whole community, develop closer ties with those living in the same BC, proximity playing an important role. Meanwhile, the younger and the middle-age groups seem to select their community friends based on other aspects such as affinity and common interests rather than in closeness. These two social connectors, proximity and common interests, have been pointed out in the development of this research´s proposal (section 1.3) as the different foundations for developing bonds between people in traditional-rural and contemporary-urban communities respectively. But, what is more, this diverse trend may not be simply dependent on demographic and personal characteristics but on the design of the built environment. In the case of the compounds studied, generally the design of the courtyards or spaces between buildings is rough and they are left as residual spaces for circulation being used as car parking in many cases. Meanwhile, the central space(s) are provided with facilities such as training machines, a playground, green areas, pools and public furniture (benches and tables). Thus, the varying quality and unequal provision of equipment lead the residents to make use of the main square when they have free time. In the case of the elderly, they have enough available time to use the central area(s) and also spend time close to their dwelling, where they meet with their BC´s neighbours. In this way, developing close ties by proximity, which can be a powerful connector reinforced by collective ownership and identity with a subgroup, is restricted for certain groups of residents, due, to a great extent, to the design quality.

For the rest of variables measuring social ties, there are no statistically significant differences between the age groups.

Length of residence

Length of residence is one of the demographic variables with the greatest influence on the ties between residents. A longer period of time living in the community increases the strength of ties between the residents. The results are statistically significant for almost all of the social ties variables (for detailed data see table B-3, B-4 y B-5 in appendix B), while the higher effect sizes are for R (for BC r=-0.37; for X r=-0.39), SA (for X r=-0.39) and A (for X r=-0.42) (table 4.2). These results are consistent with a wide range of previous researches (Hazelzet & Wissink 2012; Bridge 2002; Kasarda & Janowitz 1974; Zhu, Breitung & Li 2012; Forrest & Yip 2007).

Table 4-2. Comparison between different lengths of residence in relation to density of social ties

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases (N)	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	**-0.37**
≤ 5	2.5	2.54 (1)	241.99	152		
5 < X ≤ 10	3	3.04 (2)	316.27	267		
> 10	4	3.44 (2)	**377.23**	219		
Xiaoqu					0.000	**-0.39**
≤ 5	2	1.99 (2)	229.44	150		
5 < X ≤ 10	2	2.56 (1)	320.02	268		
> 10	3	2.91 (2)	**373.12**	214		
Sharing activities (SA)						
Xioaqu					0.017	**-0.39**
≤ 5	2	2.38 (1.5)	33.73	13		
5 < X ≤ 10	3	3.21 (1)	46.79	39		
> 10	4	3.44 (1.5)	**57.16**	47		
Number of friends (A)						
Xioaqu					0.000	**-0.42**
≤ 5	1	1.69 (2.5)	211.07	146		
5 < X ≤ 10	2	6.82 (5)	300.08	250		
> 10	5	9.60 (13.5)	**361.53**	201		
Jiedao					0.018	-0.10
≤ 5	1	1.38 (3)	254.40	141		
5 < X ≤ 10	1.5	6.85 (5)	**299.56**	240		
> 10	0	6.32 (5)	287.87	187		

*the effect size corresponds to the comparison between the minimum and maximum length of residence.
Mnd=median; Mn=mean; IQR=interquartile range; Mn rank=mean rank; N=sample size
*Only shown the result with difference statistically significant. For further information see table B-3, B-4 and B-5 in appendix B

Family incomes

Lower income participants tend to have more and stronger ties with other neighbours. These results are supported by several studies (Henning & Lieberg 1996; Logan & Spitze 1994; Forrest & Yip 2007; Wang et al. 2016), which base these findings on the necessity of mutual support and the relatively constrained social mobility of this group. In this research, particularly, there is a statistically significant difference[30] between family income groups for R (r_{BC}=-0.23; r_X=-0.32), TI (r_{BC}=-0.16; r_X=-0.18; r_J=-0.23), F with the residents of the X (r_{Dwel}=-

[30] The effect sizes have been calculated between the lowest income group and the next to the highest since the small sample size of the families with more incomes introduces an error.

0.26; $r_{Courtyard}$=-0.33; r_X=-0.28), and A within the community (r=-0.40) (table 4-3, for further detail see tables B-6, B-7 and B-8 in appendix B). These results are in line with the restraints that a family with low economic level may have on their life style (Forrest & Kearns 2001). According to the information collected through the interviews, residents with limited economic resources have fewer possibilities of travelling or joining activities outside the community. So, the events organised within the compound fill a great part of their leisure time, spending most of their free time in the X and interacting with others. Also, having fewer chances of getting out to restaurants, events, theatre, or travelling restricts the possibilities of meeting with friends from outside the community which must enhance the need for socialising with neighbours – "replacing" the warmth and company of friends by that of the neighbours. On the other hand, residents with lower economic resources need more help from their neighbours for daily issues such as picking up children from school, taking care of them occasionally or helping with the older members of the family. Having more friends within the community can become essential for this kind of favours (instrumental support) when one cannot hire a nanny or care assistance. This idea is supported by the increasing trend in the number of relatives living in the X when the income level decreases (not statistically significant). Indeed, in China, family ties are quite strong and there is a high level of reciprocity between parents and sons, which responds to Confucian principles. The parent takes care of their children and provides them with the best opportunities for their future. In exchange, the sons must take care of their parents when they need it, "paying back" the investment that they made. Within this strict principle, many members of the family move close to their relatives and stick together to help each other out when needed.

Table 4-3. Comparison between different groups of family incomes in relation to density of ties, frequency of socializing by place and number of friends

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	**-0.23**
0 – 5000	3	2.57 (2)	**321.37**	97		
5000 – 10000	2	2.17 (1.75)	281.56	141		
10000 – 20000	2	2.27 (2)	241.41	168		
20000 – 50000	2	2.52 (3)	**249.62**	101		
> 50000	3	2.71 (2)	293.19	34		
Xiaoqu					0.000	**-0.32**
0 – 5000	3	2.57 (2)	**327.54**	91		
5000 – 10000	2	2.25 (1)	283.70	142		
10000 – 20000	2	2.20 (1.5)	243.94	168		
20000 – 50000	2	2.09 (1)	**229.55**	103		
> 50000	3	2.86 (2)	302.18	34		
Take the initiative (TI)						
Building Courtyard					0.016*	-0.16
0 – 5000	3	2.86 (3)	**299.54**	96		
5000 – 10000	3	2.58 (1.75)	279.89	138		
10000 – 20000	2	2.45 (1.5)	242.87	166		
20000 – 50000	3	2.85 (2)	**249.82**	100		
> 50000	2	2.43 (3)	291.85	33		
Xiaoqu					0.005**	-0.18

0 – 5000	3	2.86 (3)	**305.46**	89		
5000 – 10000	3	2.83 (1.5)	275.81	140		
10000 – 20000	3	2.62 (2)	240.84	167		
20000 – 50000	3	2.71 (1.5)	**248.35**	101		
> 50000	3	3.00 (2)	298.34	34		
Jiedao					0.006**	**-0.23**
0 – 5000	3	2.71 (3)	**299.19**	83		
5000 – 10000	2	2.08 (2)	252.39	129		
10000 – 20000	2	2.07 (2)	240.64	165		
20000 – 50000	2	2.05 (2)	**230.70**	97		
> 50000	2	2.43 (3)	288.60	34		
Frequency of meeting with residents of the X						
Dwelling					0.000	**-0.26***
0 – 5000	1	1.33 (1)	**270.86**	85		
5000 – 10000	2	1.67 (1)	277.94	127		
10000 – 20000	2	1.78 (1)	240.25	159		
20000 – 50000	1	1.41 (1)	**201.95**	96		
> 50000	2	2.14 (0)	261.48	30		
Courtyard					0.000	**-0.33***
0 – 5000	1	1.50 (1.25)	**289.46**	74		
5000 – 10000	2	2.60 (1)	263.39	131		
10000 – 20000	2	2.30 (1)	246.72	158		
20000 – 50000	2	2.14 (1.25)	**192.42**	97		
> 50000	3	3.14 (3)	232.74	31		
Xiaoqu					0.000	**-0.28***
0 – 5000	1	1.50 (1.25)	**286.98**	77		
5000 – 10000	2	2.53 (1)	274.69	125		
10000 – 20000	2	2.07 (1)	235.12	162		
20000 – 50000	2	2.00 (2)	**206.06**	96		
> 50000	2	2.43 (3)	199.63	30		
Number of friends						
Xioaqu					0.000	**-0.40***
0 – 5000	2	2.17 (1.75)	**319.01**	85		
5000 – 10000	5	5.27 (7)	272.27	128		
10000 – 20000	3	9.55 (10)	232.77	165		
20000 – 50000	2	4.32 (5.75)	**205.24**	94		
> 50000	3	10.86 (19)	237.30	32		

*the effect size is calculated for the comparison between the lower income level and the 20000-50000

*Only shown the result with difference statistically significant. For further information see table B-6, B-7 and B-8 in appendix B

Ownership

Owners have statistically significant more density of ties at the *xiaoqu* than renters although the effect size is negligible for all the indicators (for R r_X=-0.13; for TS r_X=-0.09; for TI r_J=-0.10; for number of friends r_X=-0.11) (table 4-4, for further detail see tables B-9, B-10 and B-11 in the appendix B). This trend is logical since owners may have stronger feelings of attachment and belonging to the place (Rohe & Stewart 1996) becoming more involved with their community. Additionally, the length of residence influence indirectly on this variable since owners have been living in the community for longer periods (Fig. 4-1). However, it is important to mention that there are no remarkable differences between groups in relation to the strength of ties (table B-10 in appendix B) despite the unbalanced length of residence. Indeed, renters have more relatives living in the X than owners (r=-0.09) which could justify the equality in strength of ties (table B-11 in appendix B) - the larger number of renters with

relatives is in accordance with the mentioned process of migration where several members of the same family rent within the same community and stick together to assist each other. Certainly, the findings of Wu & Logan (2014) support this trend since they find that homeownership may actually reduce neighbouring, while migrants are more likely to engage in socialising and exchange of help with neighbours - which strengthens their sentiment towards the neighbourhoods where they live. Again, this tendency that counterbalances homeownership and length of residence – variables associated to feelings of attachment – with origin, is probably due to the larger supportive social needs of migrants in a local context and the association of ownership to local residents (due to *hukou*) and length of residence.

Table 4-4. Comparison between different groups of ownership in relation to density of ties

Mn (IQR)	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Xiaoqu					0.000	-0.13
Renters	1.5	2.00 (2.5)	300.26	124		
Owners	2	2.23 (2)	**371.87**	594		
Talk Sporadically (TS)						
Xiaoqu					0.01	-0.09
Renters	2	2.25 (2.75)	315.85	123		
Owners	3	2.82 (2)	**366.76**	592		
Take the initiative (TI)						
Jiedao					0.01	-0.10
Renters	1.5	1.75 (1.75)	302.61	119		
Owners	2	2.07 (2)	**352.08**	567		

*Only shown the result with difference statistically significant. For further information see table B-9, B-10 and B-11 in appendix B

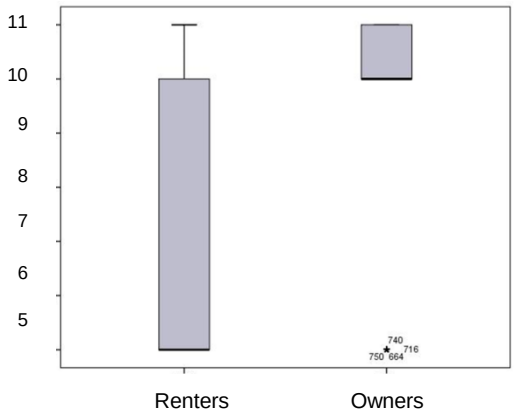


Fig. 4-1. Years of residence according to ownership

Origin and background

A person's origin can greatly influence their social integration within their community according to the data collected through formal interviewing of residents and informal chats with random Chinese people. Most of the participants coming from other provinces or rural

areas complained about the difficulty of integrating with locals. They described the Shanghainese's character as classist and snobbish and stated that locals in Shanghai consider the rest of Chinese as "lower quality people". Also, the educational background and socio-economic status are two important aspects defining "the quality of the person" for Chinese society in general (Sturgeon 2010) and the Shanghainese in particular according to some interviewees. This clear qualification of people according to their origin, educational background or status position together with the language barriers can lead to the isolation of certain social groups within a community**.**

Certainly, the quantitative data of the surveys support this qualitative information. Shanghainese have higher R (r_{BC}=-0.10; r_X=-0.11), TS, TI (r_J=-0.09), number of friends (r_X=-0.08) and relatives at all physical levels than migrants, reflecting the larger ease for locals for interacting with others (table 4-5, for further detail see table B-12 and table B-14 in appendix B). However, migrants have a higher SA and F at the dwelling and jiedao, particularly with the BC neighbours (for detailed data see table B-13 and table B-14 in appendix B). These tendencies are remarkable because despite the fact that locals know more neighbours, their relationships are less close and less multi-stranded than those of the migrants (Wu & Logan 2014). In most probability, these trends are due to two main reasons. On the one hand, locals have greater length of residence (Fig. 4-2) which impacts on their level of R and their willingness to randomly interact with others. Also, migrants come across more barriers for socialising with others due to language restrictions or to discrimination due to their origin resulting in fewer ties. On the other hand, locals may have a larger social network in the city outside of the community, which reduces their need to develop close bonds with their neighbours. Meanwhile, the situation of the migrants is the opposite, since they are far from their family and friends, having greater social needs – emotional and instrumental support - in this sense. Huang et al (2018) support this conclusion by highlighting the greater importance of supportive rather than interactive social ties for migrants intending to settle. Also, Wu & Logan (2014) find a higher frequency of visiting for migrants than for locals within the communities. Thus, the results respond to the contextual situation for each group and their social needs, migrants having closer but fewer ties within the community, while the bonds of the locals are more numerous but weaker.

The influence of the residents' background –urban or rural- on their social ties within the community follows exactly the same trend as the impact of their origin, rural people having fewer but stronger ties than urbanities. The justification for this is also shared.

Table 4-5. Comparison between different groups of origin in relation to density of social ties and number of friends

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.004	-0.10
Shanghai	2	2.41 (2)	**380.26**	556		
Migrants	2	1.81 (1.5)	329.92	179		
Xiaoqu					0.002	-0.11
Shanghai	2	2.20 (1)	**379.69**	554		
Migrants	2	2.19 (2)	325.44	178		
Take the initiative (TI)						
Jiedao					0.024	-0.09
Shanghai	2	1.97 (2)	**359.37**	531		
Migrants	2	2.00 (2)	320.38	168		
Number of friends						
Xioaqu					0.032	-0.08
Shanghai	2	4.72 (5)	**349.63**	513		
Migrants	3	5.14 (7)	312.46	167		

*Only shown the result with difference statistically significant. For further information see table B-12, B-13 and B-14 in appendix B

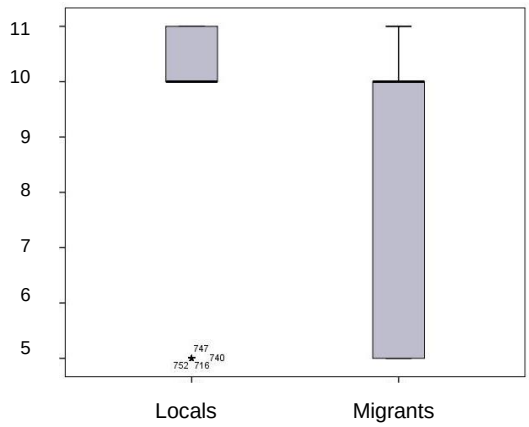


Fig. 4-2. Years of residence according to origin

Educational background

The educational background is one of the aspects with the greatest influence on the ties between neighbours. Residents with a lower educational level have more numerous and stronger ties within the compound – higher mean ranks for R, TS, TI, F in all the places, SA, and number of friends and relatives (for detailed data see tables B-15, B-16 and B-17 in appendix B). This relationship is quite direct and statistically significant for R, TS, TI and F with the X residents (table 4-6). The reasons are similar to those mentioned for the income level variable: limitations for leisure outside the community due to low economic resources (educational background is positively correlated with income level - Fig. 4-3), and increased social needs (emotional and instrumental) for developing bonds within the community. Additionally, people with a lower educational background have statistically significantly more

friends and relatives at the *xiaoqu* and jiedao (see table B-17 in appendix) which, again, is linked to their economic level and the need for the family to stick together and support each other.

Table 4-6. Comparison between different groups of educational background in relation to density of ties and frequency of socializing by place

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	0.07
Primary	-	-	**471.17**	27		
Middle	3	3.00	444.91	156		
Higher	2	2.28 (2)	374.68	157		
University	2	2.15 (2)	318.52	386		
Xiaoqu					0.000	0.03
Primary	-	-	**447.88**	25		
Middle	2	2.00	396.46	155		
Higher	2	2.00 (2)	399.68	158		
University	2	2.25 (2)	326.05	384		
Talk Sporadically (TS)						
Building Courtyard					0.000	0.04
Primary	-	-	389.85	26		
Middle	2	2.00	**424.62**	155		
Higher	3	2.71 (3)	384.28	156		
University	2	2.67 (2)	323.91	384		
Xiaoqu					0.000	0.05
Primary	-	-	**423.79**	26		
Middle	2	2.00	397.49	153		
Higher	2	2.43 (3)	416.32	159		
University	3	2.85 (2)	318.14	382		
Take the initiative (TI)						
Building Courtyard					0.000	0.03
Primary	-	-	**462.48**	26		
Middle	3	2.67	395.08	156		
Higher	2	2.43 (3)	391.17	154		
University	2.5	2.50 (1.75)	326.22	383		
Xiaoqu					0.000	0.03
Primary	-	-	**429.21**	24		
Middle	3	2.67	382.72	155		
Higher	2	2.28 (2)	404.65	156		
University	3	2.71 (2)	324.27	380		
Jiedao					0.001	0.02
Primary	-	-	**396.93**	23		
Middle	2	2.00	348.56	144		
Higher	2	1.86 (1)	391.26	148		
University	2	2.06 (2)	322.13	374		
Frequency of meeting with residents of the BC						
Xiaoqu					0.024	0.02
Primary	-	-	-	-		
Middle	1	1.67	85.84	16		
Higher	1	2.00 (2)	**91.25**	30		
University	2	2.09 (2)	69.37	104		
Frequency of meeting with residents of the X						
Dwelling					0.000	0.035
Primary	-	-	**463.23**	24		
Middle	2	1.67	364.34	151		

Higher	1	1.43 (1)	362.15	140		
University	2	1.60 (1)	313.26	364		
Courtyard					0.000	0.075
Primary	-	-	**414.98**	21		
Middle	3	2.67	392.70	137		
Higher	2	2.14 (2)	381.06	145		
University	2	2.29 (1)	286.40	362		
Xiaoqu					0.000	0.10
Primary	-	-	**459.22**	23		
Middle	2	2.00	401.89	146		
Higher	1	2.00 (2)	387.40	140		
University	2	2.09 (2)	281.72	362		
Jiedao					0.017	0.016
Primary	-	-	**381.30**	20		
Middle	2	1.67	327.03	132		
Higher	1	1.14 (0)	326.45	128		
University	2	1.65 (1)	292.95	339		

*Only shown the result with difference statistically significant. For further information see table B-15, B-16 and B-17 in appendix B

Given the common trend followed by income, origin, background and educational level in relation to strength of ties – low incomes, migrants, rural and low educational level have stronger ties -, these indicators are contrasted to clarify whether the lack of economic resources is the main reason for developing close bonds within the community in order to look for emotional but mainly for instrumental support. The results show that low income families are directly related to low educational level (Fig. 4-3) and rural background (Fig. 4-4). However, migrants have a higher educational level than locals (Fig. 4-5) – and consequently higher incomes - and they also have fewer but closer ties within the community than the Shanghainese. Thus, there seems to be a relevant emotional social need among relocated people that triggers their motivation for building ties in a local context. These results are very important because they support one of the pillars upon which the general framework of this research has been built: the social need for current Chinese society, particularly the disadvantaged and relocated population, for instrumental but also, very importantly, emotional support in a local context such as the residential community to improve their social quality of life.

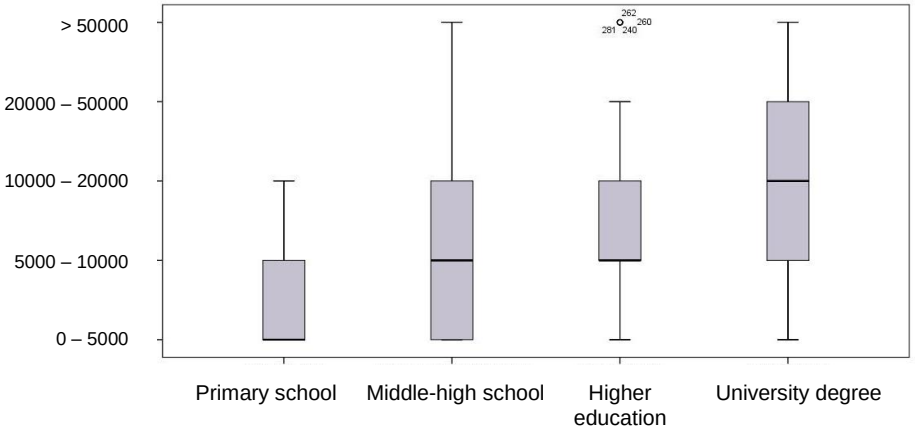


Fig. 4-3. Annual incomes according to educational background

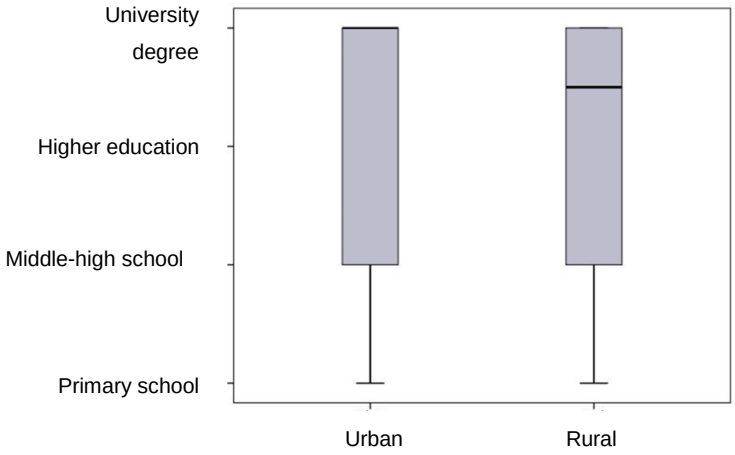


Fig. 4-4. Educational level according to background

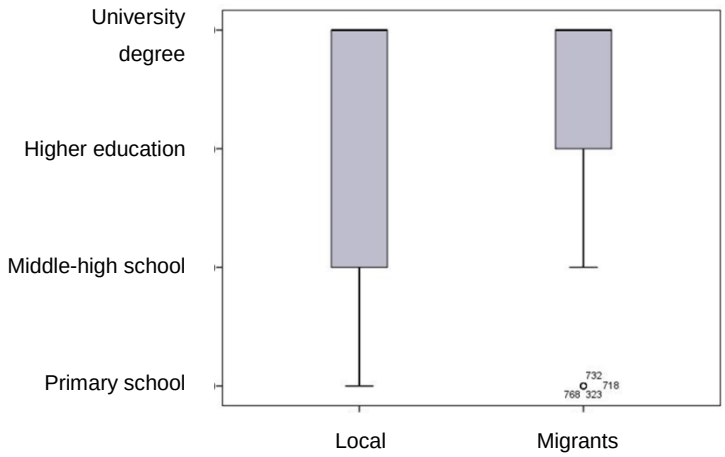


Fig. 4-5. Educational level according to origin

Family type

The data in relation to family type have been analysed through descriptive statistics by looking at the frequency, mean (Mn), median (Md) and interquartile range (IQR) given their

nominal scale. The family types have been classified into four: people living alone, single or couples living with mother/father (in law), families with child(ren), and other. In general, families with children have higher R, TS, TI, F with *xiaoqu´*s residents at all places except at the *jiedao*, SA, and number of friends, followed by families living with mother/father (in law) (table 4-7). As mentioned, children are a determinant nexus for the building of bonds between residents. They are an important reason to use the outdoor shared space and the excuse for interaction between grandparents, parents and nannies, leading this family type to have more ties. Also, families with an elderly member increase the chances of interaction with other neighbours by spending more time in the outdoor space and through the wider connections of the aging residents. On the other hand, people living alone is the group with fewer ties although they have the highest F at home with BC´s residents and the largest number of relatives in the *jiedao*, which could be one of the causes for their lower interaction.

Table 4-7. Number of ties: R. TS. TI. number of friends and relatives according to family type

	Mn	Md	IQR
Recognise BC			
Alone	**3.12**	3	2
H+M	3.06	3	2
Children	3.03	3	2
Other	2.95	3	2
Recognise *Xiaoqu*			
Alone	2.42	2	1
H+M	2.58	2	1
Children	**2.67**	**3**	2
Other	2.4	2.5	2
Talk sporadically BC			
Alone	3	3	2
H+M	3.17	3	2
Children	**3.19**	**4**	2
Other	2.57	3	2
Talk sporadically X			
Alone	2.74	3	2
H+M	2.94	3	2
Children	**3.28**	**4**	2
Other	2.55	3	3
Take initiative BC			
Alone	2.62	3	2
H+M	2.79	3	2
Children	**2.86**	**3**	2
Other	2.76	3	2
Take initiative *Xiaoqu*			
Alone	2.52	2	1.75
H+M	2.74	3	2
Children	**2.98**	**3**	2
Other	2.6	3	2.5
Friends in *Xiaoqu*			
Alone	6.25	3	8
H+M	7.10	5	9
Children	**9.57**	5	9
Other	4.31	2	5
Friends in Jiedao			
Alone	2.67	0	4

H+M	4.64	1	5
Children	**4.89**	0	5
Other	3.65	2.5	5
Relatives in *Xiaoqu*			
Alone	0.82	0	0
H+M	0.81	0	0
Children	0.69	0	0
Other	**1.06**	0	1.5
Relatives in Jiedao			
Alone	**1.43**	0	2
H+M	1.13	0	0.75
Children	1.03	0	0
Other	0.47	0	0.5

Conclusion from the demographic analysis

One of the main outcomes from the demographic analysis supports the hypothesis two – further analysed in section 4.3 – in relation to the Chinese social need for developing bonds within the residential communities in the context of the study. Particularly, the more disadvantaged groups –low income, low educational level, migrants and rural people - tend to have fewer but stronger ties within the community (Huang et al. 2018; Wu & Logan 2014). This shows their difficulty in integrating at the same time as the need for bonding – emotional and instrumental – in a local environment.

On the other hand, the elderly and families with children are those most integrated in the communities in general terms. Indeed, the environmental and social atmosphere in the compounds is usually an ideal scenario for these two groups, particularly in large cities. They feel protected by the walls and the guards, cared for by the social administration office and volunteers, and familiar with the people living around them, which provides feelings of safety but also identity and belonging. In this environment, the children and the elderly have more freedom to move around, particularly the children who can play inside the community with a certain level of security. Also, the enclosed nature of the communities increases the opportunities for migrants and people with fewer resources to become integrated and develop affectional and instrumental bonds within a local context. These reasons should be considered before the Chinese government takes the decision to open the gates. On the other hand, the mid-age group would like to have more activities suitable for them to participate within the community. With these points in mind, the proper design of outdoor spaces becomes a key element in triggering the confluence of people and their interaction. Moreover, the space between buildings should be taken into more serious consideration and be conceived as a space in which to spend time and not simply for circulation or parking. This would help increase the number of ties at the BC level which could also benefit those at the X, contributing at the same time to the cohesion of the community.

4.2.2. Influence of environmental variables on social network

Several environmental aspects are analysed to find out whether they influence the development of social ties within the community and the use that residents make of the outdoor shared spaces. The environmental variables considered are air quality, noise, temperature, presence of areas in shadow and in sunlight, and beauty. The importance given to those aspects and how adequate they are for each community as regards the opinion of the residents is explored and contrasted.

The results indicate a general trend towards considering all the environmental variables as important – Mn and Md range from 4 to 5 in a 5-point Likert scale and IQR from 0 to 1 for all variables -, while the adequacy of the environmental quality was considered as either neutral or adequate. This unification of responses must be based in the sceptical attitude of the participants as to the relevance of the environmental questions. They were of the opinion that nothing would change, much as they might wish it would, and they seemed not to think through their responses for these variables.

However, despite this unification, air quality, noise and beauty are, in this order, the environmental aspects considered most important by the residents, and those that can be a problem in some communities – noise for CSH (Mn=2,24, Md=2, IQR=2), and air quality, noise and beauty for CSL (Mn_{AQ}=2.75, Md_{AQ}=3, IQR_{AQ}=2; Mn_N=2,57, Md_N=2, IQR_N=3; Mn_B=2.79, Md_B=3, IQR_B=2). Indeed, noise and particularly beauty are the aspects maintaining a stronger relationship with both the density and the strength of social ties between residents and the time spent in the outdoor spaces of the communities (tables 4-8 to 4-9).

Table 4-8. Descriptive statistics for importance of environmental quality of the X (including whole population)

	Air quality	Noise	Temperature	Presence of shadows	Areas in sunshine	Beauty	Overall quality
Frequency							
Unimportant	0.5	1.3	1.5	1	0.7	0.7	0.2
2	1	1.5	1.5	1.8	1.3	1.5	0.8
3	3.9	4.7	**20.7**	**11.6**	9.1	6.9	5.5
4	13.3	16.8	32.1	37.4	32.2	26.3	21.3
Important	**81.3**	**75.7**	44.2	48.1	56.7	**64.6**	72.2
N	610	602	599	601	603	605	601
Mn	4.74	4.64	4.16	4.30	4.43	4.53	4.65
Md	5	5	4	4	5	5	5
IQR	0	0	1	1	1	1	1

Table 4-9. Spearman correlation (rho) between social ties and adequacy environmental variables (1/2)

	Air quality		Noise		Temperature		Shadows	
	Pvalue	rho	Pvalue	rho	Pvalue	rho	Pvalue	rho
Recognise	.148	-.042	**.002**	**.117****	**.047**	**.069***	.068	.061
Talk sporadically	.444	.006	**.040**	**.072***	.430	.007	.065	.062
Take initiative	.056	.065	**.006**	**.104****	**.000**	**.137****	**.008**	**.098****
Number of friends	.180	.039	**.001**	**.133****	.056	.068	.149	.044
Share activities	.392	.023	.489	-.002	.304	.043	.493	-.001
F. meeting at X	.088	.057	**.039**	**.074***	.170	-.041	**.017**	**.090***
Hours weekday winter	**.028**	**.081***	**.002**	**.122****	.486	.002	**.017**	**.091***
Hours weekday summer	**.007**	**.105****	**.004**	**.115****	.273	.026	**.005**	**.110****
Hours weekend winter	**.006**	**.108****	**.003**	**.120****	**.025**	**.085***	**.019**	**.089***
Hours weekend summer	**.008**	**.104****	**.022**	**.087***	**.023**	**.086***	.061	.081

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

Table 4-9. Spearman correlation (rho) between social ties and adequacy environmental variables (2/2)

	Sunshine		Beauty		Overall quality	
	Pvalue	rho	Pvalue	rho	Pvalue	rho
Recognise	**.019**	**.085***	**.020**	**.084***	.097	.053
Talk sporadically	**.028**	**.078***	**.000**	**.142****	**.030**	**.077***
Take initiative	**.000**	**.164****	**.000**	**.181****	**.000**	**.159****
Number of friends	.152	.043	**.006**	**.106****	**.013**	**.094***
Share activities	.067	.124	**.027**	**.160***	**.027**	**.160***
F. meeting at *xiaoqu*	.104	.053	**.006**	**.106****	.055	.068
Hours weekday winter	.197	.036	**.003**	**.118****	.076	.061
Hours weekday summer	.143	.046	**.001**	**.130****	**.048**	**.071***
Hours weekend winter	.169	.041	**.009**	**.102****	.382	.013
Hours weekend summer	.230	.032	**.013**	**.096***	.482	.002

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

The results show the evident concern of the Chinese for air quality in their country due to its well-known impact on health (Zhigang et al. 2009). However, regarding the noise, the different standards of the participants for the city and their communities are remarkable. None of the interviewees felt uncomfortable with the high level of noise in the city for having a walk -particularly due to traffic-, nevertheless the requirements changed radically when it came to their communities. Indeed, the contrast of noise levels inside-outside was one of the most impacting aspects during the field work. it felt like passing from the heart of Manhattan to the countryside in 30 seconds. The compounds are places expected to acquire a human

dimension and where noise is acceptable if it comes from the *social heat*[31] (term explained in section 4.4.1 – hypothesis 5) in the shared spaces. This noise – from social heat- can even be unpleasant for some residents living around the central square where the social activities are concentrated – some participants complained about the elderly doing exercise or dancing in groups in the early morning. Also, having a unique central square can become a problem when it comes to performing activities that requires different acoustic conditions simultaneously. For example, CBM stressed the need for a second square due to the incompatibility of dancing and doing tai-chi at the same time in the main square. Meanwhile, using the courtyards between buildings or transverse spaces was rejected given their small size and the possibility of disturbing the residents living around. Thus, special attention should be paid to the position and interior distribution of the buildings around the central squares, and to the design and size of the longitudinal and transverse spaces between buildings.

Meanwhile, the temperature of the outdoor space of the *xiaoqu* is the least relevant environmental aspect for the residents, followed by the presence of areas in shade and areas in sunlight. They consider that it is impossible or difficult to change these aspects, particularly the temperature, and in consequence it becomes irrelevant - even if the participants are placed in a hypothetical situation, they respond *"it cannot be changed anyway!".* This attitude, which is, in a way, conformist, is also manifested in the comparison between communities. CSMH, CSH and CSL are the communities giving less importance to the beauty of their compounds, particularly in comparison to CBH and CBMH. This is relevant when checked with the results of the adequacy of beauty, which has the lowest scores for the former communities while some of the highest for the latter (particularly CBH). Also, CSH is the community that gives less importance to all aspects, probably because they do not have shared spaces and do not make use of the outdoor space. Thus, it seems that the residents who have something good in their communities are able to value it by giving it more importance, while the communities that lack this do not consider it that relevant. This acceptation of reality and the apparent "conformist attitude" are noticeable in some of the results of the statistical analysis, and it was perceived during the interviews and during survey data collection. Indeed, this is only a manifestation of Chinese culture and the principles of "no action" *(Wu Wei)* and acceptance of the natural course of things which originates in Taoism, in addition to Buddhism's rejection of desire and material things.

Finally, from the comparison between communities, it is concluded that the environmental quality is not a determinant aspect for residents to socialise despite the finding of certain correlations. In general, CBM, CBH and CSM are the communities which are most satisfied with all the environmental aspects and the overall quality of their communities, while CSMH, CSH and CSL are more displeased. However, CBH is one of the communities with fewer

[31] Term used by Adam Chau (2008a) to highlight the relevance of sociality in the Chinese culture, understood as being "*the condition of social co-presence, i.e., the gathering of a group of people in one social space*" (Chau 2008a, p.147).

and weaker ties. Meanwhile, CSL has the worst environmental conditions and the strongest ties. Certainly, correlations of social ties and time use of the community´s outdoor space with each environmental variable shows that their relationships are very weak or weak (tables 4-8 and 4-9).

