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Accessibility
Striking Balances between China’s Urban Communities,
Blocks and Their Layouts

By
Peter G. Rowe and ChengHe Guan

Abstract.

Striking appropriate balances between encouragement of finer-grained urban block arrangements and accessible residential communities, alongside of continuing commitment to community identity, solidarity and custom is approached by tracing China’s longstanding and well-defined spatial concepts of community, followed by discussion of how networks of public thoroughfares may facilitate or impede flexible community development. Analyses of the relative performance of thoroughfare networks are offered at several urban scales. An argument is made for tempered approaches based on local conditions and movement away from fixed blueprints for urban development.

Keywords: community concepts, thoroughfare networks, urban block arrangements.

Prominent features of China’s modern urban development are large block configurations that often help define and make up the neighborhoods and sub-districts of its cities. These blocks, combined with coarse-grained networks of vehicular thoroughfares have persisted at least since the advent of modern Chinese planning in 1949, if not before in the Concession areas of Shanghai and elsewhere, alongside of other parts of East Asia and most notably Singapore and South Korea. Measuring as much as 300 to 500 meters on a side, these urban blocks are often well bounded by walls, fences, as well as other structures, and usually with well-controlled means of entry and egress. The neighborhood communities inside typically enjoy at least a perceived degree of safety and security, alongside of modicums of self-sufficiency in basic community and consumer services (Rowe 2011). The size and relative availability of large urban blocks has also been a boon to developers wishing to maximize returns on investment and to local governments wishing to minimize the extent and complications of infrastructure improvements. Cursory examination of Detailed Control Plans, a fixture in China’s urban master planning process, also indicates a high degree of conformity in the manner in which large urban block neighborhoods were created (Wang 1962; Read and Pekkanen 2009).

Today, by contrast, China’s central planning authorities have begun to re-consider their long-standing adherence to principles behind large-block neighborhood configurations. In February of 2016, for instance, the State Council issued ‘A few Suggestions for Promoting and Reinforcing Planning Construction and Management’, calling for cessation of the “construction of enclosed residential neighborhoods, in principle”, among other stipulations, and creation of “a dense urban road network with narrow streets” (State Council 2016; Ministry of Housing and Urban-Rural Development of the People’s Republic of China 2016). No doubt this was a response
to rising levels of traffic congestion, associated environmental pollution, and calls for higher levels of access to urban communities, especially in major cities. Nevertheless, by thrusting in particular and rather emphatic directions, these actions raise questions about where and how to strike appropriate balances between encouragement of finer-grained urban blocks and accessible communities, alongside of commitments to community identity, commodiousness and custom.

What follows is, first, a tracing of the Chinese concept of community and particularly its essential spatial quality. This is followed by an unraveling of different urban conditions in several Chinese urban contexts for the purpose of characterizing the veracity, or not, of recent central government reactions to the presence of inefficient roadway networks. Then, performance aspects of urban block structures, in general, are discussed from the vantage point of shortcomings and opportunities of large urban block layouts. This is followed by suggestion of a tempered and balanced approach, arguing essentially against ‘one size fits all’ and for ‘not throwing the proverbial baby out with the bathwater’.

**The Spatiality of Chinese Neighborhood Communities.**

In broaching this topic of balance, especially in the specific cultural milieu of China, it is important to bear in mind several of its qualities. First, there is the idea of community itself and what is essential to it. Second, there are the aspects of performance among arrangements of urban blocks that either facilitate or impede the essential characteristics of community. Moreover, discussion should move in that order, for it is the prescription and quality of community that is at stake and not the convenience of infrastructural improvements and property acquisitions. Furthermore, it is interesting to understand what is or might be considered to be Chinese about community, as distinct from elsewhere in the world. Within the Western ecumen, for instance, there is both a history and a presence of different concepts of community. Moving forward in time, for example, there was the ‘phalanstere’ of Fourier, founded around 1810 and later leading to co-operative towns like New Harmony in the U.S. The ‘Garden City’ ideal of Ebenezer Howard, dating from 1898, encompassed both towns and country scaled at around 32,000 inhabitants with neighborhoods on the order of 3,000 people. Applications of ‘Garden City’ principles were widespread in Europe and the U.S., including the towns of Welwyn and Letchworth in the United Kingdom. Then there was the formulation of the ‘neighborhood unit’ by Clarence Perry in 1930, with each unit inscribed within a 800 meter walking radius, centered on a school and other community facilities and reaching populations of from 3,000 to 10,000 people.