4.2.3. Influence of aesthetic and maintenance of the built environment on social network

The features analysed related to quality are classified into three groups. The first is related to the aesthetics and maintenance of the place, including the quality of the materials, façade and building maintenance, and the overall cleanliness of the community. The second group includes the availability of spaces and their suitability for leisure, such as green areas and courtyards between buildings. The third group appraises the adequacy of the equipment provided in those spaces including facilities, public furniture and quality of night lighting. Finally, the overall quality of the community is analysed. The measurement is made through a 5-point Likert scale, ranging from poor, average, good, very good up to excellent quality.

In this case, correlations between the various groups of variables –quality, social ties and time use- cannot be made due to limitations of the research for the collection of data -the quality survey was independent from the main one and the sample size is different. Nevertheless, the general trend of the whole population is analysed to explore what aspects are generally poorer in the communities, while comparisons between communities are made to identify any possible relationship with social ties and time use.

Considering the whole population, residents consider the quality of all the aspects included in the analysis as average or poor (for detailed data see table B-18 in appendix B). Particularly, the provision of green areas and the cleanliness are the most valued aspects while the availability of facilities and public furniture, and the quality of the façade maintenance and night lighting are valued least. These results support the observed importance given to green spaces in residential communities in China.

Indeed, Chinese place particular importance on the contact with nature and most of the residential compounds visited in Shanghai and Ningbo have a large amount of land use dedicated to green areas. Despite these green spaces being mostly inaccessible, they are usually well maintained - by the workers of the management company for medium or high economic level, or by the residents with their own plants creating little “private” gardens (as it is the case of CSL_2 – Fig. 4-6) in the case of communities with fewer economic resources. On the other hand, the general trend would indicate that the main issues in relation to quality are related to the provision of proper equipment instead of the availability of space, which is more easily solvable. Indeed, the provision of equipment, particularly for doing exercise, was one of the elements more demanded by the residents. The relevance of such facilities and equipment has also been observed by other authors in relation to migrants’ satisfaction and social interaction (Li & Wu 2013; Tao et al. 2014; Wen & Wang 2009).

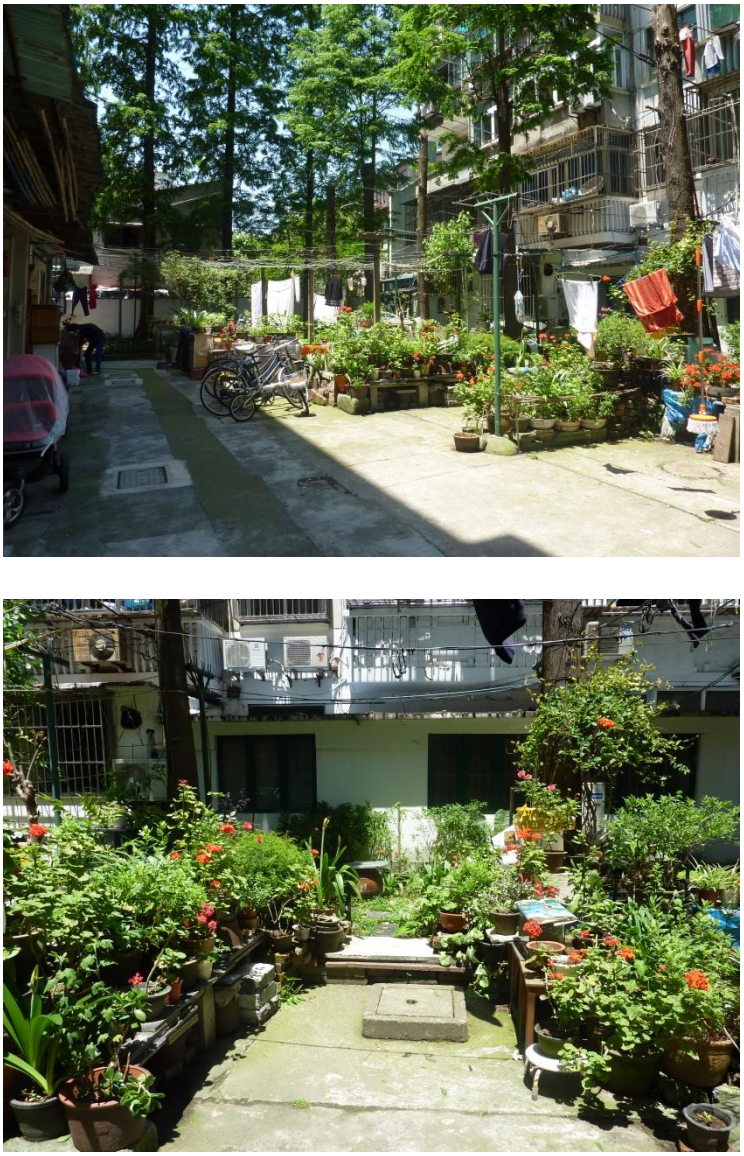


Fig. 4-6 Private garden in public space in CSL_2

In relation to the comparison between communities, SMH and especially CSL are the communities with lower satisfaction in relation to all the quality variables, while the rest of communities show no particular differences. Thus, according to the quantitative data collected, no direct relationship can be found between the aesthetics and maintenance of the built environment with social ties. However, the presence of green areas and the provision of facilities and equipment are relevant for residents to use the outdoor space according to qualitative data (interviews).

4.2.4. Relationship between time use and social network.

Overall, residents tend to spend more time in the outdoor spaces during the weekend than on weekdays and more time there in summer than in winter (Fig. 4-7 and Fig. 4-8). 45-50% of people spend between 30min and 2h in the shared spaces of the X every day –including weekdays (wday) and weekends (wend)- and almost 15% of the neighbours spend more than two hours (Fig. 4-8). These results show a weekly routine of going to the central square for more than half of the population. Also, approximately half of the residents spend between 30 min and 2 hours daily in the courtyards although the periods tend to be shorter than in the central square. On the other hand, around the 25% of the participants do not spend time either in the courtyard of their building or in the shared spaces of their community.

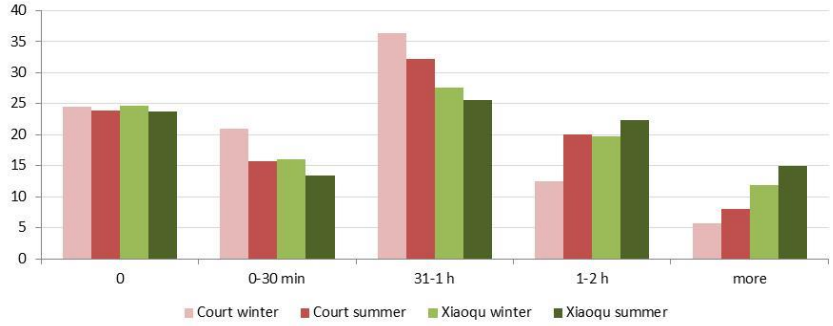


Fig. 4-7 Time spent in the courtyard and shared space of the *xiaoqu* in winter and summer (% of neighbours)

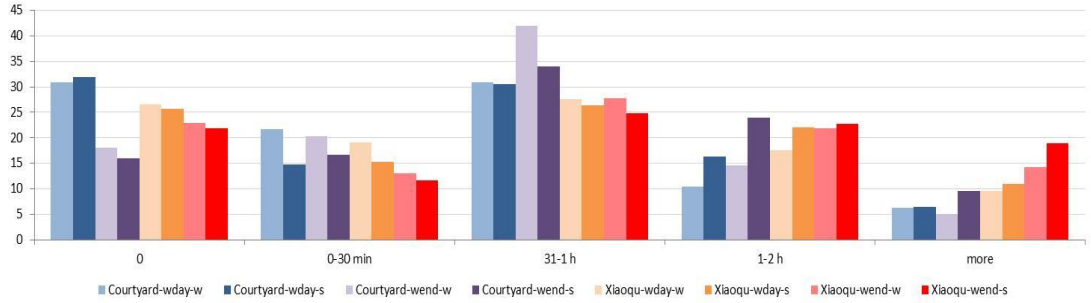


Fig. 4-8 Time spent in the courtyard and common space of the *xiaoqu* in winter and summer in weekdays and weekends (% of neighbours)

It is therefore clear that the relationship between time use and social ties is positively correlated. Generally, spending time in the outdoor space, either BC or X, favours the development of ties between residents with a weak to moderate strength (table 4-10). According to the results, spending time in the BC notably favours the development of ties with both the neighbours of the BC and X. Furthermore, the hours spent in the BC and the F_X with the BC´s neighbours have the strongest correlation (rho=0,48). This result suggests that building ties with the BC residents does not limit their interaction with the remaining residents of the X. On the contrary, it might actually favour the use of the X´s shared spaces. Probably,

knowing residents from the BC motivates people, particularly those who are less outgoing, to go to the central square together, where the activities and *social heat* is. This facilitates encounters with residents of the whole community. Moreover, this relationship is bidirectional since spending time in the central square positively correlates with F_D (rho=0.30) and F_C (rho=0.39) with the BC´s neighbours (table 4-10). Finally, we would mention that the slightly stronger correlation of social ties with the BC´s time use than with X´s time use may suggest that developing ties with a closer and smaller circle of people encourages residents to open up to other residents. Thus, despite the fact that being provided with a properly designed central square is relevant for the development of ties between residents, the design of the courtyards or spaces between buildings – something which is usually overlooked - turns out to be a very important element to take into consideration.

Table 4-10 Correlation between time use and social ties at the BC and X

	Hours in the building courtyard		**Hours in the *xiaoqu***	
	Pvalue	rho	Pvalue	rho
Building courtyard				
Recognise	.005	.243**	.001	.126**
Talk sporadically	.000	**.367****	.000	.215**
Take initiative	.003	.263**	.000	.223**
Number of friends in X	.013	.223*		
Share activities	.006	.250**	.180	.088
F. meeting at dwelling	.009	.236**	.001	.298**
F. meeting at courtyard	.000	**.378****	.000	**.364****
F. meeting at *xiaoqu*	.000	**.480****	.000	**.391****
F. meeting at jiedao	.006	.265**	.006	.254**
Xiaoqu				
Recognise	.001	.283**	.000	.264**
Talk sporadically	.000	**.399****	.000	.286**
Take initiative	.000	**.367****	.000	.273**
Number of friends	.013	.223*	.000	.200**
Share activities	.005	.258**	.238	.067
F. meeting at dwelling	.067	.151	.000	.182**
F. meeting at courtyard	.001	**.303****	.000	**.316****
F. meeting at *xiaoqu*	.000	**.431****	.000	**.353****
F. meeting at jiedao	.015	.232*	.000	.217**

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

4.3. Objective one. General trends and standards for social ties, social capital and social cohesion (including the whole population)

This section is focused on analysing the results related to the hypotheses set for the first objective of this investigation. The hypotheses were explained in Chapter 3 and are cited below to recall them:

- Hypothesis 1: The social relationships between the residents of a medium economic level gated community in a megacity in China are weak with low density and strength of ties.
- Hypothesis 2: The residents of megacities in China wish to have close social networks within their gated communities in order to obtain emotional and instrumental support – through social capital and cohesion - to achieve social quality of life in this context.

Here the entire population of all the communities studied is considered to analyse the general trend of the whole sample. In relation to hypothesis 1, the results show that less than half of the residents socialise with their neighbours with certain regularity - 35-50% of the residents R, TS, TI and SA with their neighbours at both the BC and X (Fig. 4-9 and Fig. 4-10) - and when they do so, it is usually in the shared spaces of the community, but rarely at more private locations, suggesting a certain weakness of ties. Indeed, there is around 85% (Md=2, Md=1; IQR=1) of participants that never or rarely meet their neighbours (from the BC and X) at their dwelling or the *jiedao*, which are the places associated with more intimate ties (Fig. 4-11 and Fig. 4-12). Meanwhile, 50% of the population meet in public spaces of the community a few times per month or more, and around 20% (Md=2; IQR=1) and 30% (Md=3; IQR=2) of them do so almost daily with their BC´s and X´s neighbours respectively (for detailed data see table B-19 in appendix B).

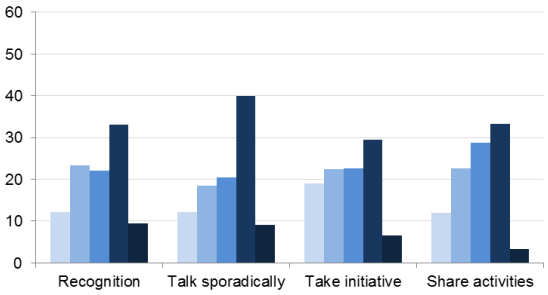


Fig. 4-9 Number of social ties in the BC (%)

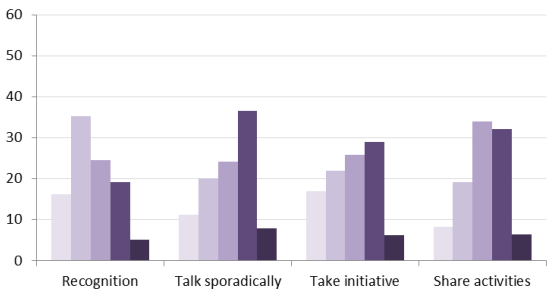
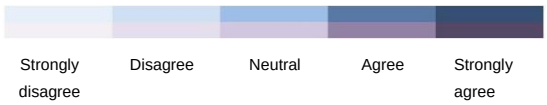


Fig. 4-10 Number of social ties in the X (%)



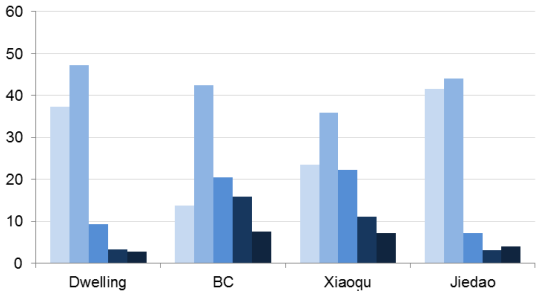


Fig. 4-11 Strength of social ties in the BC (%)

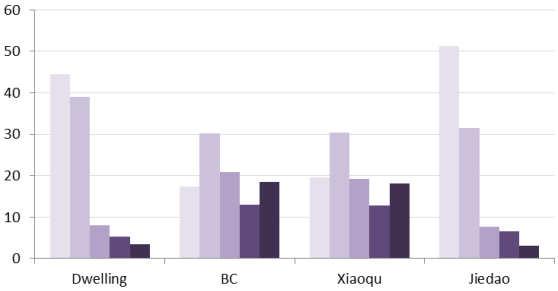
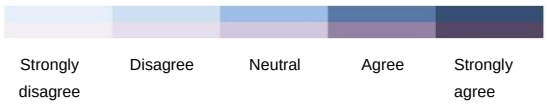


Fig. 4-12 Strength of social ties in the X (%)



This weakness of social ties is also supported by low values of social cohesion and social capital, except for TRUST and HELP. On one side, the results for social capital – measured by frequency of asking for opinion or sharing worries with other residents (OPINION), and frequency of helping each other out (HELP) - show that most of the population never or rarely ask for an opinion from their neighbours (76-79%; Md=2; IQR=1) (for detailed data see table B-20 in appendix B) which is associated to a low emotional support. Meanwhile, this trend is reversed when it comes to helping each other out at the X level - only 46% (Md=3; IQR=1) never or rarely help other residents (Fig. 4-13 y Fig. 4-14) – representing a higher instrumental support than emotional.

This tendency for HELP must be influenced by the work of the social administration office. Indeed, the system of collaboration implemented by that governmental organism in the communities encourages support between residents through volunteers that help the more disadvantaged groups (through daily visits, shopping for them, helping at home, taking them to hospital, etc.). This principle of support and collaboration is also inherent in the Chinese philosophy and the Communist system. While in the West the common tendency would be to provide this kind of assistance once a relationship has been developed between two neighbours, the order is inverted here and many relationships are built and founded on the premise of helping each other. In such a way, the results obtained seem reasonable since the low number of close relationships (such as sharing worries) does not restrain people from helping each other. This finding is particularly relevant for the conceptualization and definition of indicators measuring social capital in the Chinese context since the work of the social administration office can have a large impact on the HELP indicator and lead to distorted conclusions. Thus, the weight of HELP for social capital should be reconsidered or the work of the social administration office included as another variable. Moreover, the weakness of the HELP concept might result in misleading conclusions as to the relationship between social capital and social cohesion or social network since a community might have large social capital through HELP without being cohesive or when ties are loose.

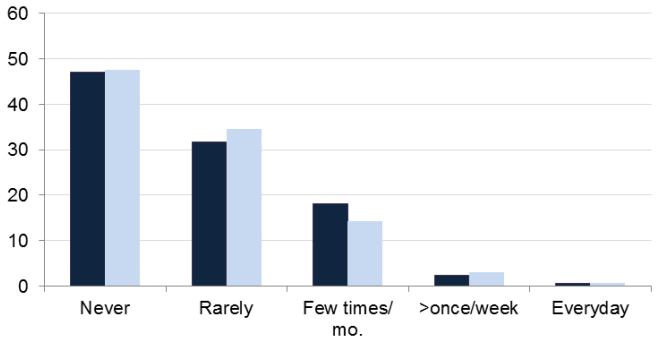


Fig. 4-13 OPINION and HELP in the BC (%)

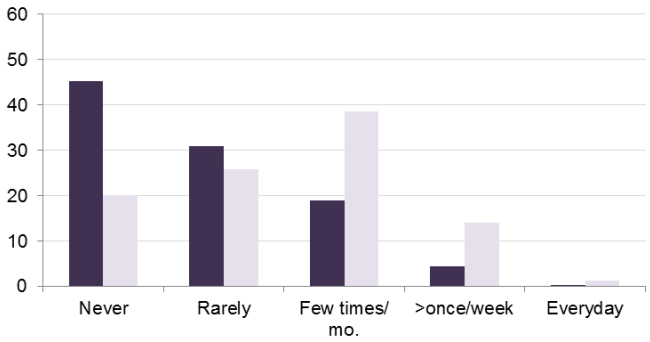


Fig. 4-14 OPINION and HELP in the X (%)

On the other side, social cohesion – measured by frequency of participation in activities in the community (PARTICIPATION), holding community meetings or events (MEETINGS), and trusting the neighbours (TRUST) – shows that most of the residents never or rarely participate in community meetings or events at the BC (81.4%; Md=1; IQR=1) or the X (71.2%; Md=2; IQR=2), which is an indicator of poorly cohesive communities (Fig. 4-15 and Fig. 4-16, for detailed data see table B-21 in appendix B). This result is supported by the low frequency of the variable PARTICIPATION with a 84% (Md=1; IQR=1) of the population that never or rarely participate in activities (Fig. 4-17). The reason for such low cohesion and barrier for developing ties between residents does not seem to be based on lack of trust between neighbours, since only 18.9% (Md=3; IQR=1) and 7% (Md=3; IQR=1) do not trust their neighbours at the BC and X levels respectively (Fig. 4-18 and Fig. 4-19, for detailed data see table B-21 in appendix B). This positive trend for TRUST - most residents have a neutral position (~45%) or firmly trust (~35-50%) their neighbours - is reasonable considering that the communities are gated with security measures and the socio-economic status of the residents is generally similar, facilitating this feeling of trust.

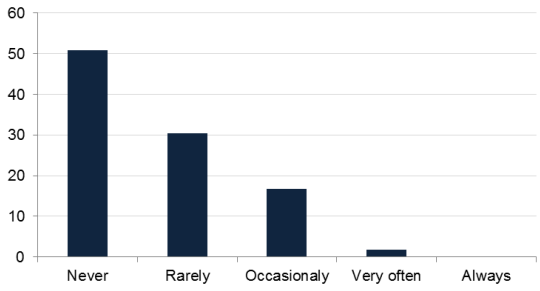


Fig. 4-15 MEETINGS in the BC (%)

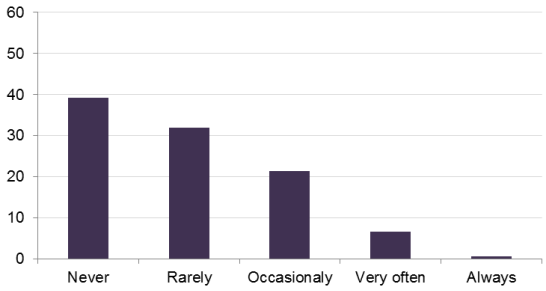


Fig. 4-16 MEETINGS in the X (%)

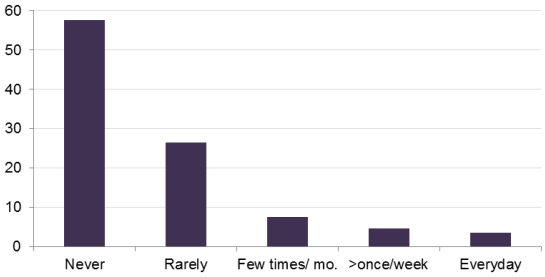


Fig. 4-17 PARTICIPATION in the X (%)

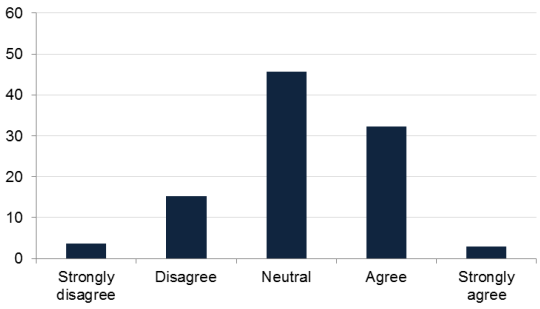


Fig. 4-18 TRUST in the BC (%)

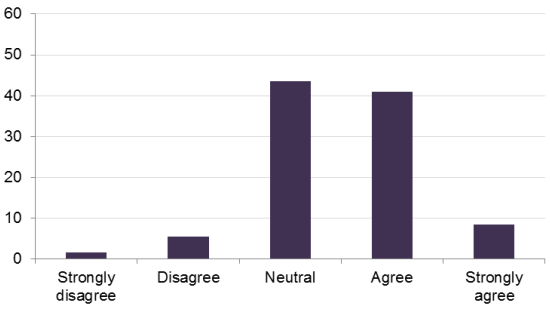


Fig. 4-19 TRUST in the X (%

Thus, the weakness of the social network within the community indicated in hypothesis 1 is confirmed with the results of this investigation. Also, such a loose social network is supported and positively correlated with low emotional support for social capital and poorly cohesive communities. In relation to social capital, OPINION and HELP have a moderate correlation with almost all the variables representing density and strength of social ties at both levels (table 4-11). However, generally, sharing worries (OPINION) has a slightly stronger correlation with social ties than helping out, except for F_c and F_X. It is worth noting that OPINION has a stronger correlation with F_D and F_J – spaces associated with closer bonds -, while HELP has a stronger correlation with F_c and F_X. This result would indicate that OPINION – emotional support - is associated more with strong social ties than HELP –

instrumental support -, while HELP is provided, not only through the social administration office but also spontaneously, in situ, between the residents in the shared spaces.

Table 4-11 Correlation between the variables of social capital and social ties

	Sharing worries		Help out	
	Pvalue	rho	Pvalue	rho
Building courtyard				
Recognise	.000	**.439****	.000	**.389****
Talk sporadically	.000	**.401****	.000	.329**
Take initiative	.000	**.491****	.000	**.428****
Share activities	.000	.319**	.000	.302**
F. meeting at dwelling	.000	**.422****	.000	.350**
F. meeting at courtyard	.000	.349**	.000	.333**
F. meeting at *xiaoqu*	.000	**.407****	.000	**.417****
F. meeting at jiedao	.011	.229*	.069	.165
Xiaoqu				
Recognise	.000	**.385****	.000	.329**
Talk sporadically	.000	.334**	.000	.305**
Take initiative	.000	**.388****	.000	.240**
Number of friends	.000	.340**	.000	**.408****
Share activities	.001	.272**	.003	.247**
F. meeting at dwelling	.000	**.387****	.000	.276**
F. meeting at courtyard	.000	.358**	.000	**.426****
F. meeting at *xiaoqu*	.000	.352**	.000	**.440****
F. meeting at jiedao	.000	**.360****	.000	.241**

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

In relation to social cohesion, it positively correlates with social ties – density and strength - with weak to moderate strength (table 4-12). Logically, regular participation in activities and meetings creates a safer and more trustworthy atmosphere that encourages interaction between residents and the use of shared spaces, setting the foundations for the development of bonds. However, this correlation is, once more, stronger for the ties built at the BC than at the X. Additionally, trusting neighbours from the BC has a greater (positive) impact on the social ties between residents of the X than does trusting neighbours from the X. That means, that trusting people living in the same BC provides more confidence to interact with other neighbours from the X than trusting residents of the whole community. This shows the importance of building a close heart at the BC level to favour not only the relationship between residents at that level but also their relationship with the whole community. Nonetheless, this relationship is reciprocal, and cohesion at the *xiaoqu* level also favours social cohesion at the BC, although to a lesser extent.

Table 4-12 Correlation between social cohesion and ties variables at the BC and X

	Building courtyard				***Xiaoqu***					
	meetings		Trust neighbours		meetings		Trust neighbours		Participation	
	P-value	rho	P-value	rho	P-value	rho	P-value	rho	P-value	rho
Building courtyard										
Recognise	.000	**.389****	.000	**.452****	.000	**.270****	.000	**.216****	.000	.201**
Talk sporadically	.000	**.416****	.000	**.318****	.000	**.285****	.000	**.207****	.000	.198**
Take initiative	.000	**.505****	.000	**.442****	.000	**.336****	.000	.135**	.000	.283**
Number of friends X	.000	**.409****	.009	**.222****	.000	**.381****	.000	.192**		
Share activities	.000	**.328****	.000	**.362****	.000	**.297****	.000	**.339****	.000	.289**
F. meeting at dwelling	.000	**.438****	.001	**.286****	.000	**.459****	.000	**.327****	.000	**.344****
F. meeting at courtyard	.000	**.435****	.000	**.461****	.000	**.442****	.000	**.385****	.000	.299**
F. meeting at X	.000	**.467****	.000	**.432****	.000	**.423****	.000	**.344****	.000	**.472****
F. meeting at jiedao	.003	**.262****	.017	**.214***	.001	**.307****	.133	.135	.000	**.352****
Xiaoqu										
Recognise	.000	**.297****	.000	**.311****	.000	**.394****	.000	**.207****	.000	**.344****
Talk sporadically	.001	**.265****	.011	**.203***	.000	**.364****	.000	.191**	.000	.308**
Take initiative	.000	**.318****	.000	**.374****	.000	**.381****	.000	.191**	.000	**.355****
Number of friends	.000	**.409****	.009	**.222****	.000	**.381****	.000	.192**	.000	.268**
Share activities	.017	.196*	.012	**.205***	.001	**.278****	.000	**.322****	.003	.243**
F. meeting at dwelling	.000	**.352****	.002	**.259****	.000	**.410****	.000	.171**	.000	.266**
F. meeting at courtyard	.004	**.244****	.003	**.248****	.000	**.398****	.000	.194**	.000	.296**
F. meeting at X	.000	**.309****	.001	**.291****	.000	**.378****	.000	**.222****	.000	.309**
F. meeting at jiedao	.244	.108	.230	.111	.000	**.327****	.053	.077	.000	**.366****

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

This positive relationship between social network, social capital and social cohesion corroborates the positive interdependence established between the three variables in the first part of hypothesis 2. Indeed, likewise in the West, having a closed social network is associated to emotional and instrumental benefits at the individual and collective level except for HELP, which can be obtained within Chinese gated communities even though the ties are weak.

The confirmation of hypothesis 1 is also supported by some other authors who indicate the weakening of ties, capital and/or cohesion in gated communities in the West (Blakely & Snyder 1997; Coy 2002; Pow 2015) and in comparison to traditional or previous neighbours in China (Yuqi Liu, Wu, et al. 2017; Hazelzet & Wissink 2012; Forrest & Yip 2007; Farrer 2002; Zhu, Breitung & Li 2012; Li et al. 2012). However, contrary to this research, some of them defend that residents of gated commodity housing desire a nice environment but distant neighbourhood relationships while those living in traditional neighbourhoods prioritize local social bonding given their less advantaged position - lower economic level, lower educational background, migrants, and rural environment. For example, Zhu et al (2012) study the reasons for neighbourhood attachment in commodity housing and traditional neighbourhoods, finding that the former model develops this sentiment based on the physical environment evaluation while the latter on neighbourly interaction. Furthermore, they sustain that neighbours distance themselves from one another and the relevance of the neighbourhood social environment is based on status and social “quality” rather than in personal contacts in commodity housing. These findings are partially supported by Liu et al (2017) who point out the different sources for neighbourhood cohesion between the residents of urban villages and those of redeveloped neighbourhoods. While the former is based on neighbourly contacts, for the latter it is based on residential satisfaction. Also, Li et al (2012) look at the relationship between community attachment, neighbourly relations and residential/neighbourhood satisfaction in new commodity housing and *danwei* neighbourhoods. They find a similar trend, relating neighbourhood satisfaction to community attachment for commodity housing and to neighbourly relations for the *danwei*. They conclude that community attachment is also acquired through neighbourly relationships in the *danwei*, however, in the case of commodity housing it is attained through the quality of the environmental, provision of clubhouses and other amenities. Thus, these results show a shift in the reasons why an individual has links with residential gated communities in the market economy in comparison to traditional neighbourhoods.

However, the findings of this research related to social standards partially contradict these conclusions since our analysis shows that bonding within the gated communities and obtaining emotional and instrumental support at the individual and collective level – social capital and social cohesion - is desirable for the Chinese population. Indeed, this analysis relates social standards to the actual social life within the communities (social ties, social capital and social cohesion) to better understand the real social needs and meaning of social

quality of life in this context. The results show that actual social life is out of balance with the standards of the residents, who generally prefer to have stronger ties with their neighbours and live in more cohesive communities. For example, 63% (Md=4.5; IQR=3) and 74% (Md=5; IQR=2) of the participants agreed or strongly agreed that is important for them to socialise with residents from their BC and X respectively (Fig. 4-20, for detailed data see table B-22 in appendix B). However, this is an indicator of dissatisfaction with the actual social ties given the high proportion of residents who do not interact with their neighbours in any place (71% never or rarely do so). Also, it is remarkable that only 17% (Md=4; IQR=2) of the participants consider it unimportant to count on their neighbours, while the rest (83%) would like to have this kind of relationship (Fig. 4-21, for detailed data see table B-20 in appendix B). Nonetheless, the actual number of residents that can count on their neighbours is lower (53.8%) than those who would like to do so (83%), which also shows a considerable percentage of people socially dissatisfied in this regard. Moreover, the variables measuring social cohesion also show a mismatch between the social reality and the desired one. Only 24% (Md=4; IQR=2) of the residents consider that holding meetings/events with their neighbours is not important (Fig. 4-22, for detailed data see table B-21) and almost 50% (Md=3; IQR=4) consider it important or very important to have the chance of participating in activities (Fig. 4-21). These results show once more, the dissociation between standards and reality.

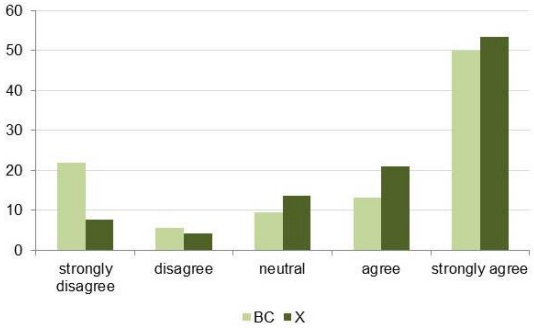


Fig. 4-20. Importance of socializing with neighbours (%)

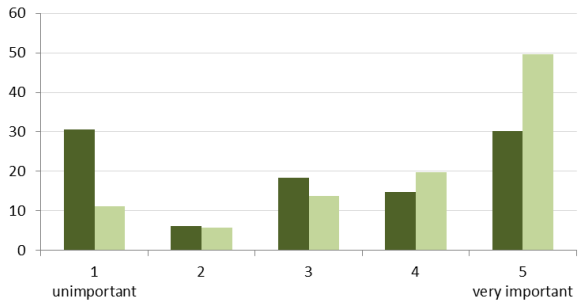


Fig. 4-21 Standards for PARTICIPATION and HELP (%)

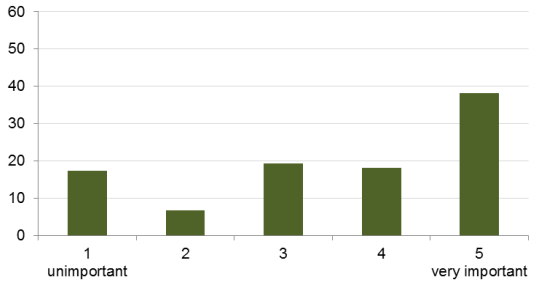


Fig. 4-22 Importance of having MEETINGS (%)

Certainly, the qualitative data also support these findings. Generally, the residents (particularly those in advanced middle-age, the unemployed and the elderly) claimed to like having a good and close relationship with their neighbours although keeping their intimacy and privacy at home[32]. Indeed, many residents of some communities complain, during the field work, about the lack of indoor and outdoor spaces to do activities or the deficiency of the administration office in organizing such events. Also, participants in their 30-40s claimed that the activities are mainly organised for the elderly but nothing to enhance the relationship between the middle-aged group. Moreover, many migrants from rural areas or other provinces were quite disappointed and frustrated with the difficulty of integration with local residents due to language or social status barriers. Thus, the lack of involvement in activities and of social bonds are linked to several aspects rather than only to the willingness of residents to participate and interact.

These general analyses show that there is an imbalance between the actual social life within the communities and the social standards of the Chinese population who wish to have emotional support through social capital, social cohesion and socialise more frequently with their neighbours. These results shed light on the meaning of social quality of life within the gated residential communities, this being associated to close social networks and the social needs – emotional and instrumental - represented here by social capital and social cohesion – a more complete analysis of social capital and cohesion by comparison of communities and correlation with independent variables is provided in appendix C. Certainly, according to these results, Certainly, according to these results, having more cohesive communities and tighter ties with the neighbours is considered positive by the Chinese population and contributes to improving their social quality of life (SQOL). Thus, although the physical environment is relevant for the attachment and satisfaction of residents of Chinese gated communities, social bonding is equally relevant. This conclusion is somewhat supported by Lu et al (2018) since they defend the importance of social bonding and the work of private governance in contributing to the social dimension of attachment despite finding that the satisfaction with neighbourhood services and neighbourhood image have become the most crucial determinants of neighbourhood attachment in commodity housing. This is also supported by Wu (2012) who found that gated neighbourhoods provide platforms for participation and engagement rather than putting an end to these social practices. Therefore, these results suggest that communities must be designed to enhance social interaction in addition to being physically attractive and equipped with facilities and amenities. This means that further study is required relating features of the built environment to social network

[32] Most of the adults and elderly residents were asked about their daily life in the communities during and after the cultural revolution when several families lived in the same house with a very small space per person (3.6 m^2 per person) sharing kitchen and toilet –this is still happening in many *lilong*. All the participants were glad about the new situation since they can have their own house, more space and better conditions. However, it is remarkable that most of them talked with nostalgia about community life in those times. "*People were flowing constantly from one house to the other, front doors were always open, even at night because there was no danger, people cared about each other and always helped each other out. We had a closer relationship and the atmosphere was safer than nowadays*" (80-year-old participant from CSL).

within Chinese gated communities. The second objective of this thesis contributes to this area of research in next section.

4.4. Objective two. Built environment and social network in gated communities.

This section is focussed on the second objective of this research and comparison between communities are established to understand the effect of the urban form on the social network within these residential units. To show the results, a first part presents the main conclusions for each of the three hypotheses that related the impact of the physical independent variables – building height, community density and population size – on the social ties among residents. Also, a summary of the design features with a larger influence on the social bonds and use of the outdoor spaces is provided. Meanwhile, in a second part a detailed discussion is developed in relation to the comparison of the social ties between communities and for each physical level (BC and X) considering the influence of all independent variables -physical (height, density, and size), demographic, environmental, quality- and of the design features.

4.4.1. Main conclusions

Hypothesis 3. Height of buildings

The hypothesis 3 stated that high-rise gated communities weaken the social network between residents at both levels of analysis, the building courtyard unit and *xiaoqu* levels. Indeed, the results of this research support this hypothesis since in high-rise communities the density and strength of social ties decrease between residents at both levels, while low, medium and medium-high-rise compounds perform better. The threshold is set at around 20 floors according to the results of this research. The increase of building height seems to reach a point at which the number of people living over the same ground area is such that it hinders their meeting and recognition, leading to an alienated character and lack of interaction. On the other hand, the success of the L, M, and MH types depends highly on the community´s topology, the provision of shared spaces and the proper design of the central square(s) and the space between buildings – including considerations related to their shape, size and position within the community. However, for high-rise communities, despite the conditions being favourable and the design of main public spaces a success, still the social bonds are weak.

This trend have been largely found in the West (Gifford 2007a; Newman 1975; Ekblad & Werne 1990; Husaini et al. 1991; Saegert 1982; Ineichen & Hooper 1974; Richman 1977; McCarthy & Saegert 1978; Bordas-Astudillo et al. 2003; Saegert 1979; Jephcott 1971; A Churchman & Ginsberg 1984; S Bochner et al. 1976; C Korte & Huismans 1983; Sinnett et al. 1972; Whyte & Parish 1984; Nadler et al. 1982; Bynum & Purri 1984; Holahan & Wilcox 1979; Bickman et al. 1973; Edwards et al. 1982; Zito 1974) and some recently in the Chinese context (Ekblad & Werne 1990; Li 1998; Tian 1997; S. Huang 2006; Forrest et al.

2002) associated to different effects produced by high-rise buildings – see Chapter 2 section 2.3.3. for an in-deep literature review.

Hypothesis 4. Community density

The hypothesis 4 stated that the increase in plot ratio and site coverage above a certain limit weakens the ties between residents of a gated community in China. According to the case studies analysed, communities with plot ratios above 2.5 tend to have fewer social ties between residents. The conclusions in this regard are associated to the height range of buildings, being the high-rise communities those reaching plot ratio values above 2.5. Also, the feeling of crowding associated to a lower sense of control and social support can be the reason for weaker social ties (Gifford 2007b; McCarthy & Saegert 1978; Bordas-Astudillo et al. 2003). For lower values there is no clear association between social ties and density. On the other hand, site coverage ranges from 0.1 to 0.2 approximately except for the low-rise community which reach a value of 0.7. For the range of values 0.1-0.2, differences have not been found in relation to social ties. However, the large occupation of the ground in CL leads to a clear increase in the relationship between residents who live close to each other, given the low-rise typology and the extreme physical proximity between them, which "force" the interaction.

Hypothesis 5. Community size

The hypothesis 5 stated that small-sized communities tend to have stronger social networks between residents at both levels of analysis, building courtyard unit and *xiaoqu* levels, than larger ones. This hypothesis has been constructed on the limited physiological nature of humans to being integrated into large groups of people (Hill & Dunbar 2002; Killworth et al. 1990; Pool & Kochen 1978) and the association of large-population urban areas with individualism, alienation and superficial relationships (Tönnies 2011; Durkheim 2005; Simmel 1976; Wirth 1938). However, the result of this research shows an inverse tendency. Large size communities tend to have more numerous and stronger ties between residents than smaller ones when the comparison is done within each height range group (i.e., medium rise, medium-high-rise, and high-rise). This result is unexpected and contrary to the hypothesis of this research which speculated that, in smaller communities, the larger recognition between residents facilitates the development of ties based on principles of familiarity, trust, safety, and belonging.

The explanation for this unpredicted result is related here to the character of the Chinese who appreciate dynamism, movement and gatherings of large numbers of people. In other words, what Adam Chau (2008a, 2008b) referred to as 'social heat'. He uses this concept to highlight the relevance of sociality in the Chinese culture, understood as being "*the condition of social co-presence, i.e., the gathering of a group of people in one social space*" (Chau 2008a, p.147). This idea of sociality may encompass the concepts of social interaction and social relationship but they can be superficial with no substantial or meaningful interactions and with no pre-existing social relationships. What is important in sociality is the

congregation of a vibrant, enthusiastic and large group of people. Adam Chau studied this notion of sociality in peasants from Shaanbei, China, where the concept of social heat is called *honghuo* ("red and fiery"). This concept has multiple meanings such as "*red-hot, fun, lively, crowded, hectic, chaotic, confused, messy, exciting, enthusing, hustle and bustle, festive, carnivalesque, intense, frenzied, sensational, social heat, red-hot sociality, or even "collective effervescence*"[33]. "[Honghuo] *embodies a native conception of social life that values the convergence and intermingling of a lot of people and the collective production and consumption of loud noises, vibrant colors, fragrant smells, savory tastes, radiant heat, and heightened excitement*" (Chau 2008a, p.149). Social heat or *honghuo* is a highly desirable condition of social life that becomes essential in China for the success of events whatever their nature: New Year´s celebrations, religious meetings, going to the mall, watching a basketball match or going to the cinema. An event with no social heat (or *honghuo*) will be a failure and it is supposed to bring shame and disgrace to its host.

Therefore, from this perspective, larger communities are more likely to gather a larger number of people in the main square of the compound providing this atmosphere of social heat. Indeed, the interviews conducted in CSL_2, which had particularly beautiful courtyards and secondary outdoor spaces (Fig. 4-23 and Fig. 4-24), highlighted this point. The residents preferred to make use of the main square because more residents gathered there, it being more fun and with more chances for interaction. However, in smaller communities, congregating large amounts of residents in the central square is clearly more difficult, which leads to the displacement of the residents towards other places, such as surrounding parks or squares, thus reducing the interaction and strength of ties between neighbours.

This unexpected result is conducive to providing a desirable social atmosphere within the communities at the same time as the fragmentation at city scale can be lower[34], with the possibility of going towards higher city densities.

[33] Collective effervescence is a sociological concept introduced by Émile Durkheim to refer to the shared sense of exaltation and group transcendence that serves to unify a community or society. This concept was conceived for the analysis of religious groups and related to the continuous process of meeting to communicate the same thought and participate in the same action simultaneously (Durkheim 1965).

[34] This reflection cannot be taken as definitive but merely as an insight since there are many other factors determining the adequate size of the community at city level, such as traffic or the walkability of the city.

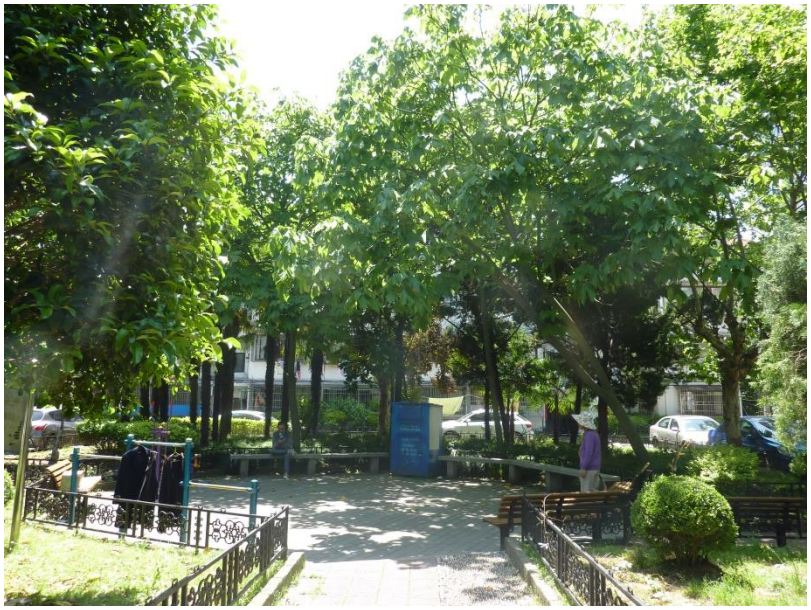


Fig. 4-23 Main square of CSL_2

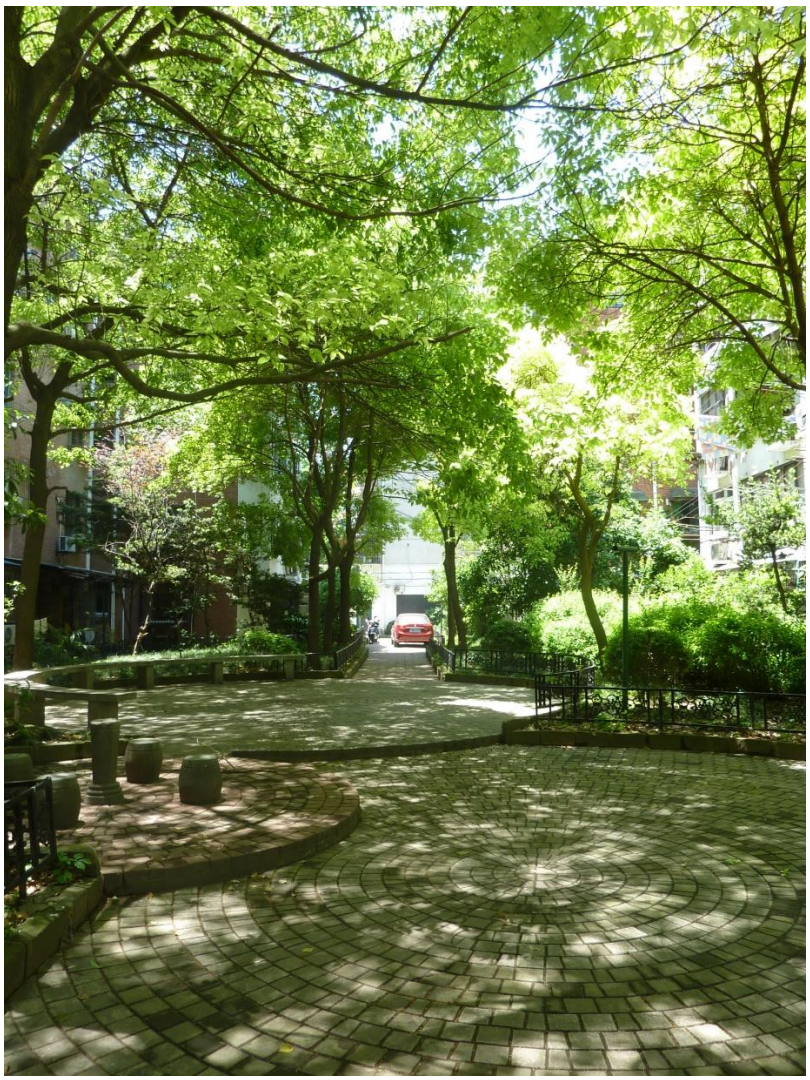


Fig. 4-24 Secondary square of CSL_2

Design features

Design features are focussed here on the outdoor common spaces. These public spaces, particularly in high-rise communities, must be designed conscientiously since they are essential places that enable residents to establish social interaction and recognition (Garling & Golledge 1989; Fleming et al. 1985). They can provide opportunities for residents to have substantial contact and the sense of neighbouring can then be fostered (S. Huang 2006).

The main conclusions in relation to the design of the communities are the following:

- Design of the courtyards between buildings

  Medium rise (6-12 floors) favours familiarity and trust between neighbours given their humanised environment. However, the size of the space between buildings discourages residents from using them – due to social discomfort and also to avoid disturbing the neighbours living around. Meanwhile, the size of such courtyards in medium-high-rise communities (12-18 floors) is adequate for use by the residents, which can enhance the social bonds between residents of the same BC. In the case of high-rise communities, despite a proper design and functioning of the outdoor spaces, the ties between residents are weak.

  The proper design of these courtyards has been found to be important to social bonding at this physical level and to contribute to the general cohesion of the gated community. This finding is supported by other authors (Cooper Marcus, C Sarkissian 1986; Bechtel 1977; Francis 1987) who highlight the importance of the spaces between buildings for informal social interaction between residents.

- The design of the central square

  Their location within the community and the provision of facilities and public furniture is essential to motivate residents to use them (S. Huang 2006). Regarding the location, it must be a place where there is a considerable flow of people. Huang (2006) also highlights this feature and the importance of common access for users to enhance social encounters (Fleming et al. 1985) in his study of outdoor spaces in high-rise housing in Taipei. Regarding the design, the space must be multi-use with areas for playing and dancing, areas to do exercise, areas to sit, chat and observe, and more private areas where one can be alone but at the same time be part of the social heat through observation. This is in line with the identification made by Gehl (2011) in *Life Between Buildings* of the confluence of several activities – activity, optional activity, and social – in an outdoor public space in order to be successful. Also, Huang (2006) appreciates the importance of providing different but visually integrated areas for conducting several activities at the same time in outdoor public spaces in Taipei. Indeed, he finds spaces with scenic and activity aspects to be those having the most influence on social interaction. This research supports those findings and also the relevance of visual contact between spaces. Certainly, such

visual contact between users in public spaces has been identified in this research as a way of increasing the feeling of *social heat* and encouraging their use and interaction between residents. The most attractive shape of the squares would be circular or elliptical.

- The topology

  The accessibility and integrative flow of residents through the community is essential to facilitate their encounters and avoid isolation. Indeed, Huang (2006) identifies a higher social interaction in circulation spaces than in seating and vague spaces. Also, the provision of facilities and equipment in the spaces adjacent to the courtyards – circulation spaces - enhances the integration of neighbours from adjacent BCs and with the rest of the residents from the X, increasing the density of ties within the community. The provision of seating structures (Gehl 2011; Carr et al. 1992; Campbell & Campbell 1988), play areas (Cooper Marcus, C Sarkissian 1986; Coley et al. 1997), exercise equipment or green areas (Coley et al. 1997; Skjaeveland & Garling 1997; Kuo et al. 1998; Kweon et al. 1998) contributes to promoting social activity and interaction.

4.4.2. Comparison of social networks between communities. A detailed analysis of the influence of independent variables and the design features

Table 4-13 below shows a comparative summary between the communities where the trends in relation to social networks –density and strength of ties- and the independent variables are represented through colour coding – based on descriptive statistics. The four-tone purple scale goes from the lighter hue representing the communities with fewer and weaker ties, worse conditions and more unfavourable demographic values to the darker tones that represent the most advantageous situations. On the top of the table, the physical independent variables, building height, and size and density of community are indicated. Noticeably, the two high-rise communities (CSH and CBH) are those with fewer and weaker ties followed by CSMH; while CSL, CBM and CBMH are those with more numerous and stronger ties. Generally, the communities performing better have favourable demographic, environmental and/or quality conditions, except for CSL, which has the worst environmental and quality conditions, and mediocre to disadvantaged demographic aspects. Opposite to CSL, is the case of CBH which has favourable demographic, environmental and quality conditions but few and weak ties, reinforcing the hypothesis 3 and the negative influence of building height on social ties. Also, as pointed out in 4.4.1, communities with a smaller population size tend to have looser social networks than larger ones within the same building height range, contrary to the hypothesis 5 of this research.

Table 4-13. Comparative summary matrix of results

Height range		Low rise	Medium rise		Medium-high-rise			High-rise	
Size		CSL	CSM	CBM	CSMH	$CBMH_1$	$CBMH_2$	CSH	CBH
Density									
Plot ratio		1.77	1.60	1.54	2.59	1.86	2.50	5.07	3.36
Site coverage		0.71	0.21	0.22	0.19	0.17	0.18	0.18	0.12
Social ties									
Density of ties									
Recognition	BC								
	X								
Talk sporadic.	BC								
	X								
Take initiative	BC								
Take initiative	X								
Take initiative	J								
Friends	X								
	J								
Strength of ties									
F. dwelling									
F. courtyard									
F. *xiaoqu*									
F. jiedao									
Demography									
Age									
Length									
Income									
Ownership									
Origin									
Background									
Education									
Family type									
Environmental									
Air quality									
Noise									
Temperature									
Shadows									
Sunshine									
Beauty									
Quality									
Materials									
Green areas									
Courtyards									
Façade ma.									
Building ma.									
Cleanliness									
Facilities									
Public furnit.									
Night lighting									
Safety									

The colour scale of demographic variables has been coded with the darker colours for those values that are more favourable for developing ties.

The relevance of these results is further analysed through Kruskal-Wallis and Mann-Whitney tests and finds statistically significant differences between communities in relation to density and strength of ties with small to moderate effect sizes (for detailed data see tables B-23 to B-28 in appendix B). The more remarkable cases are CSMH, CSH, and CBH that have particularly lower R and TS than CSL, $CBMH_1$ and $CBMH_2$ at the BC level, and lower than CBM, $CBMH_1$ and $CBMH_2$ at the X (table 4-14, for detailed data see tables B-23 and B-24). This result is reinforced by the lower number of friends at the X level of CSH and CBH (the two high-rise communities) particularly in comparison to $CBMH_2$ (r_{CSH}=-0.56; r_{CBH}=-0.33), CSL (r_{CSH}=-0.53; r_{CBH}=-0.29), and CBM (r_{CSH}=-0.49; r_{CBH}=-0.23) (table 4-14, for detailed data see table B-26). Additionally, the F at all places of encounter supports these results particularly for CSH and CBH in comparison with $CBMH_2$ (for dwelling r_{CSH}=-0.39, r_{CBH}=-0.28; for BC r_{CSH}=-0.51, r_{CBH}=-0.33; for X r_{CSH}=-0.56, r_{CBH}=-0.29; for J r_{CSH}=-0.46, r_{CBH}=-0.30) and CSL (for dwelling r_{CSH}=-0.46, r_{CBH}=-0.37; for BC r_{CSH}=-0.23; for X r_{CSH}=-0.48, r_{CBH}=-0.23) (table 4-15, for detailed data see table B-28). The results point out that communities with building heights between 20-30 floors tend to have fewer and weaker social ties than those with building heights below 20 floors.

Table 4-14. Mann-Whitney U test for…

Cases	*N* (x_0, x_1)	ΔMnd^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Recognising by visual contact neighbour of the…						
Building courtyard						
CSMH-CSL	(70.83)	***	54.53	95.95	1332.0	**-0.48**
CSMH-$CBMH_2$	(70.103)	***	62.73	103.5	1906.0	**-0.41**
CSMH–$CBMH_1$	(70.85)	**	63.09	90.28	1931.5	**-0.31**
CBH-CSL	(96.83)	***	67.02	116.58	1778	**-0.49**
CBH-$CBMH_2$	(96.103)	***	75.10	123.21	2553.5	**-0.43**
CBH-$CBMH_1$	(96.85)	***	74.83	108.41	2527.5	**-0.33**
CSH-CSL	(100.83)	***	71.45	116.77	2094.5	**-0.44**
CSH-$CBMH_2$	(100.103)	***	80.15	123.21	2965.0	**-0.38**
CSH-$CBMH_1$	(100.85)	*	80.44	106.86	2993.5	**-0.26**
Xiaoqu						
CSH-CBM	(99. 112)	***	75.83	131.96	2573.0	**-0.48**
CSH-$CBMH_2$	(99. 101)	***	78.02	122.53	2774.0	**-0.40**
CSH-$CBMH_1$	(99. 86)	***	77.09	110.45	2826.5	**-0.33**
CSMH-CBM	(70. 112)	**	75.77	100.60	2841.0	**-0.24**
CBH-CBM	(97. 112)	**	89.85	116.23	4093.0	**-0.23**
Talking sporadically with neighbour of the…						
Building courtyard						
CSMH-CSL	(70.81)	***	56.35	92.98	1459.0	**-0.43**
CSMH-$CBMH_2$	(70.102)	***	64.76	101.42	2048.0	**-0.39**
CSMH-$CBMH_1$	(70.84)	***	62.24	90.22	1871.5	**-0.32**
CBH-CSL	(97.81)	***	72.70	109.62	2299.0	**-0.37**
CBH-$CBMH_2$	(97.102)	***	82.31	116.82	3231.5	**-0.31**
CBH-$CBMH_1$	(97.84)	**	79.12	104.72	1921.5	**-0.25**
CSH-CSL	(100.81)	***	77.54	107.62	2703.5	**-0.30**
CSH-$CBMH_2$	(100.102)	**	88.15	114.59	3764.5	**-0.24**
Xiaoqu						
CSH-$CBMH_2$	(98.102)	***	82.71	117.59	3255.0	**-0.31**
CSH-CBM	(98.108)	***	86.72	118.73	3647	**-0.28**
CSH-CSL	(98. 79)	*	79.91	100.27	2980.5	**-0.20**
Number of friends in the…						
Xiaoqu						
CSH-$CBMH_2$	(97. 91)	***	65.16	125.77	1568.0	**-0.56**
CSH-CSL	(97. 77)	***	64.21	116.84	1475.0	**-0.53**
CSH-CBM	(97. 97)	***	70.60	124.40	2095.0	**-0.49**
CBH-$CBMH_2$	(85. 91)	***	71.36	104.51	2410.5	**-0.33**
CBH-CSL	(85. 77)	**	68.72	95.61	2186.0	**-0.29**
CBH-CBM	(85. 97)	*	78.91	102.54	3052.0	**-0.23**

* =slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table 4-15. Mann-Whitney U test for frequency of socialising with residents from the X

	Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Dwelling							
	CSH-CSL	(98. 81)	***	70.21	113.94	2029.5	**-0.46**
	CSH-CBM	(98. 94)	***	74.80	119.12	2479.5	**-0.44**
	CSH-CBMH_2	(98. 97)	***	78.37	117.83	2829.5	**-0.39**
	CBH-CSL	(91. 81)	***	70.34	104.66	2214.5	**-0.37**
	CBH-CBM	(91. 94)	***	76.54	108.94	2779.0	**-0.33**
	CBH-CBMH_2	(91. 97)	***	79.66	108.42	3063.0	**-0.28**
Courtyard							
	CSH-CBMH_2	93. 103)	***	68.88	125.24	2035.0	**-0.51**
	CSH-CSL	(93. 64)	*	70.66	91.12	2200.5	**-0.23**
	CBH-CBMH_2	95. 103)	***	80.26	117.25	3064.5	**-0.33**
Xiaoqu							
	CSH-CBMH_2	(98. 102)	***	68.39	131.35	1851.0	**-0.56**
	CSH-CSL	(98. 79)	***	67.40	115.80	1754.0	**-0.48**
	CBH-CBMH_2	(91. 102)	***	80.34	111.87	3124.5	**-0.29**
	CBH-CSL	(91. 79)	*	75.13	97.45	2650.5	**-0.23**
Jiedao							
	CSH-CBMH_2	(97. 102)	***	75.53	123.27	2573.0	**-0.46**
	CBH-CBMH_2	(85. 102)	***	77.13	108.06	2901.0	**-0.30**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

However, this conclusion might be simplistic and, apart from this evident outcome, further analysis is made of aspects worthy of mention related to other features of design. The topology of the community and the design of the common outdoor spaces have been seen to be essential aspects that must be designed consciously according to Chinese needs and culture since they can greatly contribute to the social success of the community. Thus, these urban design aspects are analysed below and compared between communities - considering the quantitative results and qualitative information gathered – to provide further indications for a successful design of gated communities in relation to social quality of life.

For example, among the worst-performing communities, CSH tends to have more social ties at the BC than at the X – it has the lowest mean rank for all the variables measuring density of ties at the X level (see tables B-23, B-24 and B-25 in appendix B) -, while the tendency of CSMH is the opposite – lowest mean rank for R and TS, and second lowest mean rank for TI at the BC (see tables B-23, B-24 and B-25 in appendix B). These trends are based mainly on the topology of the community, the presence of outdoor central spaces and the design of the spaces between buildings – both communities have unfavourable demography for social bonds.

In the case of CSH, the layout of the community reinforces the tendency towards social isolation driven by its demography. The double entrance and layout of the community divide the compound into two clearly defined and completely disjointed parts (Fig. 4-25), which make the casual encounter between residents almost impossible. Moreover, the buildings are associated with different socio-economic groups. The first building is for renters, the second and third have medium size flats and the fourth and fifth have the largest and highest quality flats. Lastly, the community lacks a central outdoor and indoor shared space while the available outdoor spaces for leisure are very small and hidden by the vegetation. Indeed, during the interviews, some residents from the fourth and fifth buildings stated that they were not aware of the existence of a playground inside the community (Fig. 4-26). The absence of proper shared spaces not only hinders the encounter between residents but also reduce the chances for the social administration office to organise activities for the residents. The result is that the residents use the park next to the community, which could function as their central outdoor space but it is shared with any citizen wishing to use it. These design features lead to an absolute lack of interaction between residents at both levels but particularly at the X.

Fig. 4-25 CSH plan – division of the community

Fig. 4-26 Play-ground of CSH

On the other hand, CSMH follows an inverse trend to that of CSH, with remarkably fewer ties at the BC than at the X due to the design and use made of the space between buildings. These design features are described through the analysis of four building courtyard spaces - numbered from 1 to 4 - indicated in the plan below (Fig. 4-27).

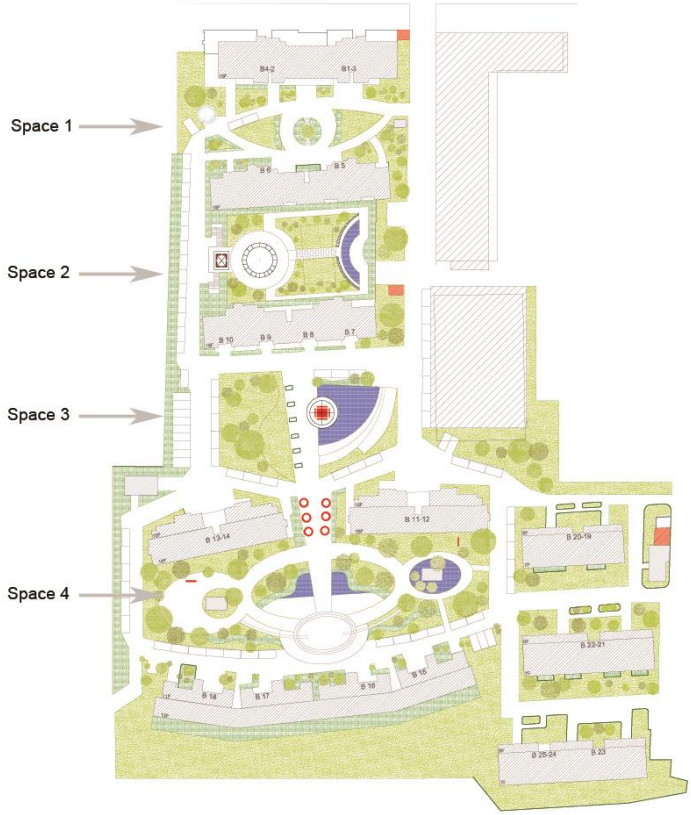


Fig. 4-27 Plan of CSMH divided by zones

In the case of space 1, the building units (1 to 6) have their entrances facing around the square (Fig. 4-28), which could favour encounters and interaction between residents. Additionally, the topology of this community and location of its gates substantially limit the circulation of residents living in other BU through this space, which could provide a more intimate character to the courtyard. However, facilities or public furniture are not provided in this square, which together with the lack of parking spaces results in a courtyard fully occupied by cars with almost no space for pedestrian circulation – a common problem in gated communities - (Fig. 4-29).

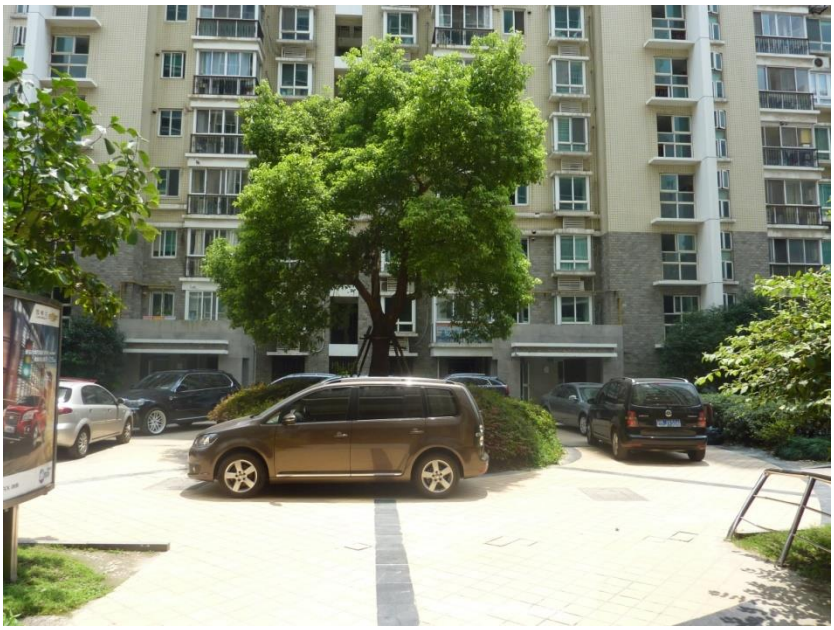


Fig. 4-28 Facing positions between entrances´ buildings in space 1 of CSMH

Fig. 4-29 Space 1 of CSMH used as a parking lot

Another case is the outdoor space 2, which could be ideal for children to play and residents to meet since it is a 2 m elevated space with no traffic risks, green areas, a pool and benches for people to rest (Fig. 4-30). However, this space is the most abandoned place in the whole community, being occupied only by cats and used to hang clothes of the neighbours (Fig. 4-31). The reason must be related to the principle of social heat and the lack of association of any BU with this space (lack of belonging). None of the buildings are accessed through this square and this courtyard has acquired an impersonal and anonymous character. Also, the elevation of this square with a unique access reduces the chances of casual encounter with other residents (Fig. 4-32), and it therefore becomes less attractive for neighbours to use.

Fig. 4-30 Green areas and seating dome in space 2 of CSMH

Fig. 4-31 Fountain and benches with shadow devices

Fig. 4-32 Access to Space 2 in CSMH

The other outdoor spaces, 3 and 4, correspond to the main squares of the community and, in consequence, the BUs around them lack integration and any possible feeling of “collective ownership”. In the case of space 3, the entrances of BUs 7 to 11 are isolated and isolated from each other with individual access paths that do not even need to pass by this recreational space (Fig. 4-33 and Fig. 4.34).

Fig. 4-33 Entrance BU 11 in CSMH

Fig. 4-34 Entrance BU 13 and 14 in CSMH

Regarding the space 4, the access route to BU 15 to 18 is the one that is most integrated with the recreational outdoor space, since residents usually pass through this leisure space to access their buildings, stopping by and speaking with other residents (based on observation analysis). This benefits the strengthening of ties between the residents of these BUs with other neighbours of the X who use the main squares. However, the ties with neighbours of the same BC would be difficult to reinforce through the design of this space. The difference of level between the entrances of the BU 15 to 18 and the square – the higher level - marks an intangible separation of what “belongs” to the BU and what belongs to the central square, leaving the BU 15 to 18 with no shared courtyard (Fig. 4-35 and 4-36).

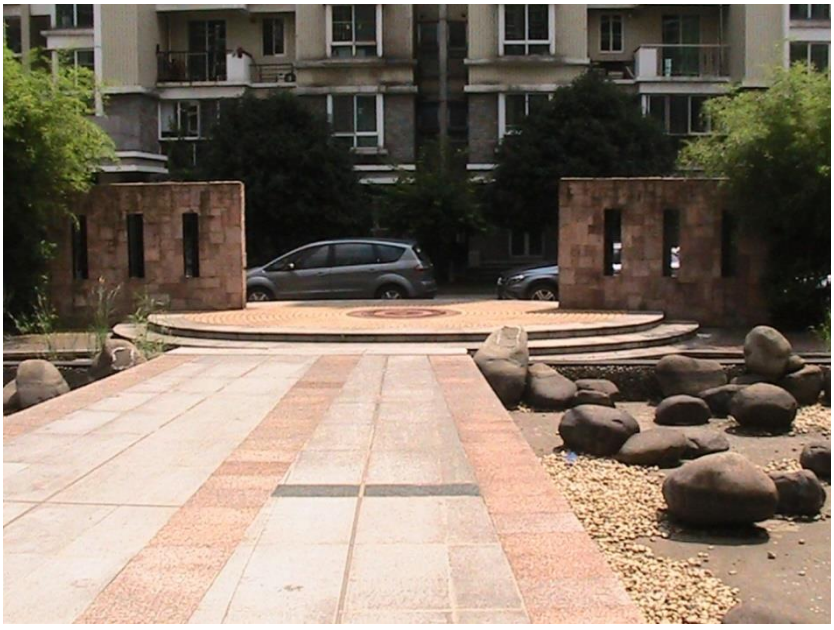


Fig. 4-35 Space 4 elevated over BU 15 to 18

Fig. 4-36 Entrance to BU 15 to 18

CBH is another community which is a perfect example of the relevance of the topology, the design of the main square(s) and the spaces between buildings to the development of social bonds. The proper design of its central spaces influences the gathering of residents and, despite being a high-rise community - with weak social ties -, it performs better at the X level for R, TS, TI and F_X than CSMH and CSH (table 4-16). This disparity is statistically significant in the case of CSMH for F_X (r=-0.24) and in the case of CSH for R_X (r=-0.26), TS_X (r=-0.20), TI_X (r=-0.20), number of friends (r=-0,24), and F_X (r=-0.28) (tables B-23 to B-26 and B-28). It could be argued that the different performance is associated with the more advantageous demographic variables of CBH than CSMH. However, the performance of CBH is similar or worse than CSMH at the BC level, which suggests that demographic

variables are not the only cause of their disparity at the X. Instead, its topology and the design of the central squares seem to be important contributing factors.

Table 4-16. Mean ranks after Kruskal to compare social ties within the same category - by size of the community

	Low	Medium		Medium high			High	
	CSL	CSM	CBM	CSMH	$CBMH_1$	$CBMH_2$	CSH	CBH
R (BC)	504.71	376.89	**377.48**	276.66	**411.33**	**468.52**	**314.69**	281.54
R (X)	412.21	376.89	**449.70**	350.51	**368.61**	**414.65**	246.41	**356.74**
TS (BC)	467.64	372.96	**374.03**	271.44	**407.50**	**437.46**	**345.38**	300.83
TS (X)	387.19	365.44	**404.05**	340.44	**367.02**	**424.23**	294.58	**385.30**
TI (BC)	414.81	378.14	**426.31**	316.57	**395.31**	**400.70**	**318.37**	305.63
TI (X)	358.85	384.14	**441.17**	341.26	**364.02**	**374.54**	294.85	**376.25**
TI (J)	329.60	367.53	**446.38**	337.98	**369.42**	**371.75**	285.37	**331.22**
Friends (X)	419.22	321.77	**392.66**	**359.06**	358.11	**439.25**	203.24	**300.74**
Friends (J)	286.10	307.90	**387.32**	326.50	**391.47**	**356.53**	259.47	**276.43**
F dwelling (X)	432.67	342.53	**402.68**	**367.21**	341.02	**402.34**	248.23	**288.26**
Courtyard (X)	365.67	**368.04**	296.89	309.22	**325.66**	**464.33**	263.41	**336.48**
Xiaoqu (X)	445.26	**325.25**	313.39	255.14	**355.96**	**465.79**	242.31	**351.32**
Jiedao (X)	299.44	**337.97**	314.96	345.04	342.02	**400.46**	232.05	**291.52**

With respect to the topology, CBH has an integrative circulation space that in many cases provide the possibility of passing through the central square (Fig. 4-37). Contrarily, the distribution of gates in CSMH segments the community in three zones (Fig. 4-38) hindering the casual coincidence of the residents of each group unless they go to the central square.