In China, there was an older, more sustained and integrated set of ideas about community, with clear definitions dating back well into antiquity. Early on there was the *li* and *zu* configuration of the Zhou Dynasty (1046-771 BC) and the Shang Dynasty before that. There, arrangements of households in a *li*, or neighborhood, were nested in relationship to *zu*, or clans (Rowe, Forsyth and Kan 2016). Also at work in antiquity, there was the legalism of Confucianism, with nested arrangements through time of *li,*
or hamlets, in relation to tang, or communities, and to xiang, or villages. By the time of the Tang Dynasty (618-907) enclosed residential wards were formalized as fang and in the case of Chang’an they became four-sided domains surrounded by walls and gates enclosing areas up to and beyond 90 hectares (Rowe, Forsyth and Kan 2016). Moving further forward in time, the baojia system of the Ming and Qing Dynasties were in place. Under the Yongle Emperor (1402-1424), for instance, every 20 households constituted a jia and ten jia formed a bao, also known as a pu. By the middle of the sixteenth century the capital of Beijing had 37 wards comprised of 670 pu, with each ward accommodating around 3,600 households, on average, with some as high as 25,340 people (Rowe, Forsyth and Kan 2016).

Then in more modern times during the Republican Period and certainly by its ‘1939 Regulations’, a nested hierarchical arrangement of community was extended from jia to bao and to zhen or xiang, comprised of several bao, or protective groupings at the time. In short, townships were made up of bao consisting, in turn, of from 6 to 15 jia, with each jia totaling some 225 households or as many as 1,200 to 1,300 persons. Moving into modern times under the tutelage of the Soviet, the danwei, or work unit configuration of community quickly gained widespread use, an example of which is shown in figure 1. Again it was a hierarchically-nested grouping of households, ranging from residential clusters – so-called ‘four dishes and one soup’ – all the way up to districts, referred to as jiedao in post-1958 China, comprised of basic living units, or xiaqu. Such arrangements also culminated in veritable ‘cities within a city’, as was the case of Caoyangxincun in western Shanghai dating from 1951 and by the 1980s housing over 100,000 residents (Lu, Rowe and Zhang 2001). Finally, more contemporary residential units usually operate under the concept of shequ, adopted by the Ministry of Civil Affairs in the late 1980s, primarily to provide basic services to local populations and to organize educational programs.

Throughout this evolutionary process, several aspects of community have remained consistent and conspicuous. First, community in China is intrinsically spatial and associated with particular places, whether they are defined settlements shared by a group of people, a common native place, an organization within civil society serving a particular locale, or, with the danwei, a place of work. Second, arrangements of community are invariably scaled-up and nested together hierarchically, even dating back into antiquity. Moreover this is a recipe that can be applied in one place or more or less equally in another. Third, positive development of social capital has been and usually is high and sustained throughout. Fourth, long-standing customs and preferences of inhabitants persist, generally favoring some degree of enclosure for safety and security, as well as maintenance of a pleasant, almost rurally-inclined ambience. Finally, probably more than elsewhere there is a convergence of the related but otherwise separable concepts of large blocks as megaplots that are physical, with superblocks that are essentially institutional and matters of jurisdiction (Whiting 2004). In addition, community both encourages and sustains a strong sense of self-identity for inhabitants. On par, it is a long-lived, culturally ingrained and socially agreeable condition not to be trifled with.
Different Network Manifestations in Urban Circumstances.

With regard to the second aspect of well-balanced communities fostering or not essential characteristics of community, particularly with regard to physical layout, considerable variation can be encountered and in different ways. First, distinctions often exist across central areas of cities compared to often later peripheral and peri-peripheral patterns of development. Second, variations can be encountered within cities in different regions of the country produced by particular yet differing geographies, histories, developmental circumstances, degrees of modernization, and so on. China is, after all, a big and diverse country. Third, within the realm of international outside influences in manners of urban district making, particular approaches have come and gone, being locally emulated to lesser or greater degrees. For the purposes of this paper three cities were examined. They were Beijing, Shenzhen and Shanghai. They also coincided with the sites of numerous interviews aimed at informing the status of China’s community well being referred to earlier (Rowe, Forsyth and Kan 2016). Within each city three areas were selected for further analysis, reflecting differences from central city to peripheral and peri-peripheral thoroughfare networks and patterns of development.

Figures 2, 3 and 4 show the road networks involved, as well as the areas that were selected for deeper analysis, each on the order of two kilometers square. Data were then compiled for each area according to five classifications of thoroughfares, ranging from small and low in capacity, such as streets and local roads, up to large and higher in capacity, like arterial roads and highways. Four measures were then used to assess the relative performance of each study area within each city. As shown in figure 5, these included intersection density, providing an indication of capacities to allow turns in direction for way finding and also to relieve monotony particularly in pedestrian movement. Understandably, central areas in all three cities had higher intersection densities, although in Shenzhen, a very new city, both the variation across areas and their magnitudes were comparatively low. This no doubt reflects the absence of a historical city core and the even-handed modernist manner of city layout in general. On par, Beijing and Shanghai have similar densities, but with significantly higher densities in the developed peripheral areas of Shanghai.