Fig. 4-37 Topology of CBH

Fig. 4-38 CSMH - Isolated zones

Regarding the design of central squares, CBH particularly promotes participation and interaction between residents due to their concentric shapes and the definition of their boundaries. The spherical or circular shape facilitates the visual contact between residents encouraging their interaction, while the size of the spaces is large enough so as to feel comfortable if communication is not desirable. Also, these two squares have small and controlled areas of interaction (such as point 1,2,3,4 of Fig. 4-39) integrated within the same space and which are visually connected. In the case of the main square (Fig. 4-39), the space is subdivided into two main zones (3, 4), where residents can rest and do other activities such as dance or play games. Zone 4 is usually a quiet area where residents pass by or simply stand to look at the surroundings. The central area of zone 3 is often occupied by children playing, while adults sit or stand around chatting and looking after them. This area is intensively used by the residents since the three domes provide a comfortable and shaded space where one can sit and chat while watching others (Fig. 4-40).

Fig. 4-39 Zones of central square of CBH

Fig. 4-40 Images of central square of CBH

On the other hand, the secondary main square of this community is composed of concentric circles perfectly defining several areas, each with a different character (Fig. 4-41). The central and open area is the stage where people perform the activities, such as children playing football or adults and the elderly dancing (Fig. 4-42). The immediate external concentric areas can be divided into two zones, the northern and the southern. The former has an intimate character and consists of spaces to sit or stand quietly in the shade observing the activity going on in the “stage” area. Meanwhile, the southern zone has a mixed atmosphere with seats overlooking two pools, where children are usually playing, and a corridor where residents pass by. The last element is the outer ring, that is used for residents to do exercise by walking around. The analysis of this square´s design is particularly interesting given its great success, performing even better than the principal central space. This is understandable since it provides all the possible scenarios desired by the Chinese population in order to enjoy an outdoor space. Primarily, it has a surface area which is controllable but sufficiently large to perform activities (stage) completely surrounded by observation areas (stands). This shape intensifies the perception of the presence of people and their interaction just by visual contact and fosters the desired *social heat*. This idea is supported by the intensive use made of the outer ring to do exercise -by walking quickly or running around-, which is surprising given the large size of this community and the fantastic green areas in which to do this activity. However, the Chinese prefer to walk around the *social heat* and be part of it. Lately, this square also offers an intimate space for shy people or those who want to be alone but be part of the moment of sociality, participating in the neighbours´ congregation by simply observing (Fig. 4-43).

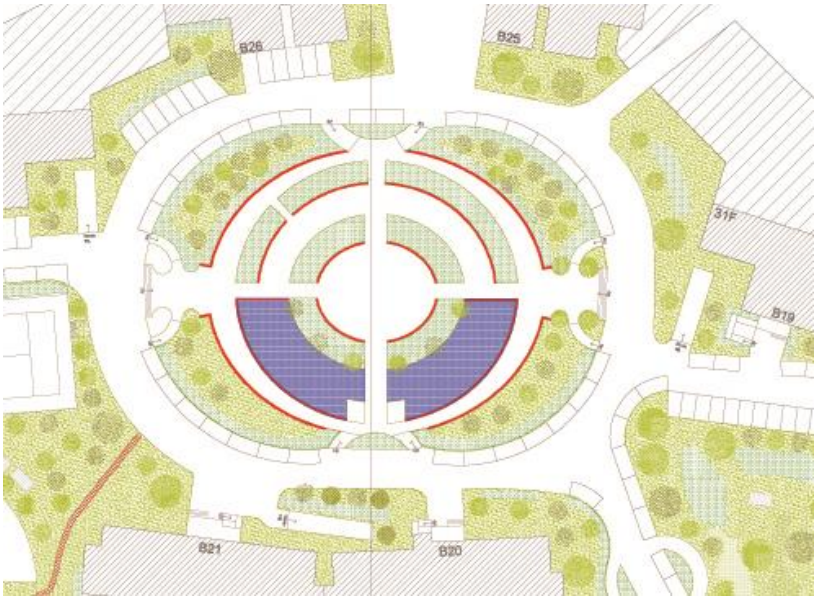


Fig. 4-41 Plan of secondary plaza of CBH

Fig. 4-42 Central area of the secondary plaza of CBH

Fig. 4-43 Area for observation of secondary square of CBH

Comparatively, CSMH also has two central spaces joined by a corridor with benches. The main square is composed of three separate spaces: the playground (1), the bridge (2) and the area surrounding the pool (3) (Fig. 4-44). The lack of visibility and integration between these three sub-spaces leads to an almost inexistent use of this square, except for circulation purposes (Fig. 4-45). In contrast, the secondary square, together with the far end of the corridor are quite successful spaces (Fig. 4-46). Again, this secondary space is composed of three zones (Fig. 4-47) but they are visually connected and have different characters. Zone 1 is a shaded resting space for residents who want to chat with others, sit or stand around. Zone 2 becomes the area used by the children to play, while the playground is empty most of the time. Obviously, the parents, grandparents and nannies prefer to use this area where the *social heat* is, other than the lonely and isolated playground. Finally, zone 3 is where residents can become observers while maintaining their privacy and desired solitude. However, despite the fact that the design of the secondary square performs reasonably well, the space is not large enough to congregate many residents or to carry out activities such as dancing, exercising or children playing freely, which reduces its efficiency in comparison with those of CBH.

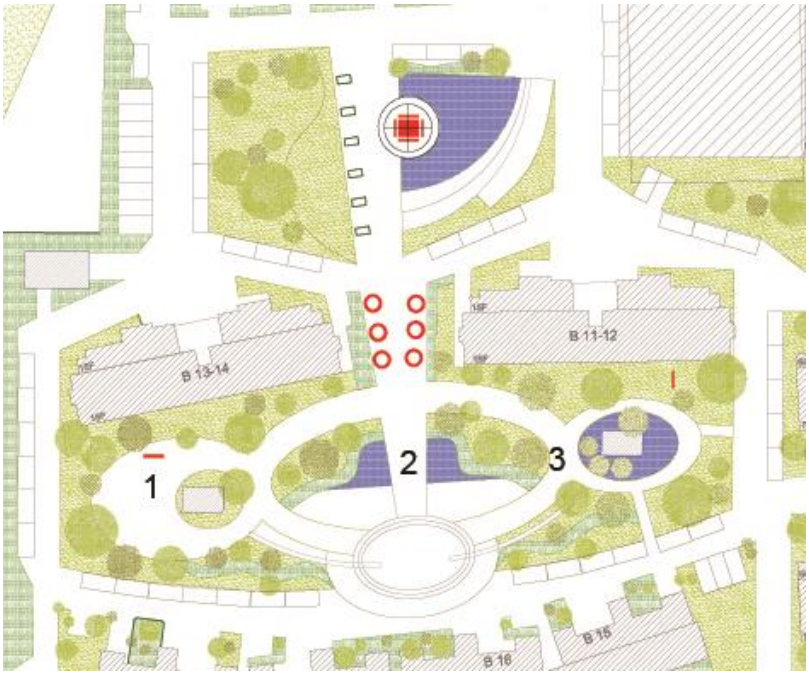
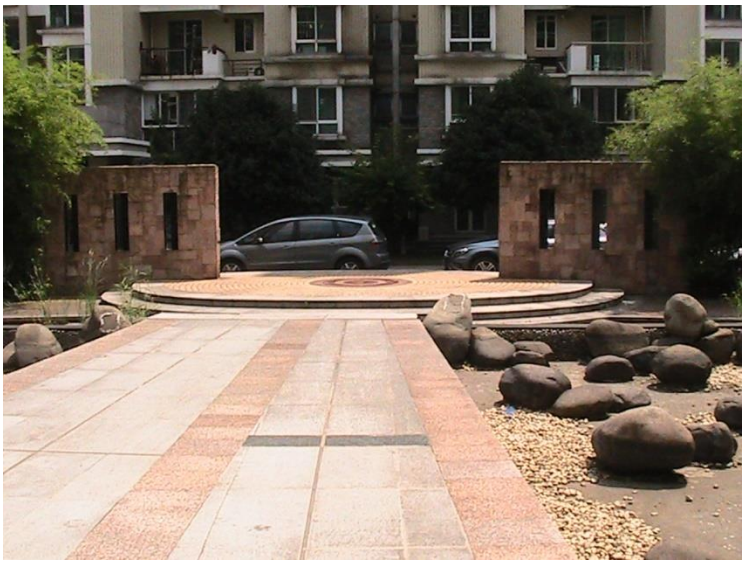


Fig. 4-44 Zones of main square of CSMH



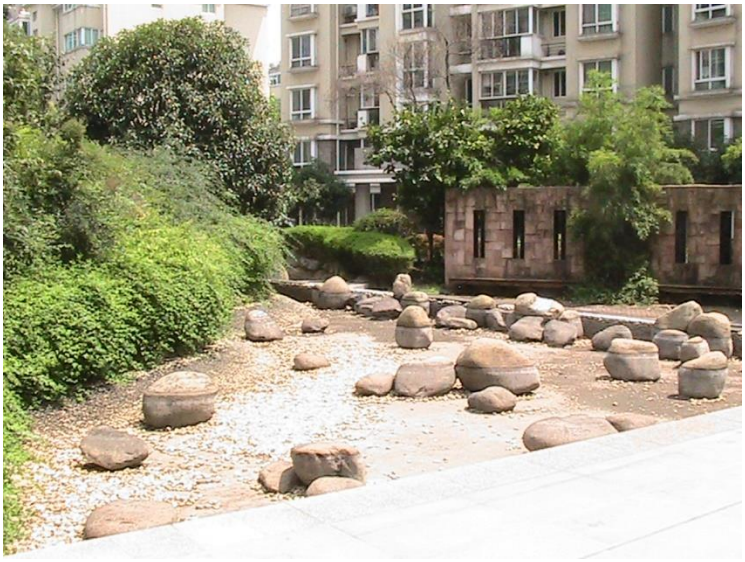


Fig. 4-45 Images of spaces1, 2, 3 of main square of CSMH

Fig. 4-46 Images of spaces1, 2, 3 of secondary square of CSMH

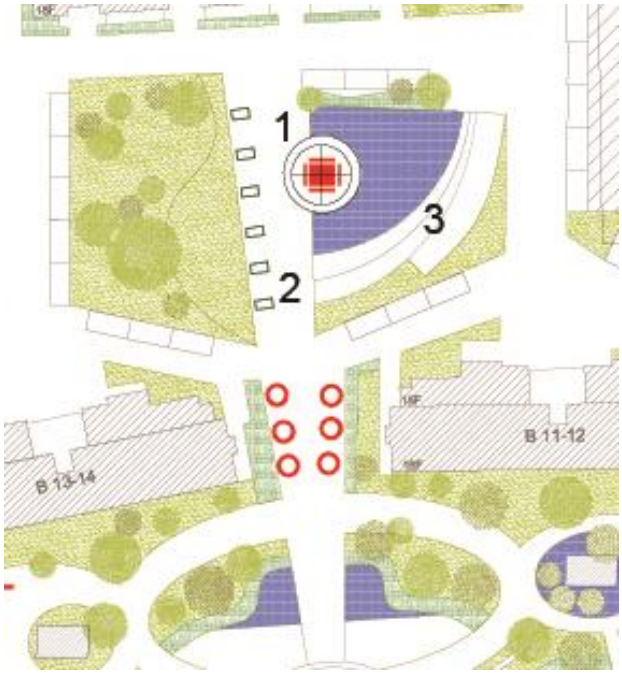


Fig. 4-47 Zones of secondary square of CSMH

On the other hand, it is also relevant to stress the design of the BC in CBH. While in CSMH the BU´s entrances usually face each other opening onto a common space, in most cases of the CBH, the entrances of the buildings face the back of the opposite BU. Thus, the section of the spaces between buildings is organised as follows: building entrance + traffic road with parking lot + green area + building back (Fig. 4-48). This section is repeated in most of the communities visited in Shanghai contrary to the trend of the compounds in Ningbo (pilot study), which follow the same distribution than CSMH but with more intimate courtyards (Fig. 4-49).

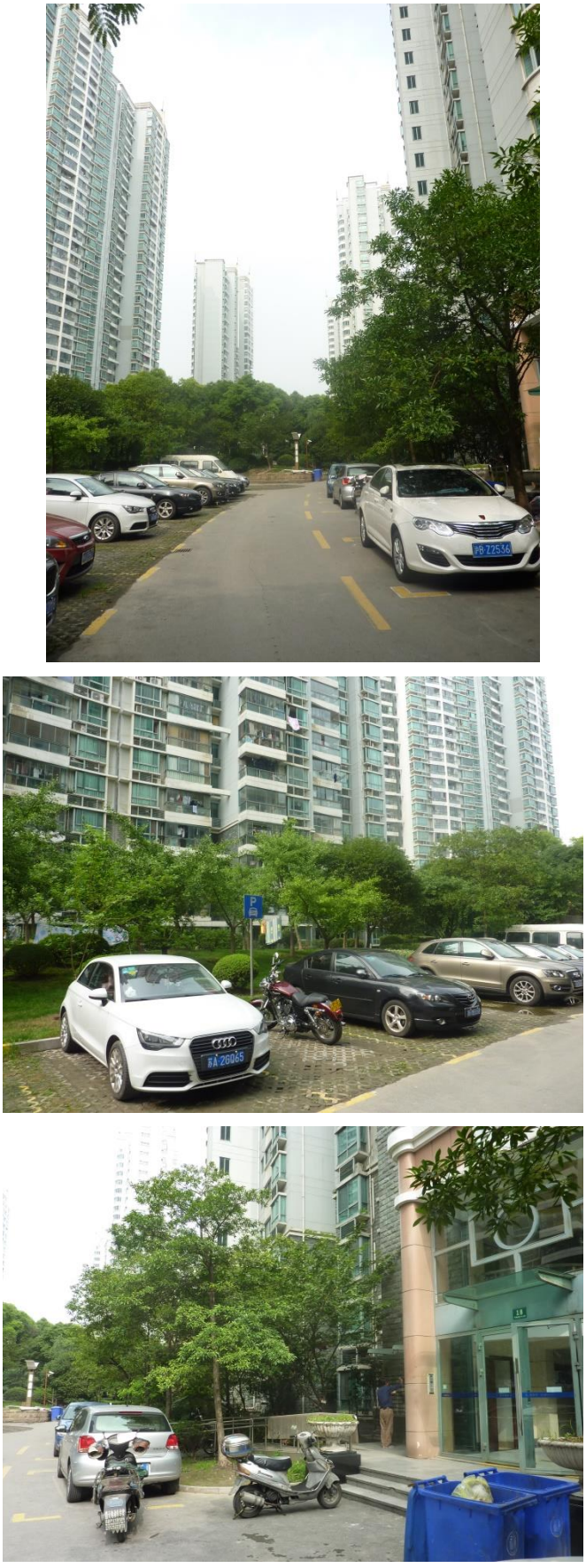


Fig. 4-48 Space between buildings (BC) in CBH

Fig. 4-49 Space between buildings (BC) in community from pilot study in Ningbo

Thus, the Shanghainese model seems to look for greater independency between neighbours through inaccessible extensive green areas to isolate buildings instead of designing them to be used by the residents and enhance their relationship. This model decreases the chance of encounters between neighbours of different BC´s and their potential feelings of belonging and collective ownership. Also, the large inaccessible green areas – only used to hang out washing - and the remarkable occupation of walkable zones by cars - due to the lack of parking spaces - result in a significant decrease of the leisure space, which is reduced to the main square(s) of the community. This situation is particularly undesirable in high-rise communities, given the great distance between buildings and the built environment which is

not conducive to building bonds with other neighbours. However, the same section in medium rise communities - although it is not especially advantageous - generates smaller green areas that, in some cases, are used by the residents as an extension of their house or to plant flowers (see CSM and CBM) (Fig. 4-50 and Fig. 4-51). In these other cases, the resident is likely to develop a certain physical attachment and identity to the place by appropriation and personalization. This may increase his/her willingness for social interaction, and also increase the chances of meeting others by spending more time in the outdoor space.

Fig. 4-50 Territorialisation in CSM

Fig. 4-51 Territorialisation in CBM

Contrary to CBH, the building height of CBM – one of the communities with stronger social bonds - favours the development of social ties between residents. However, the design of its central square and the size of the courtyards reduce the use that residents make of the outdoor space. This is remarkable when comparing the better-performing communities. On one side, CBM has lower R_{BC} (r_{CSL}=-0.34; r_{CBMH}=-0.26), TS_{BC} (not statistically significant) and F_{BC} (r_{CBMH}=-0.42) than CSL and CBMH despite the fact that the number of residents per BC in CBM is lower than in the case of $CBMH_2$. On the other hand, the results of CBM at the X initially seem contradictory since it has the highest R_X but low F_X (r_{CSL}=-0.34; r_{CBMH}=-0.40). These results indicate low contact between the CBM´s residents in the outdoor space of their communities (BC and X) but great familiarity at the X level. This argument is supported by the variables TI at both levels and F_D since the former has the highest value of all communities and the latter the second highest value (table 4-16). Thus, the residents know each other and have a close enough relationship to meet at their dwellings and take the

initiative to talk with their neighbours although they do not usually meet at the outdoor spaces of their communities. The explanation for these results is mainly based on its built environment and the design of the outdoor spaces.

Regarding the outdoor spaces, the central square of CBM has an excessively elongated shape and a large size thus generating an inhuman scale that encourages the dispersion of occupants and hinders their interaction (Fig. 4-52) – the opposite to the aforementioned case of CBH. Regarding the spaces between buildings, the medium size of the courtyards is inconvenient for interaction. On the one hand, the distance between buildings is small and the residents living around, particularly those on the lower floors, can be disturbed. Indeed, a clear example of this was observed in the CSL_2 where the residents never use the lateral courtyards and the neighbours have even taken away the stone table-top of the public furniture to avoid other residents going there to play games (Fig. 4-53). Thus, the medium-sized courtyards acquire a private character through intangible boundaries that are defined by its dimensions. In this regard, it could be argued that CSL_1 (*shikumen*) has even smaller sized spaces between the houses but the effect is the opposite. However, in the case of CSL_1, the significant closeness between the houses, the reduced indoor living spaces and the environmental conditions of the dwellings (lack of daylight and ventilation) lead the residents to occupy the streets with personal belongings and keep the doors open out of necessity (Fig. 4-54). Moreover, residents in CSL_1 hang their clothes out in the streets and prepare their food, and eat as they go in and out of their houses, and therefore this space actually becomes an extension of the house (Fig. 4-55).

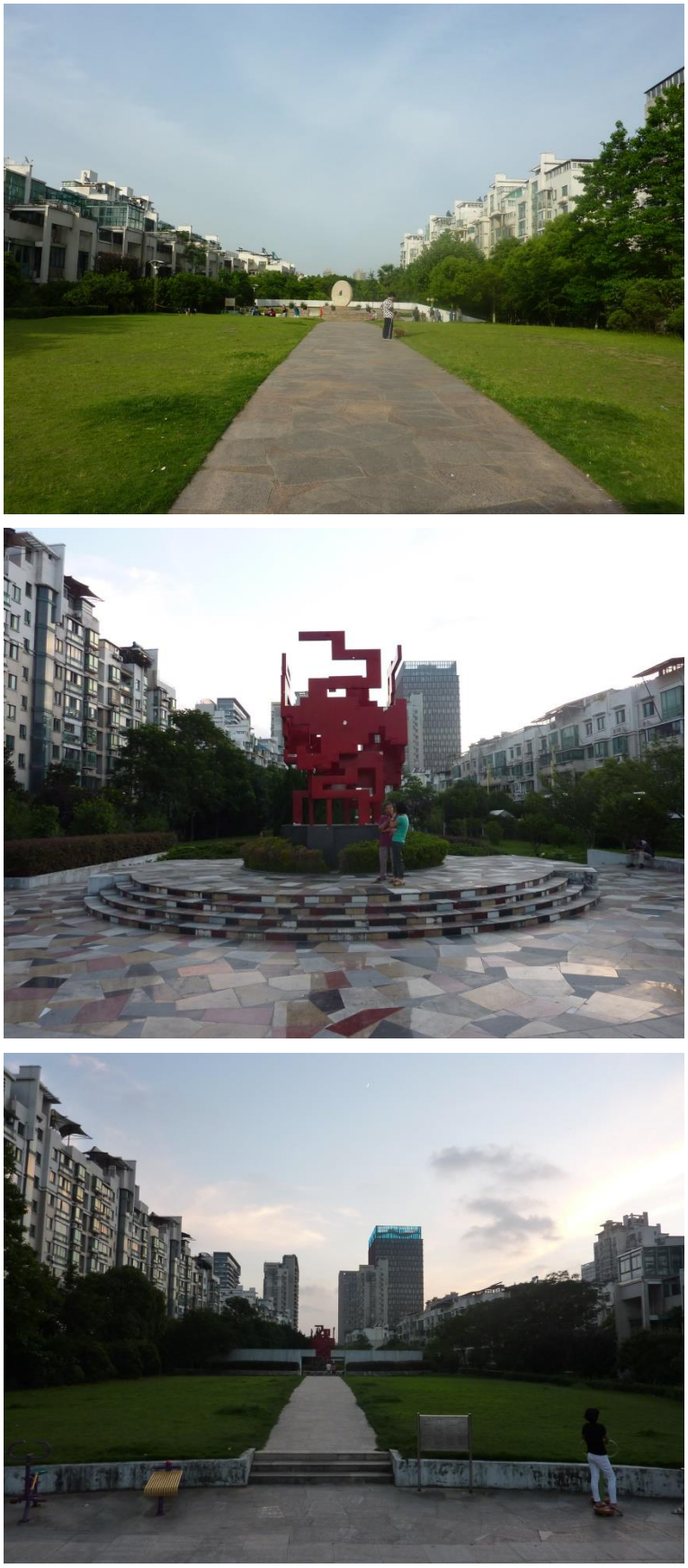


Fig. 4-52 Image of main square of CBM

Fig. 4-53 Public furniture of secondary plaza of CSL_2

Fig. 4-54 Extension of the dwellings to the outside in CSL_1

Fig. 4-55 Territorialisation in CSL_1

In addition to the possibility of disturbance, the medium size of the CBM´s courtyard can cause social discomfort to the users by making them feel obliged to interact with other residents due to their physical proximity and probably being recognised. This issue seems to be quite relevant for the Chinese. Although they enjoy social contact and love *social heat*, they need to have the freedom to decide whether or not to participate actively or only by observation – conclusion obtained through interviews. In this regard, the two CBMH are quite successful since they provide an appropriate size between buildings so as to avoid disturbance and situations of social discomfort. Also, the two CBMH communities lack a clearly recognizable central square while the facilities and public furniture are distributed throughout the communities in the courtyards (for $CBMH_1$) or in the spaces positioned transversely to the buildings (for $CBMH_2$) (Fig. 4-56 and Fig. 4-57). This design strategy is rather wise, since the provision of facilities in the courtyard or in the immediate transverse space motivate and at the same time justify the use of those spaces which mix neighbours of adjacent BCs, avoiding possible situations of social discomfort and increasing the social bonds at both levels (BC and X).

Fig. 4-56 Facilities in $CBMH_1$

Fig. 4-57 Facilities $CBMH_2$

Indeed, a good example of this design strategy are spaces 1 and 2 in $CBMH_2$ – the community with the highest Mn Rank for F_{BC} (464.33), F_X, (465.79) and F_J (400.46) (table 4-16). Both spaces are particularly successful in comparison with space 3, which is always completely empty (Fig. 4-58). Space 1 is designed along the street and provided with training machines and benches. Many residents use this space often despite the very annoying number of mosquitos present in that area due to the extensive surrounding green areas. However, its transverse position promotes the circulation of people while other residents do exercise, or just sit and observe. Also, the way the benches are grouped and their

positioning back to back is worth noting (Fig. 4-59). This distribution, intentional or not, reflects the Chinese character. The benches are grouped together to provide the function of observing while their positioning in relation to each other avoids direct contact with others, given the reduced physical distance (social discomfort).

Fig. 4-58 Spaces 1, 2, 3 of $CBMH_2$

Fig. 4-59 Positioning of benches in spaces 1 of $CBMH_2$

Space 2 is the most successful outdoor space in the whole community. It has only 4 benches and a table where people gather to chat and play games. Even so, many residents go there in the evening with their children to walk or cycle around the central elevated area. The

remarkable social success of this square was astonishing at first, since it is the noisiest space in the whole community, given its proximity to a very large external traffic road. Indeed, the collection of data (surveys) was done at this point on the recommendation of an officer of the social administration. Communication with the residents was, at certain times extremely difficult due to the acoustic pollution. However, its location within the community is vital since it assembles the connection of spaces 4 and 5 at the same time as there is an intensive flow of people through one of the gates (Fig. 4-60). This intensifies the chances of sociability and social heat. The opposite case is space 3 (Fig. 4-61), which is quiet, large and provided with public furniture but is always empty given its position on a raised level and the lack of casual circulation of people – a similar situation to that in CSMH.

Fig. 4-60 Space 2 of $CBMH_2$

Fig. 4-61 Space 3 of $CBMH_2$

Thus, although the medium building height seems to favour the creation of a favourable atmosphere for trust and familiarity, the dimensions of the spaces between buildings discourage residents from using them. The analysis of CSM confirms these outcomes, since this compound has low values of R and TS at both levels while it is the second-place community (after CBM) in taking more the initiative to interact with other residents (TI) of the X. Thus, the residents in this built environment feel confident to trust others and take the initiative to interact with them even if they do not even recognise each other. However, special attention must be paid to the design of the space between buildings to avoid disturbing neighbours and encourage relationships. Also, the design of the central space and topology are crucial to reinforcing the development of bonds.

The results expressed for the success or failure of outdoor spaces in the communities is supported by an analysis of the time that residents spend in them. Thus, residents of CSMH (Mn_{winter}=37'; Mn_{winter}=45') and CSH (Mn_{winter}=39'; Mn_{winter}=40') are those spending the least time in the shared spaces of their communities, followed by CBM (Mn_{winter}=64'; Mn_{winter}=73'). On the other hand, the residents from CBH (Mn_{winter}=92'; Mn_{winter}=103'), $CBMH_1$ (Mn_{winter}=80'; Mn_{winter}=89'), $CBMH_2$ (Mn_{winter}=85'; Mn_{winter}=91') and CSL (Mn_{winter}=91'; Mn_{winter}=93') are those using more the shared spaces of their communities during the whole year (for detailed data see table B-29 in appendix B). These results show the influence of the quality of the design of the outdoor spaces and the possibility of having *social heat* on the time that residents spend in these shared spaces. As mentioned through this section, the design of the shared spaces of CBH, $CBMH_1$, and $CBMH_2$ are the most successful among the communities studied to enhance interaction between residents. On the other hand, CSMH, CSH and CBM have lower values for time use at the same time as their outdoor spaces have been stressed as not successful. Indeed, the comparison of the central squares of CBH and CBM is a clear example of the impact that the design can have on the time spent in the outdoor space. While residents of the CBM spend a yearly average of 69 minutes, those from CBH tend to spend 30 minutes more despite having weaker ties.

4.4.3. Comparison of social network between physical levels

The statistical comparison of the density and strength of ties between the physical levels of each community, further clarify the bonds between residents in association to the place and provide insights about whether the ties at one level may discourage or promote the development of bonds at the other. Data about R, TS and TI are collected for all the communities while for F the comparison is only feasible for CBM, $CSMH_2$ and CBH (due to limitations of the research in the collection of data).

Considering the whole population, there is a general trend towards larger R, TS, TI and F at all places between neighbours of the same BC than with other neighbours of the X, although the difference is only statistically significant for R (r=-0.25) and F_{BC} (r=-0.15) (table 4-17, for detailed data see tables B-30 to B-33). On the other hand, looking at each community, CSL, $CBMH_1$, and CSH are those with a larger difference between levels throughout all the

variables measuring the number of ties, (table 4-17 and 4-18, for detailed data see tables B-30 to B-33), there being more bonds at the BC level. The reason is that these are the only three communities from the field work that lack an indoor and an outdoor central common space where one can meet, consequently limiting the development of bonds at the X level. Moreover, the design of CSL_1 and CSH particularly hinder spontaneous encounters between residents at the X level. In the case of CSH, this significant difference can be perfectly explained by the aforementioned division of the community into two parts by the layout and the position of the gates (Fig. 4-62) (for R r=-0.52; for TS r=-0.28). Meanwhile, the reticular layout of CSL_1 and the accessibility to the compound from each side of the plot define very direct paths home so reducing the chances of an encounter (Fig. 4-63). Also, the reduced size of the space between buildings in CSL and their occupation with personal belongings may constrain the circulation of other neighbours by territorialisation unless it is necessary. This common “street ownership by appropriation” by the BC´s neighbours, living close to each other, may at the same time further intensify their relationship, which is already strong due to proximity and daily contact.

Fig. 4-62 Division of CSH plan

Fig. 4-63 Plan of CSL_1

Also, $CBMH_2$ follows the same tendency as the above group of communities, there being more ties at the BC than at the X, although these differences are statistically significant only for R (r=-0,37). Similar to CSL, $CBMH_1$, and CSH, $CBMH_2$ lacks a clearly defined outdoor central square and there is a rich distribution of equipped smaller spaces throughout the community (Fig. 4-64). This may encourage the development of ties with residents living nearby. However, the presence of two indoor shared spaces that work successfully must be the reason for the difference between levels not being as dramatic in this case as in the three above.

Fig. 4-64 Several equipped spaces distributed throughout the $CBMH_2$

In contrast to the above group of communities, CSMH and CBH tend to have higher R, TS, TI and F at all places with the X´s residents than between residents of the same BC, which is statistically significant for TS (r_{CSMH}=-0.27; r_{CSH}=-0.21) and for TI (r_{CSH}=-0.28). These communities share two main characteristics: they have a central common space that performs well – in the case of CSMH the secondary square -, while the lack of liveable spaces between buildings – a design unfavourable for encouraging interaction between BC´s neighbours. Comparatively, it could be claimed that the courtyards of the medium-rise communities do not work well either, but their trend for R (r_{CSM}=-0.22) and TS is inverse, there being more ties with neighbours of the BC than with those of the X. However, the reasoning for this apparent contradiction is based on the atmosphere created by the built environment. The lower building height and lower density of the medium-rise communities facilitate recognition and feelings of trust and familiarity between residents and therefore the development of ties at this level despite the outdoor spaces not functioning well, socially. This idea is reinforced by the subtle difference between levels for TS and TI in the medium-rise communities which indicates a willingness to interact with residents, without distinction, from the whole community based on this feeling of familiarity.

Table 4-17. Wilcoxom for recognising by visual contact and taking sporadically by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
Recognising by visual contact by levels						
General					**0.000*** **	**-0.25**
Xiaoqu	2.62	294[a]	185.08	748		
Courtyard	3.04	78[b]	191.85	754		
Ties		365[c]				
By community						
CSL					**0.000*** **	**-0.45**
Xiaoqu	2.88	45[a]	25.87	79		
Courtyard	3.76	4[b]	15.25	83		
Ties		30[c]				
CSM					**0.001** **	**-0.22**
Xiaoqu	2.65	38[a]	26.18	104		
Courtyard	3.04	13[b]	25.46	104		
Ties		52[c]				
$CBMH_1$					**0.000*** **	**-0.39**
Xiaoqu	2.59	46[a]	29.47	86		
Courtyard	3.25	9[b]	20.50	85		
Ties		30[c]				
$CBMH_2$					**0.000*** **	**-0.374**
Xiaoqu	2.84	46[a]	26.49	101		
Courtyard	3.54	5[b]	21.50	103		
Ties		50[c]				
CSH					**0.000*** **	**-0.519**
Xiaoqu	1.94	65[a]	34.17	99		
Courtyard	2.71	2[b]	28.50	100		
Ties		32[c]				
Taking sporadically by levels						
By community						
CSL					**0.000*** **	**-0.317**
Xiaoqu	3.19	27[d]	17.43	79		
Courtyard	3.69	5[e]	11.50	81		
Ties		46[f]				
CSMH					**0.002**	**-0.268**
Xiaoqu	2.93	8[d]	10.44	70		
Courtyard	2.53	22[e]	17.34	70		
Ties		38[f]				
$CBMH_1$					**0.004**	**-0.219**
Xiaoqu	3.08	22[d]	13.77	86		
Courtyard	3.36	5[e]	15.00	84		
Ties		57[f]				
CSH					**0.000*** **	**-0.276**
Xiaoqu	2.67	27[d]	16.20	98		
Courtyard	3.01	4[e]	14.63	100		
Ties		67[f]				
CBH					**0.005**	**-0.205**
Xiaoqu	3.15	12[d]	11.21	97		
Courtyard	2.70	22[e]	20.93	97		
Ties		60[f]				

a. Recognise by visual contact most residents of X < Recognise by visual contact most residents of BC

b. Recognise by visual contact most residents of X > Recognise by visual contact most residents of BC

c. Recognise by visual contact most residents of X = Recognise by visual contact most residents of BC

d. Talk sporadically with many residents of X < Talk sporadically with many residents of BC

e. Talk sporadically with many residents of X > Talk sporadically with many residents of BC
f. Talk sporadically with many residents of X = Talk sporadically with many residents of BC

Table 4-18. Wilcoxom for taking initiative and frequency by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
Taking initiative						
By community						
CSL					**0.020***	**-0.187**
Xiaoqu	2.81	18[a]	12.72	78		
Courtyard	3.08	6[b]	11.83	82		
Ties		54[c]				
$CBMH_1$					**0.032***	**-0.164**
Xiaoqu	2.82	16[a]	10.78	86		
Courtyard	2.95	5[b]	11.70	85		
Ties		64[c]				
CBH					**0.000*****	**-0.282**
Xiaoqu	2.90	3[a]	4.00	97		
Courtyard	2.42	20[b]	13.20	94		
Ties		71[c]				
Frequency by pace of interaction						
Courtyard						
General					**0.012***	**-0.15**
Xiaoqu	2.85	35[d]	22.57	688		
Courtyard	2.61	12[e]	28.17	146		
Ties		94[f]				
CBM					**0.001****	**-0.29**
Xiaoqu	2.51	21[d]	11.60	84		
Courtyard	2.74	2[e]	16.25	72		
Ties		46[f]				
Xiaoqu						
CBM					**0.046**	**-0.175**
Xiaoqu	2.53	14[d]	9.11	81		
Courtyard	2.67	4[e]	10.88	73		
Ties		47[f]				

a. Take the initiative to socialise with the residents of X < Take the initiative to socialise with the residents of BC
b. Take the initiative to socialise with the residents of X > Take the initiative to socialise with the residents of BC
c. Take the initiative to socialise with the residents of X = Take the initiative to socialise with the residents of BC
d. Frequency to socialise with the residents of X < Frequency to socialise with the residents of BC
e. Frequency to socialise with the residents of X > Frequency to socialise with the residents of BC
f. Frequency to socialise with the residents of X = Frequency to socialise with the residents of BC

4.4.4. Regression analysis

The regression analysis has been carried out using binary logistic regression since multinomial regression could not be used given the large number of variables and the sample size of the data. The solution adopted consists of reducing the scale of the dependent variables to dichotomous by suppressing the neutral option of the scale and grouping strongly disagree and disagree in “disagree”, and strongly agree and agree in “agree”.

All of the predictors included have been demographic variables, the environmental quality of the X, and the continuous independent variables of height, size and density of the community. The environmental quality of the BC has not been considered here since this variable was only included on the complete questionnaire and not in the simplified one (due to limitations to the length of the questionnaire). Thus, including this variable would have resulted in a reduction of the valid sample size to around 50, which is too small to consider such a large number of variables.

As explained previously, it must be clarified that the regression analysis does not aim to reduce the social bonds between people to a formula, but merely to obtain a comparative estimation of the weight of each independent variable on social ties. The results from the regression analysis perfectly match the conclusions extracted through the previous statistical analysis. The following table 4-19 shows the summary of the formulas.

Table 4-19. Regression analysis - formulas for the variables of social ties

Density of ties	R	BC	$4.79 + 0.81D_{Length} - 0.69D_{Income} + 0.51E_{AQ} - 0.16D_{Origen} - 0.15P_{Size} - 0.15P_{SC} - 0.12P_{PR} - 0.09D_{Owner}$
		X	$0.83 - 0.48\ D_{Income} + 0.44\ D_{Length} - 0.16P_{Height} + 0.15D_{Age} + 0.09D_{Background}$
	TS	BC	$40.55 - 0.14P_{Size} + 0.11D_{Age}$
		X	$20.28 - 0.44\ E_{AQ} + 0.13D_{Age} + 0.11D_{Gender} - 0.07\ P_{PR} + 0.06D_{Owner}$
	TI	BC	$21.52 - 0.13D_{Origen} - 0.08\ P_{Height}$
		X	$0.28D_{work} + 0.13D_{Owner} + 0.13D_{Gender} + 0.12\ D_{Background}$
		J	$-16.94 - 0.39D_{Income} - 0.18D_{Origen}$
Strength of ties	F with x neighbours	D	$37.89 + 0.51E_{AQ} - 0.25P_{SC} - 0.21D_{Educa.} - 0.16P_{Size} - 0.15P_{Height} + 0.14\ D_{Background}$
		BC	$-22.51 - 0.66E_{Temp} - 0.42P_{SC} - 0.40D_{Educa.} - 0.32P_{Height} - 0.26P_{Size} + 0.16\ D_{Age}$
		X	$-10.25 - 0.82E_{Temp} + 0.36E_{AQ} - 0.32P_{PR} - 0.32D_{Educa} - 0.26P_{SC.} + 0.25P_{Size} + 0.19\ D_{Age} + 0.10E_{OverallQ}$
		J	$18.14 - P_{SC} - 0.88P_{Height} - 0.72E_{Temp} + 0.57P_{PR} + 0.55D_{Length} - 0.18D_{Origen}$

The demographic variables follow the same trends explained in previous sections and play an important role for the recognition of neighbours (R) and taking the initiative to socialise (TI). At the same time, environmental conditions and the physical independent variables – density, community size and building height- have the greatest impact on the frequency of meeting (F). Indeed, the weight of temperature ranges between 0.66 and 0.88 for the frequency of socializing in the outdoor spaces and the jiedao. Additionally, the physical variables influence almost every measurement of social ties to a varying extent. The impact of the community size ranges between 0.15 and 0.26, the ties at the BC (R_{BC}=-0.15; TS_{BC}=-0.14; F_D=-0.16; F_{BC}=-0.26) decreasing and the F_x (+0.25) increasing as the size increases. On the other hand, the weight of the building height has a wide range for different variables going from -0.08 to -0.88. According to the results, the increase in height impacts on the

decrease of R_x (-0.16), TI_{BC} (-0.08), F_D (-0.15), F_{BC} (-0.32) and F_J (-0.88) and has the greatest impact on the frequency of meeting at the BC and the J –places associated in this research to closer bonds. Finally, in relation to density, its weight ranges from -0.15 to -1 for site coverage, and from -0.07 to +0.57 for plot ratio. The increase of site coverage influences the decrease of R_{BC} (-0.15), F_D (-0.25), F_{BC} (-0.42), F_X (-0.26), and F_J (-1), particularly weakening the strength of ties – this is probably due to less land being available for outdoor shared spaces. In the same way, the increase in plot ratio decreases the R_{BC} (-0.12), TS_X (-0.07), and F_X (-0.32) and has a larger impact on the F_x.

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND FUTURE RESEARCH

5.1. Introduction

This investigation has explored the need of citizens living in large cities or megacities for bonding in a local context such as that of the Chinese gated communities in order to improve their social quality of life. These residential units have been proposed here both as great opportunities for humanizing the scale of megacities and as a means of achieving social integration. The adequacy of various features of their built environment for encouraging social interaction and bonding between residents has been investigated. Thus, basic morphological aspects, such as building height, density and population size, and certain design features of these gated communities have been examined in relation to their influence on the social ties between neighbours.

To achieve this, a review of the evolution of residential walled units in China together with the understanding of the Chinese social needs – emotional and instrumental - and behaviour through the analysis of their philosophies, beliefs and history has guided the setting up of this investigation. Thus, in order to approach the resulting research objectives, nine case studies have been investigated and compared in Shanghai.

In conclusion, this chapter firstly focuses on responding to each of the research questions and hypotheses created, providing a broad overview of the main outcomes in relation to social quality of life and the impact of urban form and other design features on social networks within gated communities. In the second section, the challenges and limitations of the research are shown. The third section provides guidelines for urban planners and urban designers as well as recommendations for future researchers. Lastly, further research lines of investigation are suggested in order to corroborate, broaden and complement this investigation.

5.2. Hypothesis verification and guidelines

The hypotheses related to objective 1 (further detail in section 3.3.2) are supported by the results of this investigation. Thus, Chinese city dwellers show a social need for bonding within their communities, particularly in disadvantaged groups, while presenting a dissatisfaction with the actual strength of ties. This result has a twofold outcome in relation to the conceptual framework of this research and the significant social and urban planning implications.

On one side, the concepts of social capital and cohesion defined here and adapted from the Social Quality Model to the scale of gated communities (further detail in section 3.1) are demonstrated to be relevant for social quality of life of the residents. In addition, the definition of social quality of life – reinterpreted from Beck at al (2001) – through the threefold relationship between social network, social sustainability and social standards (Fig. 5.1), has greatly contributed to testing and calibrating real social needs – emotional and instrumental support at an individual and collective level - of Chinese urban residents in comparison to the current social bonds within their gated communities. Furthermore, this conceptualization allows us to envisage such social needs, despite the existence of certain level of social life and cooperation triggered by their collective character, social norms – due to their culture, history and philosophies (further detail in section 2.2.1) – and the work of the social administrator and residents committee. This means that, despite the existence of a certain degree of social capital and cohesion, this remains insufficient in terms of ensuring social quality of life. Thus, giving a relevant role to social standards and questioning the benefits associated with social sustainability – social capital and cohesion in this case – bring us closer to the "unknown" and the evolving Chinese social realm. Other interesting research has also looked at social capital, cohesion and networks in this context (Forrest & Yip 2007b; Hazelzet & Wissink 2012a; Farrer 2002; Bartolini & Sarracino 2015), but none of this research has considered these aspects simultaneously and in conjunction with the characteristics of a community and their social standards. However, the inclusion of all these variables shed light on the social interests or needs of the Chinese population and their codes of interaction, providing a clear understanding of what social quality of life means in this context.

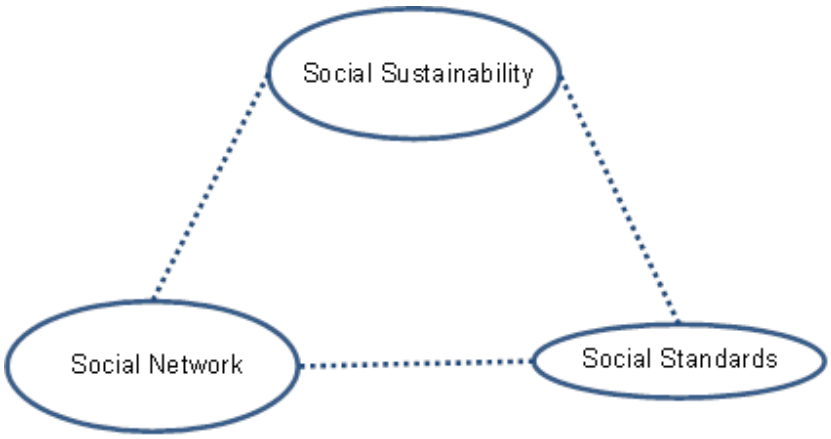


Fig. 5-1 Main components of the social quality of life

On the other side, apart from the adequacy of the conceptual framework, the implications of these results should be taken into account from urban planning and design perspectives on behalf of the social quality of life of the citizens. It is significant that, despite the change to a market economy and the "urban growth revolution", social ties in a local residential context

are still relevant for the inhabitants of megacities in China. It seems that the traditional Chinese lifestyle in walled residential spaces – courtyard houses and *danwei* –, their collectivistic culture and philosophies - which prioritize the social over the individual - has not been eroded by technological development, urban growth - associated to the alienated character of city dwellers, "lostness and despair" (Reynolds 1972; Bailey & Mabbett 2003) -, and the change to the capitalistic financial system. However, there is great disparity between reality and desire, which must be partially affected by the new urban form.

Indeed, this research has found that three quarters of the participants strongly agreed that is important for them to socialise with residents from their communities, while 71% stated that they never or rarely did so. Also, those who do socialize have weak bonds since they usually do so in the shared spaces of the community, but rarely at the spaces associated here to more intimate bonds – dwelling and *jiedao*. Similarly, 83% of the residents would like to have more social capital (count on their neighbours) within their communities, but only 53.8% had it. Likewise, it is worth noting that 84% of the sample never or rarely participate in activities, while almost 50% consider it important or very important to have the chance to do so.

Furthermore, the analysis of data by comparison of different demographic groups shows that low income, low educational level, migrants and rural people tend to have fewer but stronger ties within the community. This finding is also supported by previous investigations (Yuqi Liu, Wu, et al. 2017; Hazelzet & Wissink 2012a; Forrest & Yip 2007b; Farrer 2002; Zhu, Breitung & Li 2012; Bartolini & Sarracino 2015; Li et al. 2012; Huang et al. 2018; Wu & Logan 2014) and shows the difficulty of these disadvantaged groups in integrating at the same time as their need for bonding – affectional and instrumental - (Yuqi Liu, Zhang, Wu, et al. 2017). This outcome is highly relevant, since a large proportion of the inhabitants of large Chinese cities and megacities are migrants – urban population has increased in China more than 620 million between 1982 and 2018 according to the NBS-National Bureau of Statistics of China - , and in many cases come from rural contexts – rural population has decreased more than 243 million between 2000 and 2018 according to the NBS-National Bureau of Statistics of China – (further detail in section 1.2). Indeed, the rural-urban migration process has been one of the main triggers for enormous urban growth in China, and their need for quality of life should not be disregarded. Indeed, local residents of large Chinese cities can also feel isolated and in need of this emotional and instrumental support, given the social impact of the rapid reconstruction and urbanization process of many cities in China, including the demolition of a large proportion of low-density traditional communities.

Therefore, despite there being a need for bonding with the neighbours and certain conditions that might favour such relationships –facilities, shared outdoor spaces, delimited and controlled spaces in which to feel safe and within a group, the action of social administration office, etc. - the actual ties are weaker than desired. Considering this finding, it seems contradictory and unthinking to suggest the abolition of the gated community model - which represents the local social units remaining in megacities - instead of considering why those

communities are not accomplishing the requirement for social quality of life. The reasons for defending this model in Chinese megacities are of a diverse nature.

On one side, gates favour the common ownership of an outdoor space which brings residents together for a common purpose. Dealing with the management company brings all residents together to fight for their common interests, which turns into a reason for developing empathy and union with the rest. Also, sharing the same desires to maintain a shared space may introduces a certain sense of equality among residents which may reduce the distance between different demographic groups. This fact most likely affects the feelings of identity and sympathy towards the neighbours (Casakin & Neikrug 2012), so facilitating the development and strengthening of their ties (Lu et al. 2018). On the other hand, the work of the social administrator together with the residents committee encourage the participation of residents in activities organised within the community and lead them to take the initiative to interact with other residents. Thus, private governance and the social institutions within the gated communities contribute, in one way or another, to building feelings of place-identity and attachment as well as boosting the social ties between residents. Furthermore, the clear definition of a place, and most of all a place of residence, represent an important nucleus of sentiment which is associated with the concept of “being at home” or “being me”, connecting one’s personal identity with a particular environment (Dovey 1985; Hauge 2009; Cuba & Hummon 1993; Kasarda & Janowitz 1974). Also, the association of the self with a defined physical environment is developed through interaction with other people in a familiar context which can favour a sense of shared interests and values bringing a sense of belonging and order to one´s socio-spatial world (Relph 1976; Cuba & Hummon 1993).

However, on the other side, demolishing the walls and opening up the Chinese gated communities would blur the boundaries of these social groups. Residents would refuse to continue paying the fees for the maintenance of the complex leading probably to a deterioration of the aesthetics of the area - diminished feeling of place identity and attachment. The sentiment of common ownership would be broken and the idea of “community construction” impeded. Furthermore, the claim that the social segregation produced by the gates, which sustains the defence of the end of this walled residential model, should be questioned and approached from a different perspective. Indeed, gates *per se* should not be considered the main element producing social segregation. The wealth gap introduced by the market economy and the inequalities in access to education, health and housing present in megacities, and exacerbated in China by the *hukou*, are the basis reasons for this segregation. Otherwise, it should be questioned whether the work units produced segregation or it was only a division of the citizens organised by mixed groups in different communities. Indeed, social cohesion and close ties have been highlighted as remarkable in Chinese *danwei* (Whyte & Parish 1984; Besharov & Baehler 2013; Forrest & Yip 2007b; Y. Huang 2006), which also was a gated community. Thus, it should be considered if reducing social segregation can be more easily achieved by integrative policies

than by opening the gates of communities. Policies that require the inclusion of social housing in every community, regardless of economic level, and that facilitate the distribution of migrants through gated communities, could be more efficient. In addition, reducing the limitations of *hukou* to facilitate migrant integration and offering the same opportunities as locals would contribute to reducing the distance between social classes that are defined not only by aspects such as economic and educational level, but also by an individual's origins. Indeed, opening gates would not avoid segregation at city level since different socio-economic groups would be anyway organized by areas in the city, neighbourhoods and blocks. However, the introduction of traffic within the communities will extend the chaos, pollution and noise to the whole metropolis and the pockets of peace that can now be found all around the city will vanish.

To sum up, the feelings toward the place and the sense of belonging to a sub-group within a megacity will disappear, weakening even more the ties between residents, eroding local social support and leading to more isolated people in a highly populated place. As Lu et al (2018, p.146) state quoting Wu (2012, p.552) *"gating does not necessarily lead to the end of community participation and engagement, but helps to build the internal solidarity of neighbourhoods".* Thus, the abolition of the gated community model should be reconsidered, taking into account all these aspects and citizens' need for local bonding to improve social quality of life.

Accordingly, this research defends the idea of a possible co-existence within a megacity of the *Gemeinschaft* (community) and the *Gesellschaft* (association) models that Tönnies (2011) differentiated. On one side, gated communities provide an opportunity to create local bonding based on personal ties and common purposes, alleviating the *blasé* attitude defended by Simmel (1976), the *schizoid* character defined by Wirth (1938) and the *anomie* described by Durkheim (1963, 1997) for urban personality. In this way, the relationships within the gated community can compensate for the individualism, alienation and superficial relationships associated with dense, heterogeneous and large-population cities (Tönnies 2011; Durkheim 2005; Simmel 1976; Wirth 1938). However, this local experience can be simultaneously enriched by all the opportunities that a megacity offers, and the sociological advantages of urbanism that Fischer (1995) expressed in the "Subculture theory" - ties can be built on common interests, and urban social heterogeneity can foster new, diverse, and rich subcultures. Why should we allow the devastation of traditional and local bonding by the overwhelming engine of megacities, and thus deprive citizens of the possibility of leading both lifestyles? The proper design of gated communities could facilitate the development of such residential social networks, the integration of disadvantaged social groups, and the development of feelings of identity and attachment to place. Thus, gated communities could be understood as oasis where the human scale gains some protagonism over the multi-faceted and dynamic megacitymachine.

These reflections lead to the hypotheses of the second objective of this research, which relates to the impact of the built environment on the social interaction between residents, and the way in which their social quality of life may be improved through the design of Chinese gated communities. To this end, the relationship between the built environment - building height, built density (plot ratio and site coverage) and population size - and the social network and social sustainability – social capital and cohesion - variables is addressed considering also the standards of the residents for the quality of the built environment (Fig. 5-2).

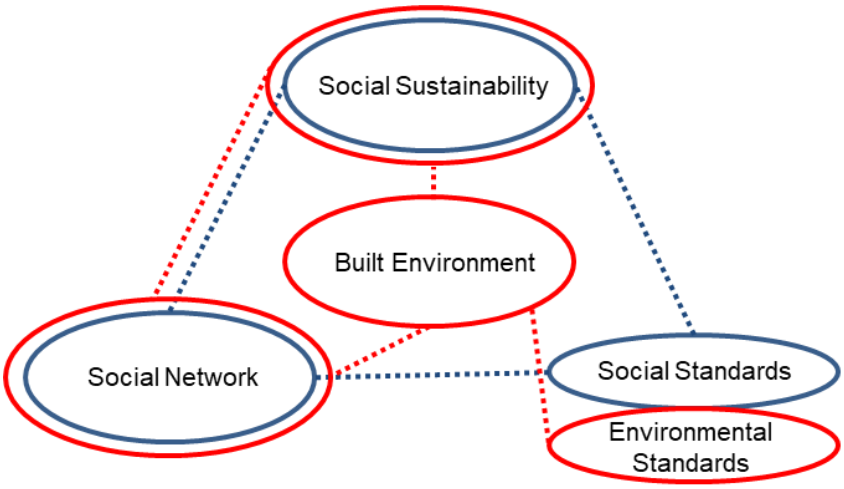


Fig. 5-2 Main components of the social quality of life in relation to the built environment

The results support hypothesis 3 (related to building height) and contradict the 5 (related to population size), while no clear response is obtained for hypothesis 4 (related to density) (further detail for hypotheses in section 3.3.2.).

Thus, in relation to hypothesis 3, this research finds that building height has an effect on the social bonds between the neighbours of gated communities. Low, medium and medium-high-rise communities perform better than high-rise communities in this regard. The threshold is set at around 20 floors according to the results of this research. The exact reasons for this result cannot be specified since researching into why high-rise buildings hinder the development of bonds between residents was beyond the scope of this investigation. Previous literature review supports this trend through much investigations conducted in the West (Gifford 2007a; Newman 1975; Ekblad & Werne 1990; Husaini et al. 1991; Saegert 1982; Ineichen & Hooper 1974; Richman 1977; McCarthy & Saegert 1978; Bordas-Astudillo et al. 2003; Saegert 1979; Jephcott 1971; A Churchman & Ginsberg 1984; S Bochner et al. 1976; C Korte & Huismans 1983; Sinnett et al. 1972; Whyte & Parish 1984; Nadler et al. 1982; Bynum & Purri 1984; Holahan & Wilcox 1979; Bickman et al. 1973; Edwards et al. 1982; Zito 1974) and some recently in the Chinese context (Ekblad & Werne 1990; Li 1998; Tian 1997; S. Huang 2006; Forrest et al. 2002). They associated this effect

with different aspects produced by high-rise buildings, such as fear, mistrust and emotional heath (Gifford 2007a; Newman 1975; Ekblad & Werne 1990) – see Chapter 2 section 2.3.3. for an in depth literature review.

In the case of Chinese gated communities, apart from the effect that living in a high-rise building can have, the impact on the space between buildings is also significant. Streets within the community become wide and impersonal, and the close relationship between buildings in the old neighbourhoods disappears. Spaces between buildings acquire an overwhelming scale and are often devoid of shade and suitably designed seating areas hindering the casual encounters and the vibrancy that Jacobs (1961) defended. On the other hand, central squares are usually provided with facilities and suitable areas to stay but, in many cases, they tend to be oversized. In short, public space loses human scale, the sense of visual enclosure and intimacy widely identified for encouraging social interaction (Lennard & Lennard 1984; Lennard & Lennard 1987; Marcus 2002). Thus, the relevance of the physical features of outdoor spaces in relation to their impact on the social interaction between users seems to have been overlooked in Chinese gated commodity housing and needs to be addressed. Indeed, the strategic integration of public outdoor and indoor spaces within the high-rise building typology could help to increase interaction between residents of the same building and reduce the negative feelings associated to this typology. It is essential to conduct further research and to test the potential of this typology, in order to properly define its limits, in relation to social quality of life in particular, and to its sustainability in general. In addition, while spaces between buildings have great potential to encourage social interaction between residents, given the large amount of people passing through this space – due to the large proportion of population living in high-rise buildings - they also need to be optimised through sensitive and creative design.

However, hypothesis 4, related to density, is not clearly demonstrated. According to the case studies analysed, communities with plot ratios above 2.5 tend to have fewer social ties between residents. The conclusions in this regard related to the height range of buildings, the high-rise communities being those reaching plot ratio values above 2.5. Also, the feeling of crowding associated to a lower sense of control and social support can be the reason for weaker social ties (Gifford 2007b; McCarthy & Saegert 1978; Bordas-Astudillo et al. 2003). For lower values there is no clear association between social ties and density. On the other hand, site coverage ranges from 0.1 to 0.2 approximately except for the low-rise community which reaches a value of 0.7. For the range of values 0.1-0.2, differences have not been found in relation to social ties. However, the greater ground coverage in CSL leads to a clear increase in the relationship between residents who live close to each other, given the low-rise typology and the extreme physical proximity between them, which “forces” interaction.

Finally, hypothesis 5 stated that gated communities with a small population size favours the development of bonds between neighbours leading to stronger ties and more cohesive communities. This hypothesis was mainly based on the benefits that a small group of people

can bring in terms of familiarity, trust and safety compared with a large size population (Durkheim & Halls 1997; Simmel 1976; Wirth 1938; Tönnies 2011; Killworth et al. 1990; Pool & Kochen 1978; Hill & Dunbar 2002). However, the analysis of data proves otherwise. Large-sized communities tend to have more numerous and stronger ties between residents than smaller ones when the comparison is done within each height range group (i.e., medium rise, medium-high-rise, and high-rise). The reasoning for this unpredicted result is based on the dynamic character of the Chinese for gathering with other people. Adam Chau (2008a, 2008b) named this concept as "social heat" to explain the relevance of sociality in this culture, which is understood to be "*the condition of social co-presence, i.e., the gathering of a group of people in one social space*" (Chau 2008a, p.147). Thus, for the Chinese, sociality involves a large group of people, noise, movement, vibrancy and enthusiasm. Social heat is a highly desirable condition of social life that becomes essential in China for the success of events. Therefore, understanding this concept explains the result of the hypothesis 5, since larger communities are more likely to gather a larger number of people together in the main square of the compound, so providing this desirable atmosphere. Hence, in smaller communities, congregating large numbers of residents in the central square is more difficult, leading to a displacement of residents towards other places, such as surrounding parks or squares, thus reducing the interaction and strength of ties between neighbours.

Apart from the effect of the previous three physical variables – building height, density and population size – it is important to consider the relevant influence of other design features, such as outdoor communal spaces (Garling & Golledge 1989; Fleming et al. 1985; S. Huang 2006). Particularly, there are three aspects to highlight as relevant for their influence on made by residents of the outdoor spaces and so on their social interaction.

Design of the courtyards

The design of the courtyards between buildings is being underestimated and even overlooked in Shanghai. They are hardly used and usually end up being used as a parking lot. The reason is the design of the courtyards. They are usually enclosed by two buildings but the entrance façade of one is facing the backyard of the second with a road in between. This design isolates the residents of each building and hinders their encounters. However, bonding between sub-groups within the community might favour the cohesion of the whole group. Indeed, the analysis of data in this research has shown that the development of bonds at the level of the BC positively correlates with the ties at the community level. It is probable that, knowing residents from one's own building or BC provides sufficient self-confidence to join in together with the activities being carried out in the central shared spaces. At the same time, by way of a feedback loop, going to the shared central square facilitates meeting with acquaintances from the same BC and may reinforce such relationships. Therefore, an adequate design of the outdoor spaces, both the courtyards between buildings and the central squares, seems essential to foster bonding between neighbours (Cooper Marcus, C Sarkissian 1986; Bechtel 1977; Francis 1987).

On the other hand, the size of the courtyards is also relevant in relation to the use that residents make of them. In medium-rise (6-12 floors) the small size of courtyard can produce social discomfort when two neighbours meet there, since they may feel forced to interact. Also, use of these small spaces may disturb neighbours living around them. In contrast, in medium-high-rise communities (12-18 floors) the size of such courtyards is suitable for being used by the residents, which enhances the social bonds between BC neighbours. In the case of high-rise communities, despite proper design and functioning of the outdoor spaces, the ties between residents are weak. As pointed previously, this typology need to be further tested to define its limits and potential.

The design of the central square

The design and location of the central square is one of the most important aspects for a community in order for it to be successful socially. Indeed, analysis of the data from the field work has shown that communities with a good central space design perform better socially at community level, while in communities with poor common central squares, the residents tend to bond more with neighbours from the BC.

In relation to the location, the central squares must be placed where there is a considerable flow of people. If residents have to pass through or close to the central square to go home, the probability of meeting with other residents increases. Huang (2006) also highlights this feature and the importance of common access for users to enhance social encounters (Fleming et al. 1985) in his study of outdoor spaces in high-rise housing in Taipei. Also, a greater flow of people around this common space will contribute to the sensation of social heat and movement. Regarding its design, the square must be multi-use with areas for playing and dancing, areas to do exercise, areas to sit, chat and observe, and more private areas where one can be alone but at the same time be part of the social heat simply by observing. These different areas must be integrated and at the same time allow for simultaneous carrying out of activates, since this will affect the success of the square. This is in line with the identification made by Gehl (2011) in *Life Between Buildings* of the confluence of several activities – activity, optional activity, and social – in an outdoor public space in order to be successful. Also, Huang (2006) appreciates the importance of providing different but visually integrated areas for conducting several activities at the same time in outdoor public spaces in Taipei. Indeed, he finds spaces with scenic and activity aspects to be those having the most influence on social interaction. This research supports those findings and also the relevance of visual contact between spaces. Certainly, such visual contact between users in the public space increases the feeling of social heat and favours its use and promotes interaction between residents. Thus, the shape of the square becomes a relevant feature of the design and forms which tend towards circular contours seem to perform better.

The topology

The topology refers to the interior layout of the communities, which defines the flow of residents through them. This aspect acquires a significant relevance in relation to the probabilities of meetings between neighbours. A successful design must integrate, with roads connecting all the courtyard buildings and the central square, while avoiding isolation of any areas.

These connecting roads, that distribute the whole community, must be considered not only as spaces for through foot-traffic but also as places where to spend time. Indeed, Huang (2006) identifies a higher social interaction in circulation spaces than in seating and vague spaces. Thus, the provision of facilities and equipment in these spaces adjacent to the courtyards is also helpful in enhancing the integration of neighbours from adjacent BCs and with the other residents from the X, increasing the density of ties within the community. This design strategy was observed in one of the case studies of this research. The community had benches and training machines in the road that was connecting two courtyards. This space was extremely successful socially and residents from both adjacent BC habitually used this space. Also, interaction with other residents of the community was encouraged when other residents of the community walked around and passed through this space. Thus, the provision of seating structures (Gehl 2011; Carr et al. 1992; Campbell & Campbell 1988), play areas (Cooper Marcus, C Sarkissian 1986; Coley et al. 1997), exercise equipment or green areas (Coley et al. 1997; Skjaeveland & Garling 1997; Kuo et al. 1998; Kweon et al. 1998) in these roads or adjacent to them can contribute to promoting social activity and interaction.

To sum up, the new built environment is adjusting to the “development” introduced by a market economy and forcing a residential life style which is not in line with the Chinese social principles and their requirements for social quality of life. This research shows a patent tension between the social reality of Chinese megacities and the desired sociability in a residential context for social quality of life. The provision of a local context where social interaction becomes familiar through the concept of the neighbourhood, and particularly of the gated communities, is identified as a relevant solution for this context to provide security, comfort and the social support required (Forrest & Kearns 2001) for the social quality of life of citizens. Gates should be manteined and urban planners and urban designers pay special attention to integrating Chinese citizens within viable communities and residential social networks to respect the desire of a millennial culture.

5.3. Challenges and limitations of the research

The main challenges facing during this research are the following:

- Internalising another culture and the problematic of an unknown context. A broad range of literature about the Chinese culture in relation to their social norms and

possible social needs and standards has been reviewed. Also, revision carried out of other researches, the context of the study and the identification of the gap serving as the basis for the aim of this investigation. However, although this literature review was very useful for defining a primary scope, it was only through trips to China and direct contact with the context and Chinese people that the scope of this research could be properly defined.

- Language barriers for an accurate translation of questionnaires. Multiple revisions were required to properly translate the questionnaires since it was not only a matter of language but the semantic meaning of the concepts.
- Obtaining permission to conduct the research in the communities and collect data during the field work in Shanghai due to the marked hierarchical bureaucracy in China and the Chinese tendency to reject taking responsibility for any decision that might bring problems. Thus, many obstacles were set by the bodies managing the communities to obtain access, involving a large investment of time.
- Building and delimiting the framework for this study by linking and questioning different social concepts at the same time as relating them with a wide notion of the built environment.

Meanwhile, the main limitations approached are the following:

- Selection of communities in a specific area due to the requirements of the students collaborating in the field work for translation purposes. The selection of communities by specific characteristics – urban form and economic level – within a restricted area of the city together with the high rejection for permission to access the communities restricted the possible selection of case studies and variety of design features.
- The research was set to analyse and relate more material levels – building, building courtyard, *xiaoqu* and *jiedao* - and to provide a deeper analysis of the courtyard between buildings in relation to their geometric characteristics. However, the impediment to collecting data door by door and the low response rate hinders the selection of specific courtyards for comparing them within the same community.

5.4. Guidelines or recommendations

The guidelines provided bellow are built upon the findings obtained through this investigation. The recommendations are addressed to urban planners and urban designers for future designs, and to researchers for further investigations.

Urban planners

- Communities designed with high-rise building forms perform worse socially than communities with low and medium-rise buildings. Neighbours from communities with building heights below 20 storeys develop stronger social bonds.

- Communities with larger population sizes perform better socially than smaller ones. Communities between 650 and 2000 families have been observed to perform better socially due to there being more ties between residents.

Urban designers

- The topology must look for an integrative flow of the residents through the whole community, connecting all the building courtyards and the central common square/s. Isolation of areas must be avoided.

- An integrative design of the outdoor common spaces is essential to encouraging the residents to make use of them and interact with others. Outdoor common spaces include the building courtyards, main square/s and roads.

- The common squares must be easily accessible and situated where residents pass though or go past on the way to and from their buildings. Avoid situating shared outdoor spaces above ground level.

- The shape of the common square/s should tend toward circular forms to enhance visual contact between users. At the same time, they must be large enough so as to avoid forcing interaction but at the same time they must maintain a human scale.

- The common square/s must be multi-use. Areas for playing and dancing, areas for doing exercise, areas for sitting, chatting and watching the world go by, and also more private areas where one can be alone, but at the same time be part of the social heat through observation, must be provided. It is important that several activities can be carried out at once.

- The design of a courtyard between buildings must integrate the surrounding buildings by situating the entrances so that they open onto them. Access of cars to these spaces must be avoided through their design. Also, the size of these courtyards must be such that residents do not feel intimidated to use them but nevertheless maintain a human scale.

Researchers

The recommendations provided in this section are mainly intended for western researchers. The objective is to facilitate the design of the methods and methodology for the collection of data to researchers based on the experience of this thesis.

- **Design of the tools.**
  Accurate translation through repetitive reviews of specific concepts by several sources is essential. On the one hand, it is essential to understand the different

meanings that certain social concepts can have in Chinese culture. The rules guiding Chinese social interactions are different from those in the West and so the strength of their ties cannot be measured in the same way as in Western research. The same social behaviour that for westerners means involvement and commitment - and so attachment -, for the Chinese is merely a natural process of merging with others based on a different understanding of the self and the acceptance of the complementary nature of dichotomies. On the other hand, there is an important language barrier in China, even among the Chinese themselves. Thus, on top of using different sources for translating the questions required, it would be appropriate to conduct a pilot study to evaluate their accuracy, if possible, in the same city where the field work is going to be carried out.

Another important aspect to take into consideration in an investigation on the social network within a gated community is the influence of the work done by the social administration office and the residents´ committee. These social institutions, composed partially of residents, perform and organise social welfare functions within the community. These actions favour the relationship between residents since some of them must take care of others and certain shared activities are organised. Therefore, this variable must to be included for future research in order to avoid misleading conclusions, since the work developed by these social institutions varies from one community to another and it has an influence on the bonding between neighbours.

Finally, there is another credence within the Chinese philosophies that must be taken into account when collecting data. The Chinese believe in accepting the inevitability of change and the importance of being willing to make the necessary adjustments in life to maintain a harmonious and balanced state (Gao & Handley-Schachler 2003) - this belief is shared by Confucianism and Taoism. It does not, however, imply taking a passive attitude but rather suggests that forcing a situation and fighting for something that is impossible is a great mistake. The result of this conviction is reflected in the answers provided by the participants during the interviews and questionnaires. Participants were not able to give a clear opinion about the quality of their communities and the aspects they would like to change. They could only value the positive aspects but they could not point out the features that they would like to improve. The reason for this attitude was their awareness of the need to maintain those aspects as they were and, their complete acceptance of such conditions can even be an obstacle to them answering hypothetical questions. Being conscious of this attitude is important when designing the tools for collection of data – questionnaires, interviews, etc. - for future research since questions in

terms of quality or environmental conditions must be formulated carefully and using different means to obtain an answer.

- **Permission to access the communities.**
  It is important to be aware of the rigid hierarchy in the bureaucratic processes in China and understand the different organizations involved in a community – management company, social administration office, residents committee and street committee - to quickly obtain permission to conduct the field work within the communities – detailed in section 3.3.3.4. Of all of the bodies managing a community, the residents´ committee is the most accessible and permissive, and it is recommendable to first obtain their permission. The social administration office is the next body to contact. They organise the activities for the residents and can be extremely helpful in providing the researcher with access to the joint activities in order to collect the required data. It is essential that these two bodies are contacted. The third organization, the management company, is the least collaborative and the least willing to give their permission to access the community since they are in charge of community security.

- **Methodology for collection of data.**
  There are two aspects to highlight here. One is how to distribute the questionnaires to the residents and recover them later, and the other is how the participants should complete the questionnaire.
  Firstly, depending on the city where the field work is conducted and the community itself, the researcher will be allowed to use various methods. The most effective method is the distribution of questionnaires door by door and the collection of them later. The response rate is higher and all of the questions are answered. The second method recommended is setting up a stand in the central square or at the gates (inside the community) to approach the residents directly and complete the questionnaire there and then. Other methods for collecting data are also explained in this thesis – section 3.3.3.4 - but the aforementioned two are the most efficient.
  Secondly, the way the participants complete the questionnaires is essential since at times the number of unanswered questions can be high. The most effective way of completing the questionnaire is do it at home, as participants take their time to answer the questions and do it at a time of relaxation. However, if the questionnaire is completed by approaching them in the outdoor spaces, it is preferable for the researcher to read the questions to the participant and assist with completing them. Otherwise, many questions can be answered randomly.

5.5.Contributions to existing research and future research

The main contributions of this research are the following:

- Conceptualization of social quality of life – threefold relationship between social network, social sustainability and social standards - within gated communities by questioning the nature of the Chinese relationships and their social standards in the context of large cities and megacities.
- Finding an imbalance between the current weakness of the social network within the gated communities and the desire for closer social networks with more social capital social cohesion.
- Relating the analysis of social network at two physical levels within the gated community, which provides an insight of the relationship between in and out groups and the influence on each other. The results of this analysis have contributed to revealing the importance of the building courtyard design – currently relegated to parking lots with no relationship between buildings established - for strengthening social bonds between neighbours.
- Contributing to the scarce research in the Chinese context (published in English language) relating urban form - particularly building height, density and population size - and social interaction within gated communities.
- Contributing to the scarce research in the Chinese context (published in English language) on the influence of the design of outdoor spaces and topology of the gated communities on social interaction.

In general terms, the broad approach of the research provides a quite comprehensive view of the current social life and the one desired within the gated community and the influence that the built environment, including urban form and design features, has on social quality of life in this residential unit.

In relation to future research, there are several possible lines of investigation. These include further research into the aspects explored here and new areas of research to complement the outcomes obtained in this thesis.

In this regard, the main priorities for continuing this line of this investigation would focus on:

- Firstly, investigating more cases under similar conditions – communities with similar economic backgrounds and locations - to further confirm the results obtained in this investigation.
- Secondly, exploring communities with different economic levels than those studied in this research, since the impact of the physical variables analysed in this investigation may be different. High-income communities are likely to have weak social bonds within their communities in any case, while low-income communities may have stronger bonds despite the fact that the style of construction is not conducive to this.

- More specific research on the social standards of residents within the gated communities is required to clarify this social need given the discrepancies found between the findings of this research and the conclusions of other investigation.
- Acquiring a greater understanding of the reasons why high-rise buildings hinder the development of ties between residents in Chinese communities and, particularly, proposing possible solutions to make this building style more socially viable.
- Finally, it is relevant to highlight the great impact that topology and the design of outdoor spaces can have on the social bonds within the community - according to the findings of this investigation. Thus, a deeper study of the features of the outdoor space combined with a deeper understanding of Chinese behaviour and needs – from an anthropological and sociological perspective - might provide interesting findings that may even alleviate the effects of using high-rise buildings.

Other lines of research that are essential to complement this investigation would be:

- Looking at the impact of building height and density from a merely social perspective provides only a partial vision of the true situation. A study of the environmental impact of these variables in terms of the energy use of these communities and of their outdoor conditions appears to be essential to obtain a comprehensive assessment. Only in this way, can an informed decision be taken by the urban planning authorities.

The outcomes of this research have identified a range of favourable values for building height and population size to enhance the social bonding between residents in the community. However, the impact of these values at city level must be tested. Density, building height and population size are three essential variables for urban planning and must be explored in depth by examining their impact on the social, environmental and economic functioning of the community and the city at the same time.

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APPENDIX A. Field work and cases studies

Fig. A-1 Plan of CSL_1

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

View (outside) 5

Fig. A-2 Images of the surrounding of the CSL_1 (views 1-5)

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

View (inside) 14

View (inside) 15

View (inside) 16

View (inside) 17

Fig. A-3 Images indise CSL_1 (views 6-17)

Fig. A-4 Plan and section of CSL_2

View (outside) 1

View (outside) 2

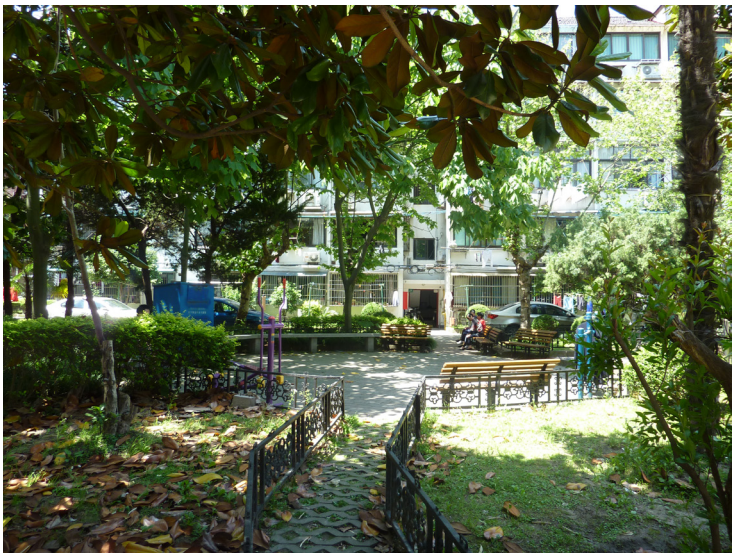
View (outside) 3

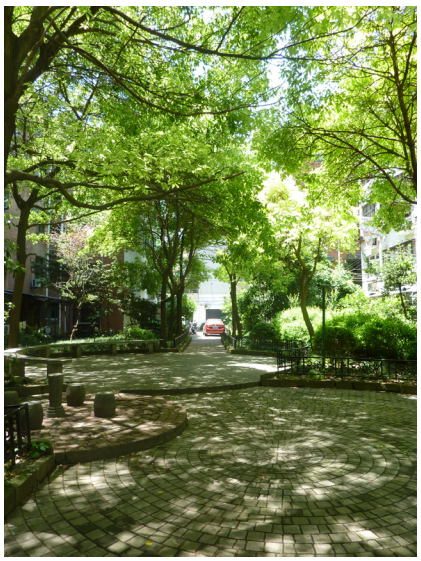
View (outside) 4

Fig. A-5 Images of the surrounding of the CSL_2 (views 1-4)

View (inside) 5


View (inside) 6


View (inside) 7



View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

Fig. A-6 Images indise CSL_2 (views 5-13)

Fig. A-7 Plan and section of CSM

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-8 Images of the surrounding of the CSM (views 1-4)

View (inside) 5

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

Fig. A-9 Images indise CSM (views 5-12)

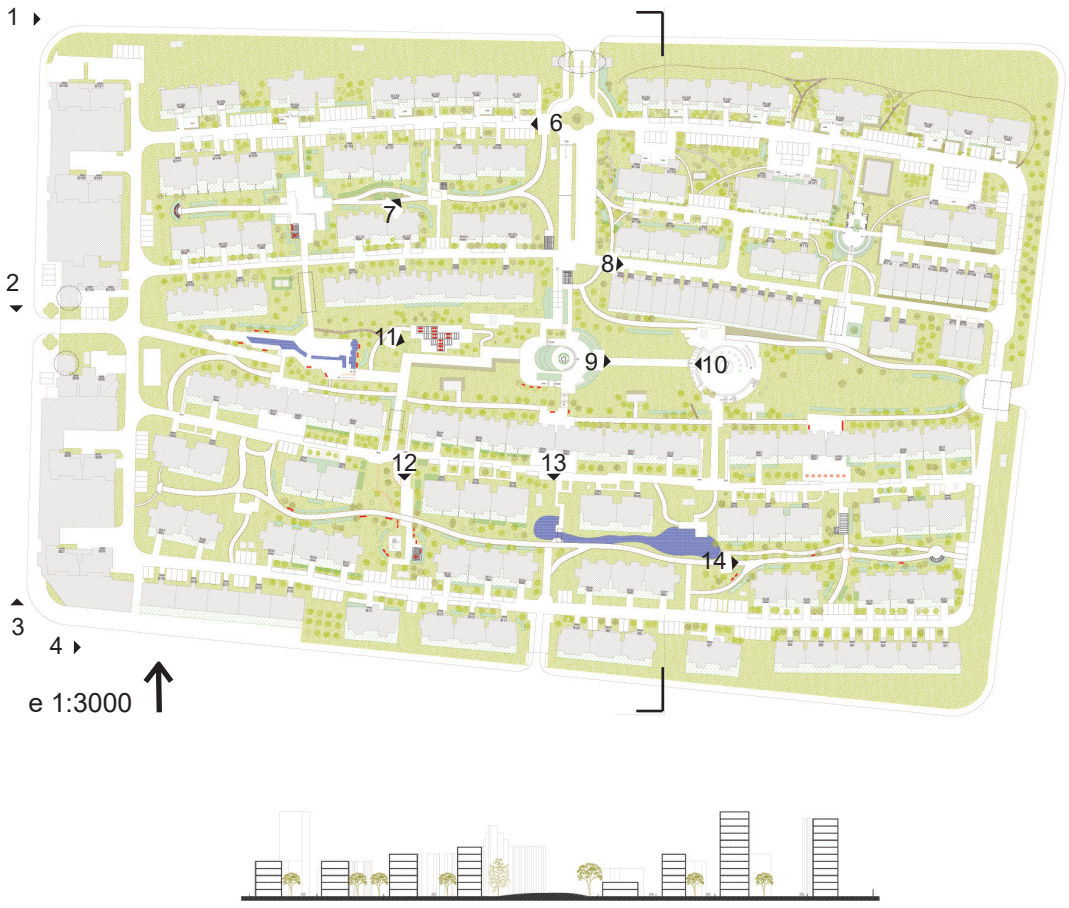


Fig. A-10 Plan and section of CBM

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-11 Images of the surrounding of the CBM(views 1-4)

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

View (inside) 14

Fig. A-12 Images indise CBM (views 6-14)

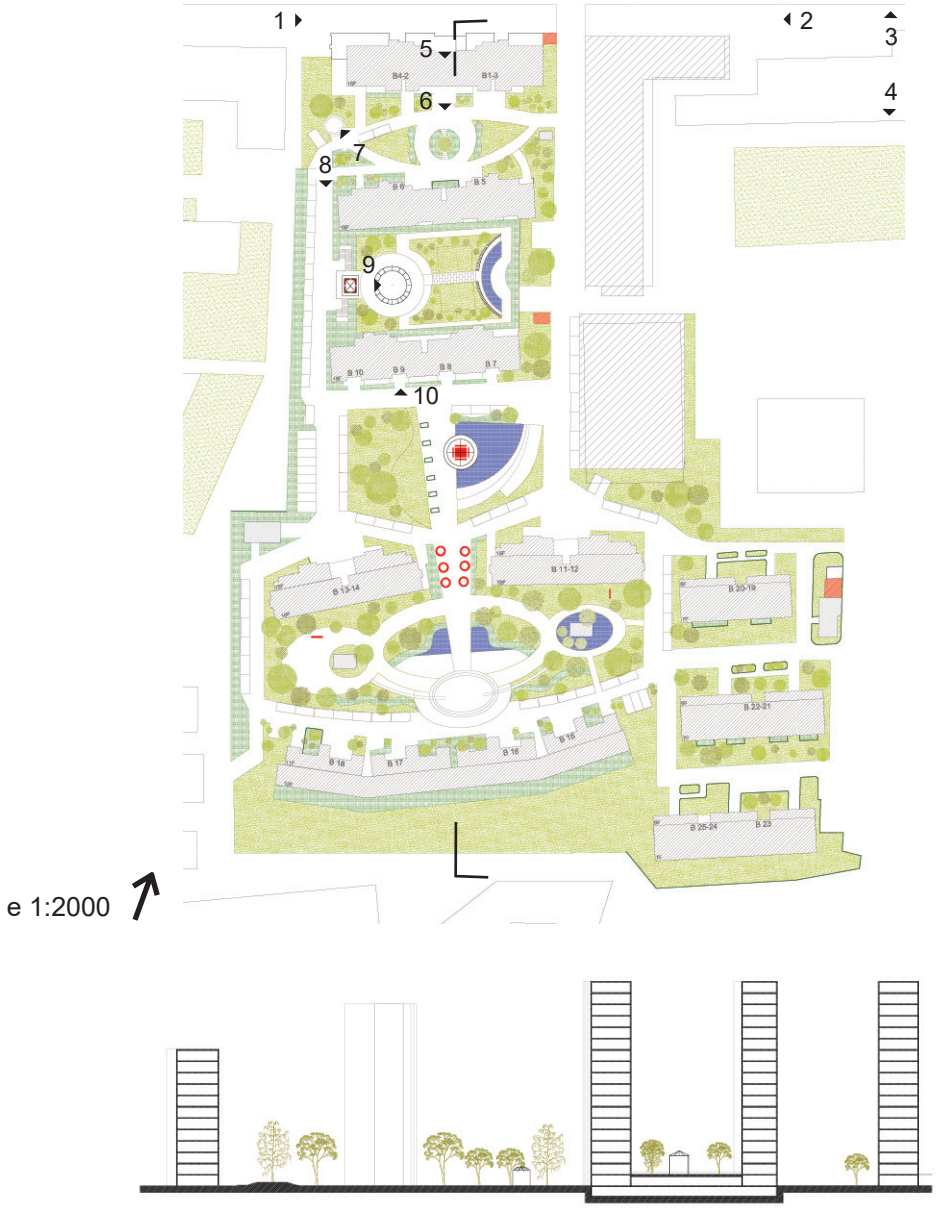


Fig. A-13 Plan and section of CSMH

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-14 Images of the surrounding of the CSMH (views 1-4)

View (inside) 5

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View inside (10)

Fig. A-15 Images indise CSMH (views 5-10)

Fig. A-16 Plan and section of $CBMH_1$

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-17 Images of the surrounding of the $CBMH_1$ (views 1-4)

View (inside) 5

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

Fig. A-18 Images indise $CBMH_1$ (views 5-13)

Fig. A-19 Plan and section of $CBMH_2$

View (outside) 1

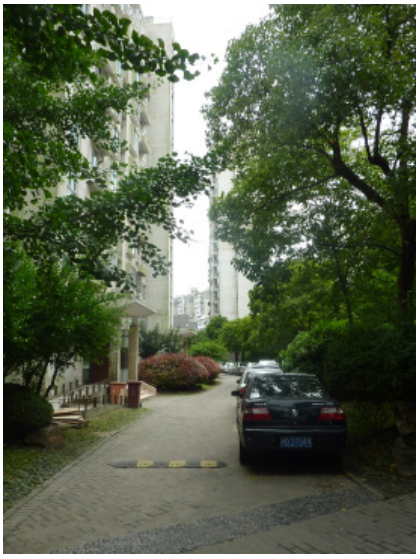
View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-20 Images of the surrounding of the $CBMH_2$ (views 1-4)

View (inside) 5



View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

View (inside) 14

View (inside) 15

View (inside) 16

Fig. A-21 Images indise $CBMH_2$ (views 5-16)

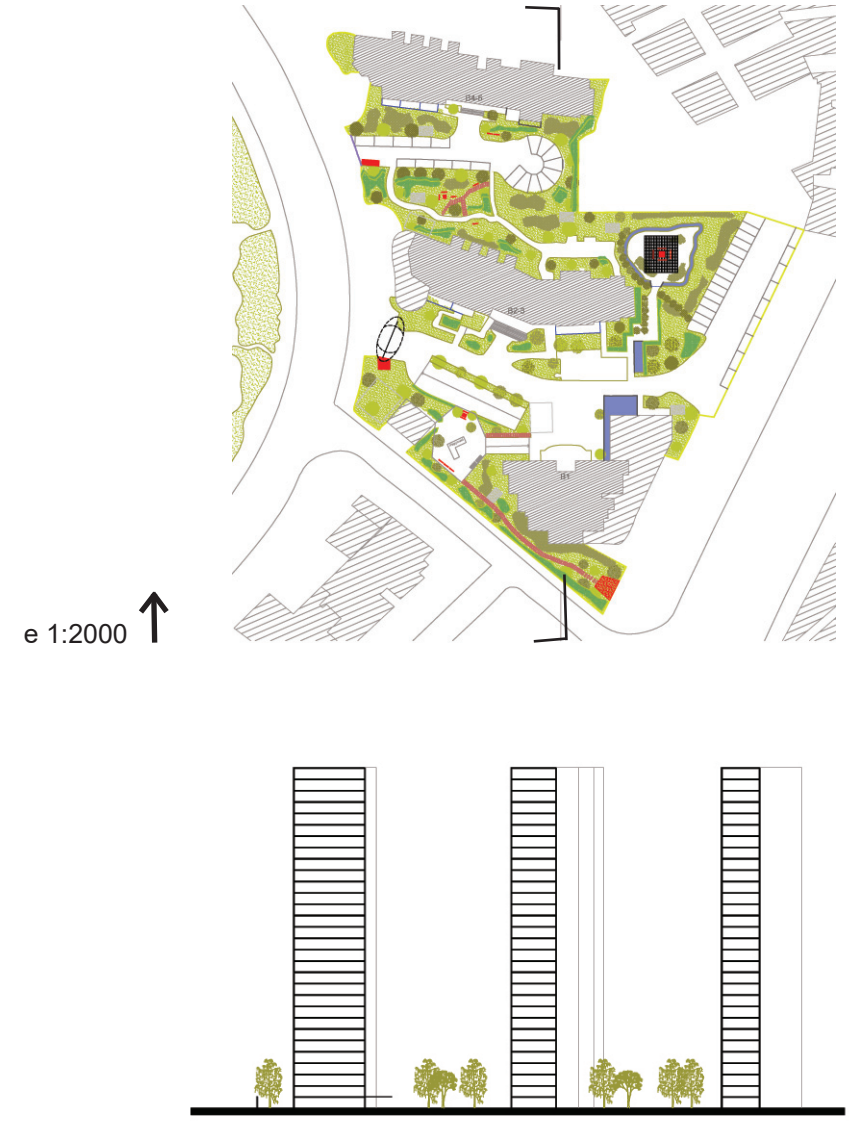


Fig. A-22 Plan and section of CSH

View (outside) 1

View (outside) 2

View (outside) 3

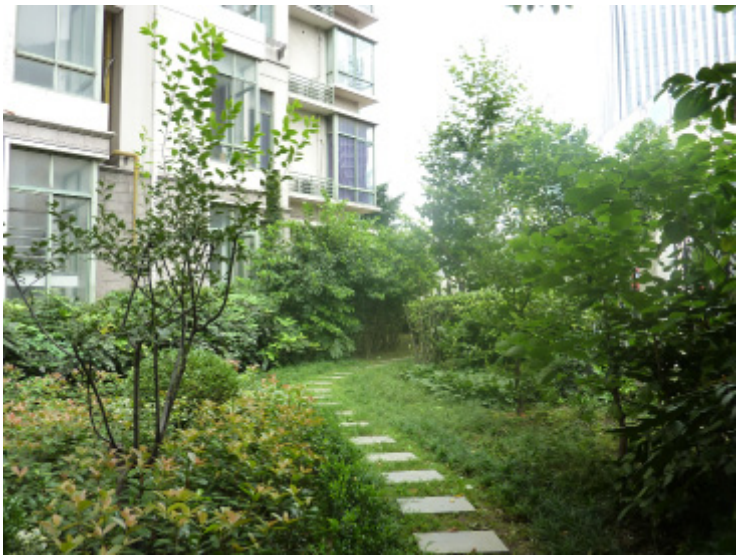
View (outside) 4

Fig. A-23 Images of the surrounding of the CSH (views 1-4)

View (inside) 5

View (inside) 6

View (inside) 7



View (inside) 8

View (inside) 9

View (inside) 10

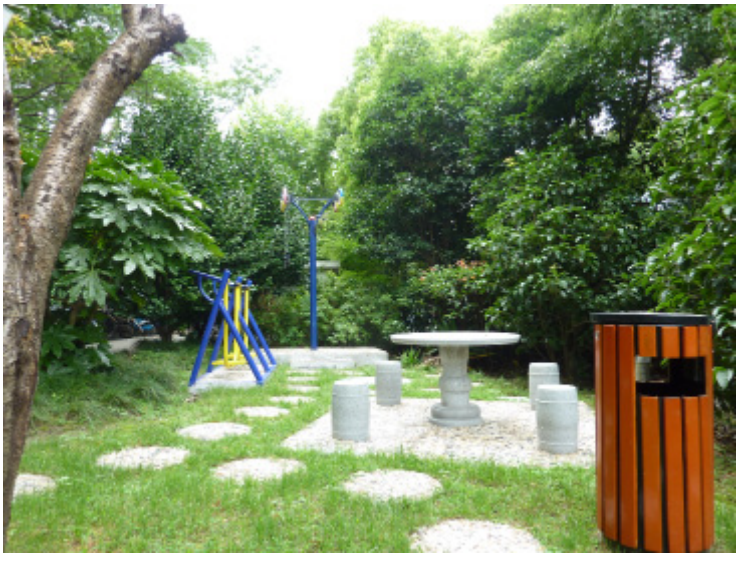
View (inside) 11

View (inside) 12

View (inside) 13

View (inside) 14

View (inside) 15



View (inside) 16

View (inside) 17

View (inside) 18

View (inside) 19

View (inside) 20

View (inside) 21

View (inside) 22

Fig. A-24 Images indise CSH (views 5-22)

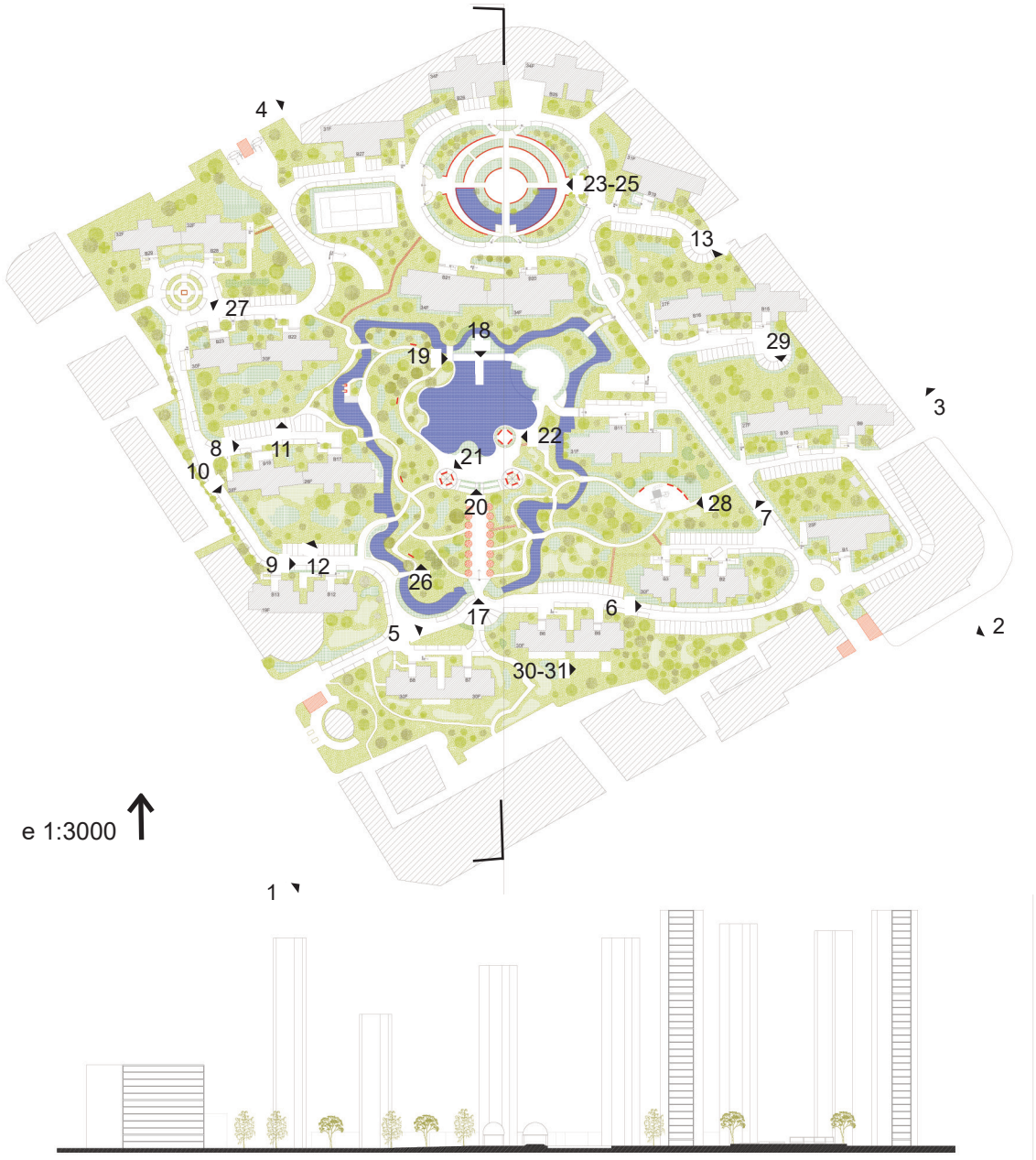


Fig. A-25 Plan and section of CBH

View (outside) 1

View (outside) 2

View (outside) 3

View (outside) 4

Fig. A-26 Images of the surrounding of the CBH (views 1-4)

View (inside) 5

View (inside) 6

View (inside) 7

View (inside) 8

View (inside) 9

View (inside) 10

View (inside) 11

View (inside) 12

View (inside) 13

View (inside) 14

View (inside) 15

View (inside) 16

View (inside) 17

View (inside) 18

View (inside) 19

View (inside) 20

View (inside) 21

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View (inside) 23

View (inside) 24

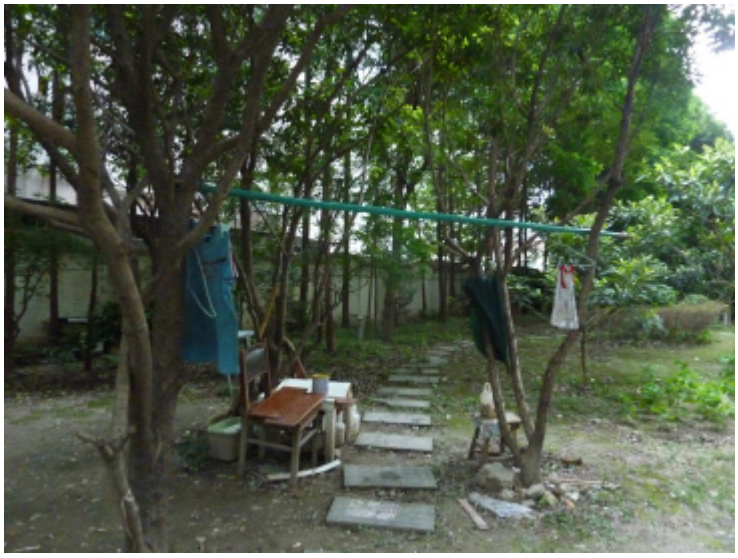
View (inside) 25

View (inside) 26

View (inside) 27

View (inside) 28

View (inside) 29



View (inside) 30

View (inside) 31

Fig. A-27 Images indise CBH (views 5-31)

APPENDIX B. Analysis of data and results

Influence of demographic variables on social network

Table B-1. Mann-whitney U test for age groups and density of ties

Variable and groups	*N* (x0, x1)	ΔMnd NHST	Mean Rank (x0)	Mean Rank (x1)	*U*	Effect size *(r)*
Recognition (R)						
Building courtyard						
Y - E	(194.228)	***	186.99	232.36	17360.5	**-0.19**
M -E	(284.228)	**	240.47	276.47	27823.0	-0.13
Xioaqu						
Y - E	(195.225)	***	176.66	239.83	15338.5	**-0.27**
M -E	(281.225)	ns	242.50	267.24	28522.0	-
Talk Sporadically (TS)						
Building courtyard						
Y - E	(193.226)	***	183.04	233.02	16605.5	**-0.22**
M -E	(281.226)	**	235.73	276.71	26620.5	-0.15
Xioaqu						
Y - E	(195.223)	***	171.55	242.69	14342.0	**-0.31**
M -E	(279.223)	***	231.61	276.38	25560.0	-0.16
Take the initiative (TI)						
Building courtyard						
Y - E	(195.218)	ns	192.87	219.64	18499.0	-
M -E	(282.218)	ns	243.95	258.97	28891.5	-
Xioaqu						
Y - E	(193.220)	**	187.20	224.37	17409.5	-0.16
M -E	(278.220)	ns	243.78	256.73	28990.5	-
Number of friends in the *xiaoqu*						
Y - E	(184.207)	***	159.48	228.46	12324.5	-0.31
M -E	(257.207)	**	215.12	254.08	22132.0	-0.14

Table B-2. Mann-whitney U test for age groups and frequency of meeting in relation to place of encounter

Variable and groups	*N* (x0. x1)	ΔMnd NHST	Mean Rank (x0)	Mean Rank (x1)	*U*	Effect size *(r)*
Frequency of meeting with residents of the BC						
Dwelling						
Y - E	(26.48)	*	**30.92**	**41.06**	453.0	**-0.24**
M -E	(61.48)	*	**50.07**	**61.27**	1163.0	**-0.19**
Courtyard						
Y - E	(24.47)	ns	32.88	37.60	489.0	-
M -E	(58.47)	*	**47.82**	**59.39**	1062.5	**-0.20**
Common xiaoqu						
Y - E	(26.49)	ns	33.92	40.16	531.0	-0.14
M -E	(62.49)	**	47.52	66.73	993.0	**-0.31**
Jiedao						
Y - E	(23.34)	ns	29.04	28.97	390.0	-
M -E	(56.34)	ns	45.31	45.81	941.5	-
Frequency of meeting with residents of the X						
Dwelling						
Y - E	(190.202)	ns	**194.78**	**198.12**	18862.5	-0.01
M -E	(264.202)	ns	**234.86**	**231.73**	26306.0	-0.01
Courtyard						
Y - E	(187.207))	***	159.08	232.21	12170.0	**-0.33**
M -E	(251.207)	**	212.97	249.54	21829.5	**-0.14**
Common xiaoqu						
Y - E	(189.203)	***	163.51	227.22	12947.5	**-0.29**
M -E	(259.203)	**	215.19	252.30	22065.5	**-0.14**
Jiedao						
Y - E	(183.183)	***	165.52	201.48	13453.5	**-0.19**
M -E	(237.183)	ns	203.73	219.27	20081.5	-0.07

Table B-3. Comparison between different lengths of residence in relation to density of social ties

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases (N)	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	**-0.37**
≤ 5	2.5	2.54 (1)	241.99	152		
5 < X ≤ 10	3	3.04 (2)	316.27	267		
> 10	4	3.44 (2)	**377.23**	219		
Xiaoqu					0.000	**-0.39**
≤ 5	2	1.99 (2)	229.44	150		
5 < X ≤ 10	2	2.56 (1)	320.02	268		
> 10	3	2.91 (2)	**373.12**	214		
Talk Sporadically (TS)						
Building Courtyard					0.000	-0.25
≤ 5	3	2.90 (2)	278.92	149		
5 < X ≤ 10	3	3.02 (2)	297.53	265		
> 10	4	3.45 (1)	**367.68**	220		
Xiaoqu					0.000	-0.29
≤ 5	3	2.69 (2)	256.78	148		
5 < X ≤ 10	3	3.02 (2)	311.65	268		
> 10	4	3.34 (2)	**360.94**	214		
Take the initiative (TI)						
Building Courtyard					0.000	-0.20
≤ 5	2	2.46 (3)	281.73	152		
5 < X ≤ 10	3	2.68 (2)	306.63	264		
> 10	3	2.97 (2)	**354.32**	217		
Xiaoqu					0.000	-0.22
≤ 5	2	2.44 (2.75)	266.96	148		
5 < X ≤ 10	3	2.77 (2)	314.79	267		
> 10	3	2.99 (2)	**348.49**	214		
Jiedao					0.001	-0.19
≤ 5	2	1.94 (2)	264.01	146		
5 < X ≤ 10	2	2.24 (2)	312.63	260		
> 10	2	2.4 (2)	**331.62**	208		

*the effect size corresponds to the comparison between the minimum and maximum length of residence.
Mnd=median; Mn=mean; IQR=interquartile range; Mn rank=mean rank; N=sample size

Table B-4. Comparison between different lengths of residence in relation to frequency of socializing by place with X´s neighbours

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases (N)	*p-value* (2-tailed)	*Effect size (r)*
Dwelling					0.000	-0.23
≤ 5	1	1.46 (1)	259.81	148		
5 < X ≤ 10	1.5	1.53 (1)	304.60	259		
> 10	2	1.76 (1)	**337.28**	201		
Courtyard					0.000	-0.25
≤ 5	2	2.00 (1)	254.92	143		
5 < X ≤ 10	2	2.28 (1)	283.65	254		
> 10	2	2.40 (1.5)	**341.17**	193		
Xiaoqu					0.000	-0.21
≤ 5	2	1.69 (1)	265.44	146		
5 < X ≤ 10	2	2.03 (1.5)	286.10	255		
> 10	2	2.28 (2)	**342.09**	197		
Jiedao					0.000	-0.23
≤ 5	1	1.46 (1)	241.65	141		
5 < X ≤ 10	1	1.46 (1)	277.88	241		
> 10	2	1.72 (1)	**309.22**	174		

*the effect size corresponds to the comparison between the minimum and maximum length of residence.

Table B-5. Comparison between different lengths of residence in relation to SA and A

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases (N)	*p-value* (2-tailed)	*Effect size (r)*
Sharing activities (SA)						
Xioaqu					0.017	**-0.39**
≤ 5	2	2.38 (1.5)	33.73	13		
5 < X ≤ 10	3	3.21 (1)	46.79	39		
> 10	4	3.44 (1.5)	**57.16**	47		
Number of friends (A)						
Xioaqu					0.000	**-0.42**
≤ 5	1	1.69 (2.5)	211.07	146		
5 < X ≤ 10	2	6.82 (5)	300.08	250		
> 10	5	9.60 (13.5)	**361.53**	201		
Jiedao					0.018	-0.10
≤ 5	1	1.38 (3)	254.40	141		
5 < X ≤ 10	1.5	6.85 (5)	**299.56**	240		
> 10	0	6.32 (5)	287.87	187		

*the effect size corresponds to the comparison between the minimum and maximum length of residence.

Table B-6. Comparison between different groups of family incomes in relation to density of ties

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	**-0.23**
0 – 5000	3	2.57 (2)	**321.37**	97		
5000 – 10000	2	2.17 (1.75)	281.56	141		
10000 – 20000	2	2.27 (2)	241.41	168		
20000 – 50000	2	2.52 (3)	**249.62**	101		
> 50000	3	2.71 (2)	293.19	34		
Xiaoqu					0.000	**-0.32**
0 – 5000	3	2.57 (2)	**327.54**	91		
5000 – 10000	2	2.25 (1)	283.70	142		
10000 – 20000	2	2.20 (1.5)	243.94	168		
20000 – 50000	2	2.09 (1)	**229.55**	103		
> 50000	3	2.86 (2)	302.18	34		
Talk Sporadically (TS)						
Building Courtyard					ns	-0.12
0 – 5000	1	2.28 (3)	293.04	95		
5000 – 10000	2.5	2.75 (2.75)	287.10	142		
10000 – 20000	3	2.70 (2)	246.87	166		
20000 – 50000	3	3.00 (2)	257.22	101		
> 50000	2	2.43 (3)	277.21	34		
Xiaoqu					ns	-0.17
0 – 5000	3	2.43 (3)	292.82	93		
5000 – 10000	3	2.75 (1.75)	288.13	142		
10000 – 20000	3	2.76 (2)	257.66	167		
20000 – 50000	3	2.86 (2.5)	240.31	102		
> 50000	3	2.86 (3)	273.47	34		
Take the initiative (TI)						
Building Courtyard					0.016*	-0.16
0 – 5000	3	2.86 (3)	**299.54**	96		
5000 – 10000	3	2.58 (1.75)	279.89	138		
10000 – 20000	2	2.45 (1.5)	242.87	166		
20000 – 50000	3	2.85 (2)	**249.82**	100		
> 50000	2	2.43 (3)	291.85	33		
Xiaoqu					0.005**	-0.18
0 – 5000	3	2.86 (3)	**305.46**	89		
5000 – 10000	3	2.83 (1.5)	275.81	140		
10000 – 20000	3	2.62 (2)	240.84	167		
20000 – 50000	3	2.71 (1.5)	**248.35**	101		
> 50000	3	3.00 (2)	298.34	34		
Jiedao					0.006**	**-0.23**
0 – 5000	3	2.71 (3)	**299.19**	83		
5000 – 10000	2	2.08 (2)	252.39	129		
10000 – 20000	2	2.07 (2)	240.64	165		
20000 – 50000	2	2.05 (2)	**230.70**	97		
> 50000	2	2.43 (3)	288.60	34		

*the effect size is calculated for the comparison between the lower income level and the 20000-50000

Table B-7. Comparison between different groups of family incomes in relation to frequency of socializing by place

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Frequency of meeting with residents of the BC						
Dwelling					ns	-
0 – 5000	1	1.86 (2)	67.42	12		
5000 – 10000	1	1.42 (0.75)	67.44	36		
10000 – 20000	2	1.93 (1)	69.94	45		
20000 – 50000	1	1.43 (1)	57.57	29		
> 50000	2	1.86 (0)	86.62	13		
Courtyard					ns	-
0 – 5000	2	2.43 (2)	62.82	11		
5000 – 10000	2	2.25 (1.75)	70.61	36		
10000 – 20000	2	2.45 (1)	64.84	45		
20000 – 50000	2	2.57 (1)	67.50	28		
> 50000	2	2.43 (1)	71.71	14		
Xiaoqu					ns	-
0 – 5000	2	2.43 (3)	71.14	11		
5000 – 10000	2.5	2.33 (1.75)	77.85	34		
10000 – 20000	2	2.10 (2)	68.54	49		
20000 – 50000	2	2.00 (2)	63.21	31		
> 50000	2	1.71 (1)	70.18	14		
Jiedao					ns	-
0 – 5000	1	1.86 (1)	57.28	9		
5000 – 10000	1.5	1.67 (1)	61.83	26		
10000 – 20000	2	1.72 (1)	56.39	41		
20000 – 50000	1	1.62 (1)	55.00	28		
> 50000	2	1.71 (1)	71.38	13		
Frequency of meeting with residents of the X						
Dwelling					0.000	**-0.26***
0 – 5000	1	1.33 (1)	**270.86**	85		
5000 – 10000	2	1.67 (1)	277.94	127		
10000 – 20000	2	1.78 (1)	240.25	159		
20000 – 50000	1	1.41 (1)	**201.95**	96		
> 50000	2	2.14 (0)	261.48	30		
Courtyard					0.000	**-0.33***
0 – 5000	1	1.50 (1.25)	**289.46**	74		
5000 – 10000	2	2.60 (1)	263.39	131		
10000 – 20000	2	2.30 (1)	246.72	158		
20000 – 50000	2	2.14 (1.25)	**192.42**	97		
> 50000	3	3.14 (3)	232.74	31		
Xiaoqu					0.000	**-0.28***
0 – 5000	1	1.50 (1.25)	**286.98**	77		
5000 – 10000	2	2.53 (1)	274.69	125		
10000 – 20000	2	2.07 (1)	235.12	162		
20000 – 50000	2	2.00 (2)	**206.06**	96		
> 50000	2	2.43 (3)	199.63	30		
Jiedao					ns	-
0 – 5000	1	1.33 (1)	240.49	73		
5000 – 10000	2	1.60 (1)	239.21	113		
10000 – 20000	1	1.52 (1)	220.73	149		
20000 – 50000	2	1.64 (1)	205.10	89		
> 50000	2	2.28 (3)	237.46	28		

*the effect size is calculated for the comparison between the lower income level and the 20000-50000

Table B-8. Comparison between different groups of family incomes in relation to sharing activities and number of friends and relatives

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Sharing activities (SA)						
Building courtyard					ns	-
0 – 5000	3	2.83 (3.25)	83.54	13		
5000 – 10000	3	2.93 (2)	71.34	35		
10000 – 20000	3	2.81 (2)	62.27	47		
20000 – 50000	3.5	3.09 (2)	73.61	31		
> 50000	4	3.14 (2)	77.04	14		
Xioaqu					ns	-
0 – 5000	3	2.83 (3.25)	82.46	13		
5000 – 10000	3	3.40 (1)	75.72	37		
10000 – 20000	3	3.00 (2)	66.76	48		
20000 – 50000	3	3.32 (1)	76.09	34		
> 50000	4	3.28 (2)	76.14	14		
Number of friends						
Xioaqu					0.000	**-0.40***
0 – 5000	2	2.17 (1.75)	**319.01**	85		
5000 – 10000	5	5.27 (7)	272.27	128		
10000 – 20000	3	9.55 (10)	232.77	165		
20000 – 50000	2	4.32 (5.75)	**205.24**	94		
> 50000	3	10.86 (19)	237.30	32		
Jiedao					ns	**-**
0 – 5000	2	2.50 (1.75)	250.38	74		
5000 – 10000	0	1.93 (5)	227.27	115		
10000 – 20000	1	9.41 (5)	230.96	152		
20000 – 50000	0	2.68 (3.5)	215.17	90		
> 50000	3	9.71 (30)	245.17	30		
Number of relatives						
Xioaqu					0.05	**-0.22**
0 – 5000	0	1.62 (0.25)	**227.70**	66		
5000 – 10000	0	0.93 (0)	224.38	108		
10000 – 20000	0	0.43 (0)	202.45	143		
20000 – 50000	0	1.05 (0)	218.25	86		
> 50000	0	0.21 (0)	**183.19**	24		
Jiedao					ns	-
0 – 5000	0	1.71 (5)	234.57	67		
5000 – 10000	0	0.17 (0)	217.93	103		
10000 – 20000	0	1.07 (0.5)	195.15	141		
20000 – 50000	0	1.00 (1.5)	211.30	86		
> 50000	0	0.57 (0)	198.24	23		

*the effect size is calculated for the comparison between the lower income level and the 20000-50000

Table B-9. Comparison between different groups of ownership in relation to density of ties

Mn (IQR)	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					ns	-
Renters	2	2.00 (2)	340.16	119		
Owners	2	2.23 (2)	361.56	596		
Xiaoqu					0.000	-0.13
Renters	1.5	2.00 (2.5)	300.26	124		
Owners	2	2.23 (2)	**371.87**	594		
Talk Sporadically (TS)						
Building Courtyard					ns	-
Renters	2.5	2.5 (3)	353.64	117		
Owners	2	2.68 (2)	354.67	591		
Xiaoqu					0.01	-0.09
Renters	2	2.25 (2.75)	315.85	123		
Owners	3	2.82 (2)	**366.76**	592		
Take the initiative (TI)						
Building Courtyard					ns	-
Renters	2.5	2.25 (1.75)	345.38	119		
Owners	3	2.54 (2.5)	354.55	586		
Xiaoqu					ns	-
Renters	2	2.00 (1.5)	314.70	113		
Owners	3	2.74 (2)	359.14	590		
Jiedao					0.01	-0.10
Renters	1.5	1.75 (1.75)	302.61	119		
Owners	2	2.07 (2)	**352.08**	567		

Table B-10. Comparison between different groups of ownership in relation to frequency of socializing by place

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Frequency of meeting with residents of the BC						
Dwelling					ns	-
Renters	1	1.25 (0.75)	60.36	7		
Owners	2	1.68 (1)	75.20	141		
Courtyard					ns	-
Renters	1.5	1.75 (1.75)	57.81	8		
Owners	2	2.49 (1)	73.36	136		
Xiaoqu					ns	-
Renters	2	2.25 (2.75)	75.94	8		
Owners	2	2.07 (2)	76.00	143		
Jiedao					ns	-
Renters	1	1.25 (2)	43.50	6		
Owners	2	1.70 (1)	62.95	117		
Frequency of meeting with residents of the X						
Dwelling					ns	-
Renters	2	1.75 (0.75)	330.32	114		
Owners	2	1.58 (1)	334.16	552		
Courtyard					ns	-
Renters	1.5	1.75 (1.75)	297.39	104		
Owners	2	2.35 (1)	334.94	553		
Xiaoqu					ns	-
Renters	1.5	2.00 (2.5)	314.04	112		
Owners	2	2.10 (2)	334.46	549		
Jiedao					ns	-
Renters	1.5	1.50 (1)	281.69	105		
Owners	2	1.61 (1)	309.86	504		

Table B-11. Comparison between different groups of ownership in relation to sharing activities, and number of friends and relatives

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Sharing activities (SA)						
Building courtyard					ns	
Renters	3.5	3.00 (2.5)	82.25	8		
Owners	3	2.89 (2.5)	74.06	140		
Xioaqu					ns	
Renters	3	2.75 (2.25)	67.56	8		
Owners	3	3.23 (2)	78.04	146		
Number of friends						
Xioaqu					0.003	-0.11
Renters	3	2.75 (4.75)	287.57	118		
Owners	2	5.35 (8)	**344.57**	550		
Jiedao					ns	
Renters	3.5	3.5 (6)	279.40	104		
Owners	0	3.46 (4)	313.82	511		
Number of relatives						
Xioaqu					0.033	-0.09
Renters	0	0.5 (1.5)	**314.72**	114		
Owners	0	0.35 (0)	289.01	473		
Jiedao					ns	
Renters	0	0.5 (1.5)	267.42	99		
Owners	0	0.49 (0)	288.70	470		

Table B-12. Comparison between different groups of origin in relation to density of social ties

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.004	-0.10
Shanghai	2	2.41 (2)	**380.26**	556		
Migrants	2	1.81 (1.5)	329.92	179		
Xiaoqu					0.002	-0.11
Shanghai	2	2.20 (1)	**379.69**	554		
Migrants	2	2.19 (2)	325.44	178		
Talk Sporadically (TS)						
Building Courtyard					ns	-
Shanghai	2	2.92 (2)	**371.59**	554		
Migrants	2	2.09 (2.5)	348.50	177		
Xiaoqu					ns	-
Shanghai	3	2.77 (2)	**368.87**	555		
Migrants	3	2.71 (2.5)	356.93	176		
Take the initiative (TI)						
Building Courtyard					ns	-
Shanghai	2	2.54 (2)	**367.33**	550		
Migrants	2	2.33 (2)	353.66	177		
Xiaoqu					ns	-
Shanghai	3	2.49 (1)	**364.14**	551		
Migrants	3	2.90 (2)	357.29	173		
Jiedao					0.024	-0.09
Shanghai	2	1.97 (2)	**359.37**	531		
Migrants	2	2.00 (2)	320.38	168		

Table B-13. Comparison between different groups of origin in relation to frequency of socializing by place

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Frequency of meeting with residents of the BC						
Dwelling					ns	-
Shanghai	1	1.67 (1)	71.34	103		
Migrants	2	1.62 (1)	**75.41**	41		
Courtyard					ns	-
Shanghai	2	2.48 (1)	**72.73**	102		
Migrants	2	2.28 (2)	64.53	38		
Xiaoqu					ns	-
Shanghai	2	2.07 (2)	**77.90**	109		
Migrants	2	2.05 (2)	62.82	38		
Jiedao					ns	-
Shanghai	1	1.51 (1)	58.53	86		
Migrants	2	2.00 (2)	**65.49**	34		
Frequency of meeting with residents of the X						
Dwelling					ns	-
Shanghai	1	1.41 (1)	343.58	520		
Migrants	2	1.90 (0)	**349.38**	169		
Courtyard					ns	-
Shanghai	2	2.10 (1)	**342.77**	510		
Migrants	2	2.47 (1)	325.38	166		
Xiaoqu					ns	-
Shanghai	2	1.97 (2)	**347.69**	521		
Migrants	2	2.24 (2)	321.47	161		
Jiedao					ns	-
Shanghai	1	1.41 (1)	**318.89**	475		
Migrants	2	1.95 (1)	305.10	155		

Table B-14. Comparison between different groups of origin in relation to sharing activities, and number of friends and relatives

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Sharing activities (SA)						
Building courtyard					ns	-
Shanghai	3	2.74 (2)	71,19	104		
Migrants	3	3.14 (2)	**75,90**	40		
Xioaqu					ns	-
Shanghai	3	2.92 (2)	72,15	109		
Migrants	4	3.67 (1)	**84,40**	41		
Number of friends						
Xioaqu					0.032	-0.08
Shanghai	2	4.72 (5)	**349.63**	513		
Migrants	3	5.14 (7)	312.46	167		
Jiedao					ns	-
Shanghai	0	3.23 (3)	**324,21**	477		
Migrants	2	2.76 (5)	294,96	156		
Number of relatives						
Xioaqu				453	ns	-
Shanghai	0	0.48 (0)	**303,10**	145		
Migrants	0	0.14 (0)	288,24			
Jiedao					ns	-
Shanghai	0	0.64 (0)	**300,12**	443		
Migrants	0	0.24 (0)	277,33	145		

Table B-15. Comparison between different groups of educational background in relation to density of ties

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Recognition (R)						
Building Courtyard					0.000	0.07
Primary	-	-	**471.17**	27		
Middle	3	3.00	444.91	156		
Higher	2	2.28 (2)	374.68	157		
University	2	2.15 (2)	318.52	386		
Xiaoqu					0.000	0.03
Primary	-	-	**447.88**	25		
Middle	2	2.00	396.46	155		
Higher	2	2.00 (2)	399.68	158		
University	2	2.25 (2)	326.05	384		
Talk Sporadically (TS)						
Building Courtyard					0.000	0.04
Primary	-	-	389.85	26		
Middle	2	2.00	**424.62**	155		
Higher	3	2.71 (3)	384.28	156		
University	2	2.67 (2)	323.91	384		
Xiaoqu					0.000	0.05
Primary	-	-	**423.79**	26		
Middle	2	2.00	397.49	153		
Higher	2	2.43 (3)	416.32	159		
University	3	2.85 (2)	318.14	382		
Take the initiative (TI)						
Building Courtyard					0.000	0.03
Primary	-	-	**462.48**	26		
Middle	3	2.67	395.08	156		
Higher	2	2.43 (3)	391.17	154		
University	2.5	2.50 (1.75)	326.22	383		
Xiaoqu					0.000	0.03
Primary	-	-	**429.21**	24		
Middle	3	2.67	382.72	155		
Higher	2	2.28 (2)	404.65	156		
University	3	2.71 (2)	324.27	380		
Jiedao					0.001	0.02
Primary	-	-	**396.93**	23		
Middle	2	2.00	348.56	144		
Higher	2	1.86 (1)	391.26	148		
University	2	2.06 (2)	322.13	374		

Table B-16. Comparison between different groups of educational background in relation to frequency of socializing by place

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Frequency of meeting with residents of the BC						
Dwelling					ns	-
Primary	-	-	-	-		
Middle	1	1.33	**90.56**	17		
Higher	1	1.28 (0)	74.77	26		
University	2	1.71 (1)	71.10	104		
Courtyard					ns	-
Primary	-	-	-	-		
Middle	1	1.67	72.07	14		
Higher	2	2.28 (2)	**83.30**	32		
University	2	2.5 (1)	68.26	97		
Xiaoqu					0.024	0.02
Primary	-	-	-	-		
Middle	1	1.67	85.84	16		
Higher	1	2.00 (2)	**91.25**	30		
University	2	2.09 (2)	69.37	104		
Jiedao					ns	-
Primary	-	-	-	-		
Middle	2	1.67	**69.30**	10		
Higher	1	1.43 (1)	64.44	24		
University	1	1.69 (1)	59.81	88		
Frequency of meeting with residents of the X						
Dwelling					0.000	0.035
Primary	-	-	**463.23**	24		
Middle	2	1.67	364.34	151		
Higher	1	1.43 (1)	362.15	140		
University	2	1.60 (1)	313.26	364		
Courtyard					0.000	0.075
Primary	-	-	**414.98**	21		
Middle	3	2.67	392.70	137		
Higher	2	2.14 (2)	381.06	145		
University	2	2.29 (1)	286.40	362		
Xiaoqu					0.000	0.10
Primary	-	-	**459.22**	23		
Middle	2	2.00	401.89	146		
Higher	1	2.00 (2)	387.40	140		
University	2	2.09 (2)	281.72	362		
Jiedao					0.017	0.016
Primary	-	-	**381.30**	20		
Middle	2	1.67	327.03	132		
Higher	1	1.14 (0)	326.45	128		
University	2	1.65 (1)	292.95	339		

Table B-17. Comparison between different groups of educational background in relation to sharing activities, and number of friends and relatives

Variable and groups	Mnd	Mn (IQR)	Mn rank	Valid cases N	*p-value* (2-tailed)	*Effect size (r)*
Sharing activities (SA)						
Building courtyard					ns	-
Primary	-	-	-	-		
Middle	3	3.33	**89.50**	14		
Higher	3	2.57 (3)	78.32	30		
University	3	2.88 (2)	71.38	104		
Xioaqu					ns	-
Primary	-	-	-	-		
Middle	4	3.67	**91.00**	14		
Higher	3	2.57 (3)	77.86	33		
University	3	3.21 (2)	75.62	107		
Number of friends						
Xioaqu					0.000	0.052
Primary	-	-	**404.78**	23		
Middle	1	4.00	384.73	147		
Higher	2	2.14 (5)	375.32	141		
University	2.5	5.60 (8)	295.26	359		
Jiedao					0.032	0.014
Primary	-	-	**369.72**	23		
Middle	0	1.00	315.93	135		
Higher	2	1.86 (3)	339.72	127		
University	0	3.81 (5)	297.06	339		
Number of relatives						
Xioaqu					0.000	0.036
Primary	-	-	**382.03**	19		
Middle	-	-	279.54	130		
Higher	0	4.29 (1)	320.19	121		
University	0	0.36 (0)	283.70	316		
Jiedao					0.008	0.021
Primary	-	-	**362.63**	20		
Middle	-	-	269.99	131		
Higher	0	0.28 (0)	304.10	115		
University	0	0.54 (0)	285.75	310		

Influence of aesthetic and maintenance of the built environment on social network

Table B-18. Descriptive statistics for adequacy of aesthetic and maintenance of the built environment in the X

	CSMH	CSH	CBM	CBH	$CBMH_1$	CSM	$CBMH_2$	CSL
Materials								
Mn	2.14	**2.78**	2.52	2.65	**2.87**	2.61	2.47	1.17
Md	2	3	2	2.5	3	3	2	1
IQR	1	1	1	1	0.75	1	1	0.25
Green areas								
Mn	2.43	2.61	**3.21**	3	3	**3.23**	**3.17**	
Md	2	3	3	3	3	3	3	
IQR	1	1	0	2	1.5	1	1	
Courtyards								
Mn	2.28	2.56	2.56	3	2.75	**3.8**	**2.95**	1.33
Md	2	3	2	3	3	3	3	1
IQR	1	1	1	2	1	1	2	1
Façade maintenance								
Mn	2.19	2.56	2.65	**2.73**	**2.87**	**2.74**	2.47	1.67
Md	2	2	2	3	3	3	2	2
IQR	1	1	1	1	2	1	1	1
Building maintenance								
Mn	2.38	2.65	**2.91**	2.57	**3.06**	2.64	2.52	1.33
Md	3	3	3	2	3	2	2	1
IQR	1	1	1	2	2	1	1	1
Cleanliness								
Mn	2.62	**3.17**	2.87	2.88	**3.12**	**2.97**	**2.95**	1.5
Md	3	3	3	3	3	3	3	1.5
IQR	1	1	2	2	0.75	2	2	1
Facilities								
Mn	1.67	2.39	**2.95**	2.61	2.69	2.54	2.50	1.67
Md	2	2	3	2	3	2	3	1.5
IQR	1	1	2	1	1	1	1	1.25
Public furniture								
Mn	1.95	2.61	**3**	2.46	2.69	2.33	2.55	1.50
Md	2	3	3	2	2.5	2	3	1
IQR	0.5	1	1	1	1	1	1	1.25
Night lighting								
Mn	2.28	3	**2.95**	2.69	2.56	2.56	2.30	1.83
Md	2	3	3	3	2.5	2	2	2
IQR	1	2	2	1	1	1	1	1.25
Overall quality								
Mn	2.43	**2.96**	**3**	2.88	**3.06**	2.82	2.72	1.5
Md	3	3	3	3	3	3	3	1.5
IQR	0	0	2	2	0	1	1	1

General trends and standards for social ties, social capital and social cohesion

Table B-19. Descriptive statistics of social ties indicators at the BC and X levels

	N	Mn	Confidence Interval* Mn		Md	IR
			Lower	Upper		
Recognition						
Building courtyard	754	3.04	2.96	3.13	3	2
Xiaoqu	748	2.62	2.54	2.70	2	1
Talking sporadically						
Building courtyard	746	3.15	3.07	3.23	3	2
Xiaoqu	744	3.10	3.01	3.18	3	2
Taking initiative						
Building courtyard	742	2.82	2.73	2.91	3	2
Xiaoqu	737	2.85	2.77	2.94	3	2
Sharing activities						
Building courtyard	150	2.93	2.76	3.11	3	2
Xiaoqu	156	3.09	2.92	3.25	3	2
Frequency of meeting with building courtyard´s neighbours						
Dwelling	150	1.87	1.72	2.01	2	1
Courtyard	146	2.61	2.42	2.79	2	1
Xiaoqu	153	2.42	2.24	2.61	2	1
Jiedao	125	1.84	1.67	2.01	2	1
Frequency of meeting with *xiaoqu´*s neighbours						
Dwelling	701	1.84	1.77	1.9194	2	1
Courtyard	688	2.85	2.74	2.9491	3	2
Xiaoqu	694	2.80	2.70	2.9024	3	2
Jiedao	639	1.79	1.71	1.8714	1	1

*Confidence interval at 95%

N=sample size; Mn=mean; Md=median; IR=interquartile range

Table B-20. Descriptive statistics of social capital and standards at the BC and X levels

	N	Mn	Confidence Interval* Mn		Md	IR
			Lower	Upper		
Sharing worries						
Building courtyard	170	1.78	1.64	1.91	2	1
Xiaoqu	168	1.74	1.77	1.90	2	1
Helping out						
Building courtyard	728	1.84	1.61	1.87	2	1
Xiaoqu	733	2.51	2.43	2.59	3	1
Standards						
Importance of counting on neighbours in the *xiaoqu*						
	743	3.91	3.81	4.01	4	2

*Confidence interval at 95%

N=sample size; Mn=mean; Md=median; IR=interquartile range

Table B-21. Descriptive statistics of social cohesion and standards at the building courtyard and *xiaoqu* levels

	N	Mn	Confidence interval* Mn		Md	IR
			Lower	Upper		
Participation in activities						
	748	1.71	1.63	1.79	1	1
Discuss community worries						
Building courtyard	167	1.69	1.57	1.82	1	1
Xiaoqu	744	1.97	1.90	2.04	2	2
Trust						
Building courtyard	164	3.16	3.03	3.29	3	1
Xiaoqu	744	3.49	3.44	3.55	3	1
Standards						
Importance of having the chance of participating in activities in the *xiaoqu*						
	748	3.07	2.96	3.19	3	4
Importance of having community meetings and/or events with your *xiaoqu´*s neighbours						
	747	3.53	3.42	3.63	4	2

Confidence interval at 95%
N=sample size; Mn=mean; Md=median; IR=interquartile range

Table B-22. Descriptive statistics of standard of social ties at the BC and X levels

	N	Mn	Confidence Interval* Mn		Md	IR
			Lower	Upper		
Importance of socializing with the neighbours						
Building courtyard	160	3.64	3.38	3.89	4.5	3
Xiaoqu	752	4.08	3.99	4.17	5	2

*Confidence interval at 95%
N=sample size; Mn=mean; Md=median; IR=interquartile range

Table B-23. Mann-Whitney U test for recognising by visual contact neighbour of the…

Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Building courtyard						
CSMH-CSL	(70.83)	***	54.53	95.95	1332.0	**-0.48**
CSMH-CBMH$_2$	(70.103)	***	62.73	103.5	1906.0	**-0.41**
CSMH–CBMH$_1$	(70.85)	**	63.09	90.28	1931.5	**-0.31**
CSMH-CBM	(70.111)	**	74.40	101.47	2723.0	**-0.26**
CSMH-CSM	(70.104)	*	73.54	96.90	2662.5	**-0.23**
CBH-CSL	(96.83)	***	67.02	116.58	1778	**-0.49**
CBH-CBMH$_2$	(96.103)	***	75.10	123.21	2553.5	**-0.43**
CBH-CBMH$_1$	(96.85)	***	74.83	108.41	2527.5	**-0.33**
CBH-CBM	(96.111)	**	86.73	118.13	3670.5	**-0.27**
CBH-CSM	(96.104)	*	86.41	113.5	3639.5	**-0.24**
CSH-CSL	(100.83)	***	71.45	116.77	2094.5	**-0.44**
CSH-CBMH$_2$	(100.103)	***	80.15	123.21	2965.0	**-0.38**
CSH-CBMH$_1$	(100.85)	*	80.44	106.86	2993.5	**-0.26**
CSM-CSL	(104.83)	***	79.69	111.93	2827.5	**-0.31**
CSM-CBMH$_2$	(104.103)	*	91.30	116.83	4035.0	**-0.22**
CBM-CSL	(111.83)	***	81.25	117.88	2832.0	**-0.34**
CBM-CBMH$_2$	(111.103)	**	91.92	123.11	4006.0	**-0.26**
CBMH$_1$-CSL	(85.83)	*	73.38	94.75	2593.5	**-0.23**
Xiaoqu						
CSH-CBM	(99. 112)	***	75.83	131.96	2573.0	**-0.48**
CSH-CBMH$_2$	(99. 101)	***	78.02	122.53	2774.0	**-0.40**
CSH-CSL	(99. 79)	***	73.27	109.84	2304.0	**-0.37**
CSH-CSM	(99. 104)	***	81.49	121.52	3118.0	**-0.36**
CSH-CBMH$_1$	(99. 86)	***	77.09	110.45	2826.5	**-0.33**
CSH-CBH	(99. 97)	**	84.03	112.41	3372.5	**-0.26**
CSH-CSMH	(99. 70)	**	75.02	99.12	2476.5	**-0.25**
CSMH-CBM	(70. 112)	**	75.77	100.60	2841.0	**-0.24**
CBH-CBM	(97. 112)	**	89.85	116.23	4093.0	**-0.23**

* =slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-24. Mann-Whitney U test for talking sporadically with neighbour of the…

	Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Building courtyard							
	CSMH-CSL	(70.81)	***	56.35	92.98	1459.0	**-0.43**
	CSMH-CBMH$_2$	(70.102)	***	64.76	101.42	2048.0	**-0.39**
	CSMH-CBMH$_1$	(70.84)	***	62.24	90.22	1871.5	**-0.32**
	CSMH-CBM	(70.108)	**	73.43	99.92	2655.0	**-0.26**
	CSMH-CSM	(70.104)	**	72.84	97.37	2614.0	**-0.25**
	CBH-CSL	(97.81)	***	72.70	109.62	2299.0	**-0.37**
	CBH-CBMH$_2$	(97.102)	***	82.31	116.82	3231.5	**-0.31**
	CBH-CBMH$_1$	(97.84)	**	79.12	104.72	1921.5	**-0.25**
	CSH-CSL	(100.81)	***	77.54	107.62	2703.5	**-0.30**
	CSH-CBMH$_2$	(100.102)	**	88.15	114.59	3764.5	**-0.24**
Xiaoqu							
	CSH-CBMH$_2$	(98.102)	***	82.71	117.59	3255.0	**-0.31**
	CSH-CBM	(98.108)	***	86.72	118.73	3647	**-0.28**
	CSH-CSL	(98. 79)	*	79.91	100.27	2980.5	**-0.20**
	CSH-CBH	(98, 97)	*	86.98	109.13	3673.5	**-0.20**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-25. Mann-Whitney U test for taking the initiative to socialise with neighbour of the…

	Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Building courtyard							
	CSMH-CBM	(67.108)	**	71.07	98.50	2484.0	**-0.27**
	CSH-CBM	(100. 108)	***	87.96	119.82	3745.5	**-0.27**
	CBH-CBMH$_2$	(94. 103)	*	86.51	110.40	3667.0	**-0.21**
	CBH-CSL	(94. 82)	**	76.65	102.09	2740.0	**-0.25**
	CBH-CBM	(94. 108)	***	83.40	117.25	3375.0	**-0.30**
Xiaoqu							
	CSMH-CBM	(69. 105)	**	72.59	97.30	2593.5	**-0.25**
	CSH-CBM	(98. 105)	***	81.09	121.52	3095.5	**-0.36**
	CSH-CSM	(98. 103)	**	88.62	112.78	3833.5	**-0.21**
	CSH-CBH	(98. 97)	*	87.31	108.80	3705.0	**-0.20**
	CSH-CBMH$_2$	(98. 101)	*	89.28	110.40	3898	**-0.19**
Jiedao							
	CSMH-CBM	(65. 94)	**	65.11	90.30	2087.0	**-0.28**
	CSH-CBM	(97. 94)	***	75.05	117.62	2527.0	**-0.40**
	CBH-CBM	(92. 94)	***	77.32	109.34	2835.5	**-0.31**
	CSL-CBM	(78. 94)	***	71.04	99.33	2460.0	**-0.29**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-26. Mann-Whitney U test for number of friends in the…

	Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Xiaoqu							
	CSH-CBMH$_2$	(97. 91)	***	65.16	125.77	1568.0	**-0.56**
	CSH-CSL	(97. 77)	***	64.21	116.84	1475.0	**-0.53**
	CSH-CBM	(97. 97)	***	70.60	124.40	2095.0	**-0.49**
	CSH-CBMH$_1$	(97. 83)	***	69.66	114.85	2004.5	**-0.44**
	CSH-CSMH	(97. 62)	***	65.95	101.98	1644.5	**-0.39**
	CSH-CSM	(97. 100)	***	81.64	115.84	3166.5	**-0.31**
	CSH-CBH	(97. 85)	*	80.01	104.62	3007.5	**-0.24**
	CBH-CBMH$_2$	(85. 91)	***	71.36	104.51	2410.5	**-0.33**
	CBH-CSL	(85. 77)	**	68.72	95.61	2186.0	**-0.29**
	CBH-CBM	(85. 97)	*	78.91	102.54	3052.0	**-0.23**
	CSM-CBMH$_2$	(100. 91)	***	80.18	113.38	2968.0	**-0.30**
	CSM-CSL	(100. 77)	*	78.20	103.03	2769.58	**-0.24**
Jiedao							
	CSH-CBMH$_1$	(97. 78)	***	71.86	108.07	2217.5	**-0.38**
	CSH-CBM	(97. 82)	***	73.71	109.27	2396.5	**-0.37**
	CSH-C8	(97. 86)	**	78.84	106.84	2894.5	**-0.29**
	CBH-CBMH$_1$	(77. 78)	***	63.69	92.12	1901.5	**-0.33**
	CBH-CBM	(77. 82)	***	65.71	93.42	2056.5	**-0.32**
	CSL-CBMH$_1$	(76. 78)	**	65.09	89.60	2020.5	**-0.29**
	CSL-CBM	(76. 82)	**	66.93	91.15	2160.5	**-0.28**
	CSM-CBMH$_1$	(96. 78)	*	77.78	99.47	2810.5	**-0.22**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-27. Mann-Whitney U test for number of relatives in the…

	Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Xiaoqu							
	CSH-CBMH$_1$	(97. 71)	**	77.38	94.23	2752.5	**-0.26**
	CSH-CBH	(97. 74)	**	78.85	95.37	2895.5	**-0.25**
	CSH-CBM	(97. 64)	**	75.12	89.91	2534.0	**-0.24**
	CSH-CSL	(97. 76)	**	80.28	95.57	3034.5	**-0.23**
Jiedao							
	CSH-CBMH$_1$	(97. 71)	**	77.38	94.23	2752.5	**-0.26**
	CSH-CBM	(97. 64)	**	75.12	89.91	2534.0	**-0.24**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-28. Mann-Whitney U test for frequency of socialising with residents from the X

	Cases	*N* (x_0, x_1)	ΔMnd^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Dwelling							
	CSH-CSL	(98. 81)	***	70.21	113.94	2029.5	**-0.46**
	CSH-CBM	(98. 94)	***	74.80	119.12	2479.5	**-0.44**
	CSH-$CBMH_2$	(98. 97)	***	78.37	117.83	2829.5	**-0.39**
	CSH-CSMH	(98. 60)	***	68.24	97.89	1836.5	**-0.36**
	CSH-$CBMH_1$	(98. 79)	**	77.91	102.76	2784.0	**-0.28**
	CSH-CSM	(98. 101)	**	86.60	113.0	3635.5	**-0.26**
	CBH-CSL	(91. 81)	***	70.34	104.66	2214.5	**-0.37**
	CBH-CBM	(91. 94)	***	76.54	108.94	2779.0	**-0.33**
	CBH-$CBMH_2$	(91. 97)	***	79.66	108.42	3063.0	**-0.28**
	CSM-CSL	(101. 81)	*	81.16	104.39	3046.5	**-0.23**
Courtyard							
	CSH-$CBMH_2$	93. 103)	***	68.88	125.24	2035.0	**-0.51**
	CSMH-$CBMH_2$	(65. 103)	***	59.71	100.15	1736.0	**-0.41**
	CSH-CSM	(93. 103)	***	82.48	112.97	3299.5	**-0.28**
	CSH-CSL	(93. 64)	*	70.66	91.12	2200.5	**-0.23**
	CBM-$CBMH_2$	84. 103)	***	69.17	114.25	2240.0	**-0.42**
	CBH-$CBMH_2$	95. 103)	***	80.26	117.25	3064.5	**-0.33**
	$CBMH_1$-$CBMH_2$	81. 103)	***	70.27	109.99	2370.5	**-0.38**
	CSM-$CBMH_2$	(103. 103)	***	87.93	119.07	3700.5	**-0.27**
Xiaoqu							
	CSMH-$CBMH_2$	(60. 102)	***	50.67	99.64	1210.0	**-0.52**
	CSMH-CSL	(60. 79)	***	49.40	85.65	1134.0	**-0.46**
	CSMH-$CBMH_1$	(60. 83)	*	59.06	81.36	1713.5	**-0.27**
	CSMH-CBH	(60. 91)	*	63.43	84.29	1975.5	**-0.24**
	CSH-$CBMH_2$	(98. 102)	***	68.39	131.35	1851.0	**-0.56**
	CSH-CSL	(98. 79)	***	67.40	115.80	1754.0	**-0.48**
	CSH-$CBMH_1$	(98. 83)	***	76.44	108.19	2640.0	**-0.31**
	CSH-CBH	(98. 91)	**	80.83	110.26	3070.0	**-0.28**
	CSH-CSM	(98. 100)	*	87.11	111.64	3686.0	**-0.22**
	CBM-$CBMH_2$	(81. 102)	***	68.67	110.52	2241.5	**-0.40**
	CBM-CSL	(81. 79)	***	65.59	95.79	1991.5	**-0.34**
	CBH-$CBMH_2$	(91. 102)	***	80.34	111.87	3124.5	**-0.29**
	CBH-CSL	(91. 79)	*	75.13	97.45	2650.5	**-0.23**
	$CBMH_1$-$CBMH_2$	(83. 102)	***	75.28	107.42	2762.0	**-0.31**
	CSM-$CBMH_2$	(100. 102)	***	80.41	122.18	2991.0	**-0.37**
	CSM-CSL	(100. 79)	***	76.44	107.16	2594.0	**-0.30**
Jiedao							
	CSH-$CBMH_2$	(97. 102)	***	75.53	123.27	2573.0	**-0.46**
	CSH-CSMH	(97. 52)	***	64.99	93.66	1551.5	**-0.37**
	CSH-$CBMH_1$	(97. 74)	***	73.22	102.75	2349.5	**-0.34**
	CSH-CSM	(97. 90)	***	78.99	110.18	2909.0	**-0.33**

CSH-CBM	(97. 68)	**	73.40	96.70	2366.5	**-0.29**
CSH-CBH	(97. 85)	*	83.13	101.05	3310.5	**-0.21**
CBM-$CBMH_2$	(68. 102)	**	71.40	94.90	2509.0	**-0.25**
CBH-$CBMH_2$	(85. 102)	***	77.13	108.06	2901.0	**-0.30**
CSL-$CBMH_2$	(71. 102)	**	70.91	98.20	2478.5	**-0.28**

* = slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Table B-29. Descriptive statistics for time use of the courtyard and the *xiaoqu*

	CSMH	**CSH**	**CBM**	**CBH**	**$CBMH_1$**	**CSM**	**$CBMH_2$**	**CSL**
Courtyard								
Weekday winter								
N	42	-	64	23	-	-	-	-
Mn	46.19	-	**58.27**	40.65	-	-	-	-
Md	30	-	**60**	35	-	-	-	-
SD	71.83	-	58.11	39.75	-	-	-	-
Weekday summer								
N	41	-	67	25	-	-	-	-
Mn	45.12	-	**55.36**	37.90	-	-	-	-
Md	30	-	**50**	30	-	-	-	-
SD	73.07	-	56.82	46.65	-	-	-	-
Weekend winter								
N	38	-	69	22	-	-	-	-
Mn	46.84	-	**70.14**	46.42	-	-	-	-
Md	30	-	**60**	45	-	-	-	-
SD	52.92	-	59.00	51.26	-	-	-	-
Weekend summer								
N	37	-	67	25	-	-	-	-
Mn	46.66	-	**71.54**	**86.46**	-	-	-	-
Md	30	-	**60**	**60**	-	-	-	-
SD	39.61	-	70.14	136.15	-	-	-	-
Xiaoqu								
Weekday winter								
N	63	98	86	89	61	92	100	71
Mn	29.82	31.69	48.94	**66.53**	**66.86**	59.40	**74.34**	**74.17**
Md	15	12.5	30	35	60	60	60	35
IQR	45.26	45.55	65.68	77.31	71.53	53.82	84.95	98.76
Weekday summer								
N	62	98	86	87	61	92	100	71
Mn	38.08	32.41	54.99	**83.10**	**71.60**	58.49	**77.95**	**75.28**
Md	17.5	10	37.50	50	60	60	60	60
IQR	61	46.72	60.77	101.83	82.39	50.97	87.21	91.90
Weekend winter								
N	58	98	91	83	80	73	100	71
Mn	41.96	35.62	**71.44**	**77.23**	**76.10**	**82.61**	**78.34**	**99.35**
Md	30	20	60	60	60	60	60	60
IQR	54.13	50.22	92.79	92	79.87	88.73	90.29	113.97
Weekend summer								
N	61	98	89	80	80	73	100	71
Mn	49.10	37.07	**80**	**94.03**	**94.89**	**88.35**	**85.90**	**100.63**
Md	30	12.5	60	60	60	60	60	60
IQR	55,51	57.07	105.18	100.36	95.84	85.76	95.45	110.46

Comparison of social network between physical levels

Table B-30. Wilcoxom for recognising by visual contact by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
General					**0.000*** **	**-0.25**
Xiaoqu	2.62	294[a]	185.08	748		
Courtyard	3.04	78[b]	191.85	754		
Ties		365[c]				
By community						
CSL					**0.000*** **	**-0.45**
Xiaoqu	2.88	45[a]	25.87	79		
Courtyard	3.76	4[b]	15.25	83		
Ties		30[c]				
CSM					**0.001** **	**-0.22**
Xiaoqu	2.65	38[a]	26.18	104		
Courtyard	3.04	13[b]	25.46	104		
Ties		52[c]				
CBM					0.325	ns
Xiaoqu	2.98	26[a]	18.50	112		
Courtyard	3.07	14[b]	24.21	111		
Ties		67[c]				
CSMH					0.29	ns
Xiaoqu	2.48	12[a]	13.17	70		
Courtyard	2.44	16[b]	15.50	70		
Ties		40[c]				
$CBMH_1$					**0.000*** **	**-0.39**
Xiaoqu	2.59	46[a]	29.47	86		
Courtyard	3.25	9[b]	20.50	85		
Ties		30[c]				
$CBMH_2$					**0.000*** **	**-0.374**
Xiaoqu	2.84	46[a]	26.49	101		
Courtyard	3.54	5[b]	21.50	103		
Ties		50[c]				
CSH					**0.000*** **	**-0.519**
Xiaoqu	1.94	65[a]	34.17	99		
Courtyard	2.71	2[b]	28.50	100		
Ties		32[c]				
CBH					0.675	ns
Xiaoqu	2.51	16[a]	14.19	97		
Courtyard	2.48	15[b]	17.93	98		
Ties		64[c]				

a. Recognise by visual contact most residents of X < Recognise by visual contact most residents of BC

b. Recognise by visual contact most residents of X > Recognise by visual contact most residents of BC

c. Recognise by visual contact most residents of X = Recognise by visual contact most residents of BC

Table B-31. Wilcoxom for taking sporadically by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
General					0.188	ns
Xiaoqu	3.10	152[a]	114.68	744		
Courtyard	3.15	100[b]	144.47	746		
Ties		476[c]				
By community						
CSL					**0.000*** **	**-0.317**
Xiaoqu	3.19	27[a]	17.43	79		
Courtyard	3.69	5[b]	11.50	81		
Ties		46[c]				
CSM					0.392	ns
Xiaoqu	3.06	20[a]	18.30	104		
Courtyard	3.15	15[b]	17.60	104		
Ties		68[c]				
CBM					0.425	ns
Xiaoqu	3.27	22[a]	18.59	108		
Courtyard	3.19	21[b]	25.57	108		
Ties		59[c]				
CSMH					**0.002**	**-0.268**
Xiaoqu	2.93	8[a]	10.44	70		
Courtyard	2.53	22[b]	17.34	70		
Ties		38[c]				
$CBMH_1$					**0.004**	**-0.219**
Xiaoqu	3.08	22[a]	13.77	86		
Courtyard	3.36	5[b]	15.00	84		
Ties		57[c]				
$CBMH_2$					0.136	ns
Xiaoqu	3.37	14[a]	10.29	102		
Courtyard	3.51	6[b]	11.00	102		
Ties		81[c]				
CSH					**0.000*** **	**-0.276**
Xiaoqu	2.67	27[a]	16.20	98		
Courtyard	3.01	4[b]	14.63	100		
Ties		67[c]				
CBH					**0.005**	**-0.205**
Xiaoqu	3.15	12[a]	11.21	97		
Courtyard	2.70	22[b]	20.93	97		
Ties		60[c]				

a. Talk sporadically with many residents of X < Talk sporadically with many residents of BC

b. Talk sporadically with many residents of X > Talk sporadically with many residents of BC

c. Talk sporadically with many residents of X = Talk sporadically with many residents of BC

Table B-32. Wilcoxom for taking initiative by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
General					0.092	ns
Xiaoqu	2.86	88[a]	73.29	737		
Courtyard	2.82	85[b]	101.19	742		
Ties		547[c]				
By community						
CSL					**0.020***	**-0.187**
Xiaoqu	2.81	18[a]	12.72	78		
Courtyard	3.08	6[b]	11.83	82		
Ties		54[c]				
CSM					0.129	ns
Xiaoqu	2.94	8[a]	9.19	103		
Courtyard	2.85	13[b]	12.12	103		
Ties		80[c]				
CBM					0.081	ns
Xiaoqu	3.27	18[a]	15.03	105		
Courtyard	3.14	21[b]	24.26	108		
Ties		60[c]				
CSMH					0.084	ns
Xiaoqu	2.69	7[a]	9.57	69		
Courtyard	2.49	14[b]	11.71	67		
Ties		43[c]				
$CBMH_1$					**0.032***	**-0.164**
Xiaoqu	2.82	16[a]	10.78	86		
Courtyard	2.95	5[b]	11.70	85		
Ties		64[c]				
$CBMH_2$					0.177	ns
Xiaoqu	2.90	11[a]	8.50	101		
Courtyard	3.00	5[b]	8.50	103		
Ties		85[c]				
CSH					0.112	ns
Xiaoqu	2.42	7[a]	4.14	98		
Courtyard	2.50	1[b]	7.00	100		
Ties		90[c]				
CBH					**0.000*****	**-0.282**
Xiaoqu	2.90	3[a]	4.00	97		
Courtyard	2.42	20[b]	13.20	94		
Ties		71[c]				

a. Take the initiative to socialise with the residents of X < Take the initiative to socialise with the residents of BC

b. Take the initiative to socialise with the residents of X > Take the initiative to socialise with the residents of BC

c. Take the initiative to socialise with the residents of X = Take the initiative to socialise with the residents of BC

Table B-33. Wilcoxom for frequency by levels, BC and X

	Mean	N ranks	Mean Rank	Valid cases (N)	*p-value* (2-tailed)	Effect size (r)
Dwelling						
General					0.642	ns
Xiaoqu	1.84	16[a]	15.88	701		
Courtyard	1.87	14[b]	15.07	150		
Ties		110[c]				
CSMH					0.774	ns
Xiaoqu	1.82	3[a]	5.33	60		
Courtyard	1.86	5[b]	4.00	36		
Ties		25[c]				
CBM					0.435	ns
Xiaoqu	2.01	10[a]	8.25	94		
Courtyard	2.05	6[b]	8.92	74		
Ties		52[c]				
CBH					0.317	ns
Xiaoqu	1.50	1[a]	2.50	91		
Courtyard	1.46	3[b]	2.50	28		
Ties		23[c]				
Courtyard						
General					**0.012***	**-0.15**
Xiaoqu	2.85	35[a]	22.57	688		
Courtyard	2.61	12[b]	28.17	146		
Ties		94[c]				
CSMH					0.971	ns
Xiaoqu	2.57	7[a]	6.57	65		
Courtyard	2.47	6[b]	7.50	38		
Ties		23[c]				
CBM					**0.001****	**-0.29**
Xiaoqu	2.51	21[a]	11.60	84		
Courtyard	2.74	2[b]	16.25	72		
Ties		46[c]				
CBH					0.546	ns
Xiaoqu	2.80	3[a]	3.50	95		
Courtyard	2.26	4[b]	4.38	27		
Ties		20[c]				
Xiaoqu						
General					0.307	ns
Xiaoqu	2.80	27[a]	21.33	694		
Courtyard	2.42	17[b]	24.35	153		
Ties		94[c]				
CSMH					0.118	ns
Xiaoqu	2.13	4[a]	5.00	60		
Courtyard	2.15	8[b]	7.25	39		
Ties		21[c]				
CBM					**0.046**	**-0.175**
Xiaoqu	2.53	14[a]	9.11	81		
Courtyard	2.67	4[b]	10.88	73		
Ties		47[c]				
CBH					0.564	ns
Xiaoqu	2.83	5[a]	5.40	91		
Courtyard	2.03	4[b]	4.50	28		
Ties		18[c]				
Jiedao						
General					0.139	ns
Xiaoqu	1.79	16[a]	13.34	639		

Courtyard	1.84	9[b]	12.39	125		
Ties		90[c]				
CSMH					1.000	ns
Xiaoqu	1.79	2[a]	3.75	52		
Courtyard	1.87	3[b]	2.50	31		
Ties		25[c]				
CBM					0.131	ns
Xiaoqu	1.70	8[a]	5.19	68		
Courtyard	1.93	2[b]	6.75	60		
Ties		42[c]				
CBH					0.414	ns
Xiaoqu	1.61	2[a]	3.50	85		
Courtyard	1.54	4[b]	3.50	24		
Ties		17[c]				

a. Frequency to socialise with the residents of X < Frequency to socialise with the residents of BC

b. Frequency to socialise with the residents of X > Frequency to socialise with the residents of BC

c. Frequency to socialise with the residents of X = Frequency to socialise with the residents of BC

APPENDIX C. Social capital and social cohesion

Social capital

General comparison between communities

Statistically, high-rise communities (CSH and CBH) have significantly less social capital, especially compared to $CBMH_1$ in relation to OPINION and, $CBMH_2$ and CSL in relation to HELP with a small effect size (r=0.25-0.48) (table C-1). This general trend aside, among the better performing groups, the contradictory performance of CSL in relation to both indicators is worth noting. For HELP, CSL has the highest mean rank, while for OPINION it is even statistically significantly lower than for $CBMH_2$ (r=-0.21). The high value of HELP is probably associated with a greater need for collaboration between residents for daily issues – physical help - based on their low economic level (the lowest of all communities) together with the lack of involvement of the social administration office (according to the residents' opinion). Also, the layout of the community, with its narrow streets and low-rise housing, facilitates direct and continuous contact between residents due to proximity and therefore the opportunities to exchange favours. However, this does not involve having a close relationship, HELP or even not developing such a close relationship taking precedence.

On the other hand, the result of CBM for social capital is unexpected since it has the lowest value of HELP (even statistically significantly lower than CSH), while it is one of the communities with most numerous and strongest social ties. This might be due to the quality of the work done by the social administration office. Since they provide great support to the residents (according to qualitative data from interviews and observation), it is likely that the need of the neighbours to help each other is minimal. These two situations once again bring out the controversy of how to use HELP for measuring social capital in the Chinese context. Likely, the best solution is to include the involvement of the social administration office as one independent variable.

Table C-1. Mann-Whitney U test for social capital at the *xiaoqu* level

Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Asking for opinion and sharing worries						
CSH-$CBMH_2$	(95. 101)	***	77.73	118.04	2824.0	**-0.38**
CSH-$CBMH_1$	(95. 84)	***	73.92	108.19	2462.0	**-0.36**
CSH-CSMH	(95. 68)	**	72.02	95.94	2282.0	**-0.28**
CSH-CSM	(95. 105)	*	88.95	110.95	3890.5	**-0.21**
CBM-$CBMH_2$	(98. 101)	*	88.53	111.13	3825.0	**-0.21**
CBH-$CBMH_2$	(99. 101)	**	84.58	116.10	3423.5	**-0.29**
CBH-$CBMH_1$	(99. 84)	**	80.49	105.57	3018.5	**-0.25**
CSM-$CBMH_2$	(105. 101)	*	92.63	114.80	4161.0	**-0.20**
CSL-$CBMH_2$	(78. 101)	*	77.97	99.29	3000.5	**-0.21**
Helping each other						
CSMH-CSL	(66. 79)	***	49.49	92.64	1055.5	**-0.54**
CSMH-$CBMH_2$	(66. 102)	***	55.60	103.20	1458.5	**-0.50**
CSMH-$CBMH_1$	(66. 83)	**	62.98	84.56	1945.5	**-0.26**
CSMH-CSM	(66. 105)	**	72.02	94.79	2542.5	**-0.24**
CSH-CSL	(98. 79)	***	71.43	110.79	2149.5	**-0.41**
CSH-$CBMH_2$	(98. 102)	***	78.91	121.25	2882.0	**-0.39**
CBM-CSL	(101. 79)	***	64.17	124.16	1330.0	**-0.59**
CBM-$CBMH_2$	(101. 102)	***	69.54	134.14	1872.5	**-0.57**
CBM-$CBMH_1$	(101. 83)	***	75.44	113.26	2468.5	**-0.37**
CBM-CSM	(101. 105)	***	82.42	123.78	3173.0	**-0.36**
CBM-CSH	(101. 98)	***	84.00	116.49	3333.0	**-0.30**
CBH-CSL	(99. 79)	***	68.42	115.92	1823.5	**-0.48**
CBH-$CBMH_2$	(99. 102)	***	75.14	126.10	2489.0	**-0.45**
CBH-$CBMH_1$	(99. 83)	**	80.52	104.60	3021.0	**-0.24**
CBH-CSM	(99. 105)	**	89.51	114.75	3911.5	**-0.22**
$CBMH_1$-CSL	(83. 79)	**	69.36	94.25	2271.0	**-0.28**
$CBMH_1$-$CBMH_2$	(83. 102)	**	78.20	105.04	3004.5	**-0.26**
CSM-CSL	(105. 79)	***	79.04	110.39	2734.0	**-0.31**
CSM-$CBMH_2$	(105. 102)	***	87.62	120.86	3635.0	**-0.29**

* =slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

Nevertheless, considering the whole population, the correlation is strong between HELP and OPINION at the BC and moderate at the X (table C-2). This means that residents who help each other tend also to share their worries, particularly at the BC. Also, residents who tend to help or share their worries with their BC´s neighbours usually do so also with the X´s residents (rho_{HELP}=0.55; $rho_{OPINION}$=0.65). This may be associated with the personality of the individuals or to the influence that having ties at one level has in developing bonds at the other.

Table C-2 Correlation between social capital variables at the BC and X

	Building courtyard				*xiaoqu*			
	Sharing worries		Help out		Sharing worries		Help out	
	Pvalue	rho	Pvalue	rho	Pvalue	rho	Pvalue	rho
B. courtyard								
Sharing worries	-	1	-	-	-	-	-	-
Help out	.000	**.701****	-	1	-	-	-	-
Xiaoqu								
Sharing worries	.000	**.654****	.000	**.410****	-	1	-	-
Help out	.000	**.401****	.000	**.553****	.000	**.428****	-	1

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

Correlation of social capital with other variables

The relationship of social capital with demographic and environmental variables is explored in addition to the relationship with feelings of safety and attachment to the community. The results show that demographic and environmental variables have a weak or negligible correlation with the social capital variables, following the same trend at both levels (table C-3). Only safety and attachment show a stronger correlation with social capital, this being weak to moderate.

The demographic variables in relation to social capital follow a similar trend as to social ties. Length of residence and age are the variables the strongest positive correlation with OPINION and HELP. Meanwhile, incomes and educational background have a weak but negative correlation with both variables at both levels. The reasoning is similar to that explained in section 4.3. Time is essential in order to build connections between people from different backgrounds, when the only common ground is the place where one lives. Also, the elderly is the group who may need more HELP but also with more time to socialise with other residents and participate in activities. On the other hand, people with higher economic level and educational background have more opportunities for leisure activities outside the community, and develop fewer social ties and social capital with their neighbours. Finally, people with more economic resources may need less help from other residents since they can hire someone in the event that they need assistance.

In relation to safety, feeling safe in the BC has a moderately positive correlation with OPINION and HELP. Indeed, sharing worries and, to a lesser extent, helping out other residents requires a safe atmosphere where people can trust others to build this relationship of confidence. However, it is important to notice that this relationship (feeling safe-social capital) becomes negligible at the *xiaoqu* level, where, generally, social ties also become weaker – considering the whole population. These differences between levels suggest that the relationship developed in the shared spaces of the *xiaoqu* are more superficial than in

the building courtyard level.

Finally, attachment has a weak to moderate positive correlation with both variables of social capital at the BC and X. Residents who are more attached to the place share their worries with other residents and help each other out more often.

Table C-3 Correlation between social capital and safety, attachment, demographic and environmental variables at the BC and X

	Building courtyard				***Xiaoqu***			
	Sharing worries		Help out		Sharing worries		Help out	
	Pvalue	rho	Pvalue	rho	Pvalue	rho	Pvalue	rho
Demography								
Length resid.	.050	**.178**	.023	**.207***	.000	**.219****	.000	**.169****
Age	.141	**.120**	.519	.053	.000	**.182****	.061	.072
Background	.797	-.020	.795	-.021	.521	.024	.629	.018
Family type	.110	**-.123**	.156	**-.110**	.463	.027	.423	.030
Income	.074	**-.144**	.345	-.077	.002	**-.132****	.000	**-.182****
Ownership	.310	.078	.488	.054	.009	.098**	.818	-.009
Origen	.602	-.041	.766	-.024	.323	-.037	.103	-.061
Education ba.	.016	**-.187***	.155	**-.111**	.001	**-.123****	.000	**-.245****
Safety								
Building courtyard	.000	**.330****	.000	**.296****	.015	**.199***	.344	.078
Xiaoqu	.155	.113	.249	.092	.859	-.007	.657	.017
Attachment	.000	**.355****	.007	**.213****	.000	**.138****	.000	**.222****
Environment								
Building courtyard								
Air quality	.682	.033	.684	.033	-	-	-	-
Noise	.570	-.047	.296	-.086	-	-	-	-
Temperature	.150	**.120**	.817	.019	-	-	-	-
Shadows	.609	.042	.233	.099	-	-	-	-
Sunshine	.396	.070	.120	**.130**	-	-	-	-
Beauty	.673	.035	.386	.072	-	-	-	-
Overall Quali.	.923	.008	.972	.003	-	-	-	-
Xiaoqu								
Air quality	.580	.044	.964	-.004	.732	-.014	.257	-.046
Noise	.868	.013	.410	-.067	.028	.091*	.179	.055
Temperature	.383	.071	.866	-.014	.271	.046	.041	-.085*
Shadows	.540	.049	.482	.057	.288	.044	.795	-.011
Sunshine	.624	.039	.420	.065	.335	.040	.599	-.022
Beauty	.879	.012	.827	.018	.650	.019	.718	-.015
Overall Quali.	.785	.022	.833	-.017	.907	.005	.886	-.006

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

Social cohesion

General comparison between communities

The social cohesion indicators –PATICIPATION, MEETING and TRUST- show no shared tendency in the comparison between communities.

The results of PARTICIPATION are related to the availability of common indoor/outdoor spaces and to the size of the community. On the one hand, the lack of organization of activities by the social administration office in CSH and CSL - due to the absence of common indoor and/or central outdoor spaces - results in lower values of PARTICIPATION than the rest of compounds (small effect size r=0.24-0.36) (table C-4). On the other hand, the smaller communities have the lower mean rank for PARTICIPATION[35] (CSM Mr=380,87, CBM Mr=418.84; CSMH Mr=361,41, $CBMH_1$ Mr=413.63, $CBMH_2$ Mr=432.10; CSH Mr=294.66, CBH Mr=386.65), likely due to the mentioned effect of *social heat*.

In relation to MEETING, the results show no clear conclusion. The availability of a meeting space, and the work of the residents committee and social administration office are relevant aspects for this variable and should be included as independent variables for further studies. Indeed, the residents of CSMH and CSL complain about the lack of involvement of the administration office in organising meetings and activities within their communities, and they have some of the lowest values for MEETING. Building height also seems to have an impact on this variable since both high-rise communities have the lowest values and larger effect sizes when compared with the better-performing community $CBMH_2$ (r=0.34 for CSH, r=0.42 for CBH).

Lastly, TRUST is related to the population size of the community. The smaller communities have higher levels of TRUST[36] except for the medium high-rise compounds (CSL Mr=404.27; CSM Mr=427.31, CBM Mr=302.52; CSMH Mr=333.89, $CBMH_1$ Mr=391.92, $CBMH_2$ Mr=385.87; CSH Mr=388.90, CBH Mr=340.49). This exception is reasonable given the significant difference of social ties between CSMH and both CBMH - the former is one of the compounds with fewer and weaker ties and the latter two have the closest networks. Certainly, smaller community size may facilitate the work of the social administration office and the residents committee in dealing with social issues at the same time as the efficiency of the management company and the guards for security measures. For example, CSM has the highest value for TRUST despite having no strong social network. This is due to the excellent organization of the resident committee in controlling security within the compound on top of the work of the guard, of course. A few residents, on a rota basis, take a walk through the community every night after dinner playing an audio recording to remind the

[35] The mean Rank here is referred to the Kruskal Wallis test
[36] The mean Rank here is referred to the Kruskal Wallis test

residents to close their doors and windows and to make sure that no people from outside are inside the community. This special security initiative managed by the residents, which is feasible for a small population size, becomes a common goal that increases the level of TRUST between them.

Consequently, the most influential variables for social cohesion are the availability of shared spaces, the work of the administration office and the size of the community. The impact of the latter is controversial since larger communities tend to have more PARTICIPATION but lower levels of TRUST, and vice versa. Nevertheless, it is important to point out that just 7% of all the participants do not trust their neighbours while 84.9% never, or rarely, participate in activities. This means that TRUST can be more easily achieved within the range of values considered for the independent variables, while PARTICIPATION is more difficult to achieve. Thus, in relation to cohesion, moving towards creating larger communities might provide more benefits than disadvantages.

Table C-4. Mann-Whitney U test for social cohesion at the *xiaoqu* level

Cases	*N* (x_0, x_1)	ΔMnd ^{NHST}	Mean Rank (x_0)	Mean Rank (x_1)	*U*	Effect size *(r)*
Participation in activities						
CSH-$CBMH_2$	(99. 102)	***	82.94	118.53	3261.0	**-0.35**
CSH-CBM	(99. 105)	***	84.21	119.74	3387.0	**-0.34**
CSH-$CBMH_1$	(99. 84)	***	78.39	108.04	2810.5	**-0.33**
CSH-CBH	(99. 102)	**	89.09	112.56	3870.0	**-0.24**
CSH-CSM	(99. 105)	**	90.24	114.06	3983.5	**-0.24**
CSL-$CBMH_2$	(80. 102)	***	72.51	106.40	2560.5	**-0.36**
CSL-CBM	(80. 105)	***	73.61	107.78	2648.5	**-0.36**
CSL-$CBMH_1$	(80. 84)	***	68.04	96.27	2203.5	**-0.34**
CSL-CBH	(80. 102)	**	78.81	101.46	3064.5	**-0.25**
CSL-CSM	(80. 105)	**	79.85	103.02	3148.0	**-0.25**
Community meetings						
CSMH-$CBMH_2$	(69. 102)	***	65.99	99.53	2138.5	**-0.35**
CSH-$CBMH_2$	(100. 102)	***	82.28	120.35	3177.5	**-0.34**
CBM-$CBMH_2$	(103. 102)	**	90.20	115.93	3934.5	**-0.23**
CBH-$CBMH_2$	(100. 102)	***	77.89	124.65	2739.0	**-0.42**
CBH-$CBMH_1$	(100. 85)	**	81.54	106.49	3103.5	**-0.25**
CBH-CSM	(100. 105)	**	90.61	114.80	4011.0	**-0.22**
$CBMH_1$-$CBMH_2$	(85. 102)	**	81.25	104.62	3251.5	**-0.22**
CSM-$CBMH_2$	(105. 102)	**	91.36	117.01	4027.5	**-0.22**
CSL-$CBMH_2$	(80. 102)	***	72.46	106.44	2556.5	**-0.33**
Trust neighbours						
CSMH-CSM	(67. 105)	**	72.87	95.20	2604.0	**-0.24**
CBM-CSM	(103. 105)	***	87.30	121.38	3635.5	**-0.31**
CBM-CSL	(103. 81)	**	81.66	106.29	3054.5	**-0.25**
CBM-CSH	(103. 100)	**	90.31	114.05	3945.5	**-0.22**
CBM-$CBMH_1$	(103. 85)	**	84.27	106.90	3323.5	**-0.22**
CBM-$CBMH_2$	(103. 103)	*	91.84	115.16	4104.0	**-0.21**
CBH-CSM	(100. 105)	*	91.00	114.43	4049.5	**-0.21**

* =slightly significant; **=significant; ***=highly significant; n.s. = not significant

R < 0.20 = negligible; 0.20 ≤ r ≤ 0.5 = small; 0.50 ≤ r < 0.80 = moderate; r ≥ 0.80 = large.

The correlation of the social cohesion variables at the BC level is moderate while at the X it is weak (table C-5). Additionally, the strong correlation between MEETING and TRUST at both levels ($rho_{meetings}$=0.65; rho_{trust}=0.66) should be underlined. On one side, this may reflect that the cohesion at one physical level benefits the other, while also the personality of the individual must influence their involvement in the community and become an important factor for this result. Indeed, the comparison between levels does not show any statistically significant difference between levels for the social cohesion variables, with the exception of TRUST in CSMH where social ties at the BC are particularly poor due to design reasons, as explained in section 4.4.2.

Table C-5 Correlation between social cohesion variables at the BC and X

	Building courtyard				***Xiaoqu***			
	Meetings		Trust		Meetings		Trust	
	Pvalue	rho	Pvalue	rho	Pvalue	rho	Pvalue	rho
Building Cou.								
Meetings	-	1	-	-	-	-	-	-
Trust	,000	**.444****	-	1	-	-	-	-
Xiaoqu								
Meetings	,000	**.654****	.008	**.214****	-	1	-	-
Trust	,003	**.241****	.000	**.661****	.000	**.255****	-	1

4.4.5. Correlation of social cohesion with other variables

In relation to demography, it follows the same trends as for social capital and social ties. Length of residence, age and ownership have a positive correlation with cohesion while communities where residents have a higher educational background tend to be less cohesive (table C-6).

Also, safety, particularly in the BC, and attachment to the community have a weak to moderate correlation with social cohesion at both physical levels. Feeling safe in the BC positively correlates with trusting neighbours at the X (rho=0.29), which once more shows the effect of the BC environment on the relationships at the X level. In the same way, but to a lesser extent, feeling safe at the X correlates with trusting neighbours of the BC (rho=0.20).

Finally, the environmental variables have a weak correlation with TRUST while their relationship with MEETINGS is negligible. Temperature, adequate presence of shaded areas and beauty are the environmental variables with the greatest influence on TRUST, particularly between the BC´s neighbours. Indeed, the latter two, shaded areas and beauty, are the most valued by the residents in order to spend time in an outdoor space, which logically influences the chances for meeting and developing trust.

Table C-6 Correlation between social cohesion and safety, attachment, demographic and environmental variables at the BC and X

	Building courtyard				***Xiaoqu***			
	meetings		Trust		meetings		Trust	
	Pvalue	rho	Pvalue	rho	Pvalue	rho	Pvalue	rho
Demography								
Length resid.	.129	.139	.260	.105	.001	.130**	.258	.045
Age	.079	.144	.807	.020	.036	.080*	.335	.037
Background	.469	-.058	.460	-.060	.717	.014	.371	-.033
Family type	.597	-.041	.386	.068	.244	.043	.171	.051
Income	.554	.048	.509	.054	.041	-.088*	.353	-.040
Ownership	.666	.034	.518	.051	.004	.109**	.871	-.006
Origen	.812	.019	.283	.086	.004	-.108**	.937	.003
Education ba.	.029	-.170*	.007	**-.212****	.001	-.119**	.002	-.116**
Safety								
Building courtyard	.000	**.370****	.000	**.511****	.000	**.297****	.000	**.291****
Xiaoqu	.055	.154	.014	.197*	.138	.055	.000	**.327****
Attachment	.001	**.269****	.011	**.203***	.000	.166**	.000	**.268****
Environment								
Building courtyard								
Air quality	.890	-.011	.156	.116	.605	-.043	.258	.093
Noise	.323	-.082	.603	.044	.485	-.058	.641	.039
Temperature	.883	-.012	.001	**.265****	.973	.003	.002	**.253****
Shade	.375	.073	.000	**.296****	.994	.001	.035	.175*
Sunshine	.222	.101	.399	.071	.640	.039	.535	.052
Beauty	.039	.170	.016	**.200***	.305	.085	.082	.145
Overall Quali.	.196	.107	.204	.106	.424	.066	.120	.129
Xiaoqu								
Air quality	.699	.031	.194	.104	.079	.071	.014	.100*
Noise	.460	-.060	.533	.051	.066	.075	.088	.070
Temperature	.618	.041	.091	.140	.077	.073	.152	.059
Shade	.296	.085	.004	**.231****	.086	.070	.403	.034
Sunshine	.403	.068	.082	.141	.026	.091*	.082	.071
Beauty	.304	.083	.018	.191*	.055	.079	.167	.057
Overall Quali.	.706	.031	.218	.101	.762	.012	.009	.108**

*. Correlation is significant at the 0.05 level (1-tailed)

**. Correlation is significant at the 0.01 level (1-tailed)

APPENDIX D. Approach to the context of the study

The definition of the conceptual framework and, particularly, the refinement of the methods of investigation has occupied the bulk of this investigation. To achieve this, four trips to China were necessary.

The first two visits (Beijing, May 2013; Ningbo, July 2013) contributed to deepening the understanding of the Chinese (social, cultural and environmental) context, engaging with the Chinese academic community and with government representatives. Structured and unstructured interviews with experts from different disciplines, and working at different scales of intervention - Chinese architects, urban designers, urban planners, and economists - from professional and academic areas were conducted in order to gain a better understanding and a holistic view of the urbanization process in China and its context, as well as to find more sources of data and information. Various topics were discussed, from national economic and demographic flows to the social and environmental problems at the scale of the neighbourhood, as well as land management systems, policies, regulations, and limitations and procedures of the urban planning system in China. The findings from this first visit contributed to shaping the conceptualization of the study and complementing the statistical analysis previously conducted at national scale - inter-regional and inter-provincial comparisons of demographic, economic and land development and investment - to identify the provinces with a greater potential for growth over the coming years in China and select the location for the investigation.

The third visit to China (June to July 2014) was focused on carrying out a pilot study in Ningbo to consolidate the research objective of this investigation, in addition to testing the procedures for data collection and analysis. Thus, on the one hand, the pilot study offered a closer understanding of the Chinese culture, its values and traditions, and the daily life of the urbanities in large cities. Also, identifying representative features of traditional and contemporary Chinese architectural and urban design and a deeper understanding of the morphological structure of the Chinese city - considering its influence on the life style of its residents - represented the foundations on which the social confines of the research were built. Additionally, a more thorough investigation into the interpretation of the concept of ‘neighbourhood’ in the Chinese context - not necessarily analogous to ‘western’ paradigms - was essential in order to draw the physical boundaries and the extent of the social aspects explored. On the other hand, the pilot study also made it possible to properly define the methods of data collection, barriers, time requirements, and resources needed to perform the field work necessary to reach the expected outcome of this PhD research. Interviews, questionnaires, and observations conducted in two gated communities during the pilot study revealed that the functional, typological, and morphological changes from the *danwei* of the pre-economic era to the current *shequ* structure have had significant impacts on the social life among residents, and on indoor and outdoor environmental conditions.

The last visit (Shanghai, April to July 2015) was to initiate field work which was to four months to collect the data necessary for the analysis and to support the testing of the hypotheses. The field work was conducted in nine gated communities (*xiaoqu*) in Shanghai (China). The duration of the trip was based on the experience gathered during the pilot study and later adjusted given the barrier of weather conditions (monsoon season) and the opportunities to broaden the study to three communities more than was initially intended. The dates of the trip were selected based on the requirements to conduct the field work in a seasonal transition period where the behaviour of people can be observed under different weather conditions (spring and summer season). Spring is likely one of the best periods of the year in Shanghai for residents to make use of the outdoor space which facilitates the collection of data for the researcher. On the other hand, summer also offered the possibility of meeting many residents in the outdoor spaces but it can be more difficult and less stable because of the monsoon season and the high temperatures and humidity levels which can be reached, providing a different scenario for analysing daily life. The gated communities or *xiaoqu* for the field work were selected according to the main physical variables of interest and the average socio-economic level of the communities - see section 3.4 for further information of the case studies.