The second measure, again as shown in figure 5, is length density of thoroughfares per square kilometer, where Shanghai was somewhat superior overall, but again with densities declining towards each city's periphery. More telling, particularly with regard to traffic moving capacity and congestion abatement, Shanghai was clearly superior among the three cities in the third measure concerned with lane density per square kilometer of thoroughfares. This may be partly due to the sampling of areas within the study, although other data and findings show similar results, with Shanghai on the order of 50 percent higher in capacity and road density measures than, say, Beijing (Pan 2013). In relation to other cities elsewhere in the world, like Barcelona and New York, however, Chinese cities appear to have far less road density the corollary of which is larger urban block sizes, especially outside of the concentrated inner-city areas. The fourth measure, driven as much by the circulation
capacities of networks thoroughfares and fineness of grain of urban blocks, was way finding, defined as the number of ways of moving from one location on one side of the study area to another location on the other side of the area. Here again Shanghai appeared to have the potential for performing better.

**Aspects of Performance among Urban Block Arrangements.**

Both in principle and in kind, several considerations inform the relative performance of urban block arrangements of varying sizes and geometries. Figure 6, for instance, demonstrates some of the variation to be had among several well-known and regular layouts of urban blocks, with Barcelona, Los Angeles, Shanghai and New York rendered at the same scale. Road areas are much the same, varying from 24 to 28 units, and yet the number of thoroughfares and alignments vary considerably, with a low of 6 for Shanghai and highs of 12 for both Barcelona and New York City. As a consequence the number of intersections within the same given area, presenting potential for alternative ways of path finding, also vary from 36 for Barcelona down to just nine for Shanghai. Building volumes are different among the cities, although this is also largely a matter of allowable site ratios and significant underground development in the case of Barcelona. Open space distributions in the arrangements from which these urban blocks were drawn were reasonably similar, led by Shanghai, but with the exception of New York with its relatively low proportion.

One consideration for street networks and urban block arrangements is an inherent capacity to foster reasonably flexible changes in uses abutting thoroughfares when necessary or called upon during cycles of urban growth and change. This is often a matter of the despecialization of use or primary function in buildings due to fluctuating market forces requiring both a redistribution of useful access and an accommodating flexibility in building stock. One conspicuous downfall of unrelieved megalot arrangements in Chinese cities upwards, say, of 400 meters on a side is the lack of potential for conversion over time from one set of uses flexibly to others. Finer-grained arrangements of urban blocks with less-specialized buildings are inherently more flexible as can be seen from simulation results in figure 7. This outcome was also forcefully argued for by the likes of Jane Jacobs over New York City’s Greenwich Village in the 1960s (Jacobs 1961). Also, as a corollary to accommodating processes of despecialization in the interests of efficient functional conversion, reasonably fine-grained arrangements of urban blocks can be occupied in different ways. Moreover, if well scaled, as was the case in Ildefonse Cerda’s layout for the extension to Barcelona in the mid-nineteenth century, the same blocks can accommodate a diversity of use at the outset. On the other hand, there are also clearly limits involved here as well. Greenwich Village, for example, is but one kind of community and not necessarily well suited to other cultural circumstances and life-styles.

Another consideration in urban layout is appropriate accommodation within blocks of building types and their particular sizes, geometries and regularities. Matters would be simplified if buildings were completely mutable by way of their physical
characteristics. However, they are not, yielding particular dimensional qualities and regularities in building footprint, for instance. Perimeter block buildings, often used to define the edges of urban layouts and often occupied by residential uses tend to be on the order of eleven to fifteen meters in width, as shown in figure 8. Other building types, like parallel arrays of slab block apartments, common in China, have dimensional qualities in plan determined largely by the width of the blocks and the spacing between rows, determined by geography and sun-angle exposure for certain periods of time. In addition, as shown in figure 9, buildings for different primary uses vary considerably in ideal footprint and thus combinations of buildings occupying the same block require certain basic dimensions for those occupied blocks. Among selections of high-rise commercial towers, for instance, the industry standard, at least in the U.S., is on the order of just over 2,000 square meters in floor plate size, going as low as around 1,600 square meters in some prominent projects and as high as 5,500 square meters in the case, say, of Roppongi Hills with its very wide footprint used to accommodate contemporary service requirements. For residential high-rise buildings, by contrast, the industry standard is around 450 square meters in footprint, moving down to as low as 360 square meters and up as high as 800 square meters. In these regards, the 64-meter width of the New York City block has accommodated a variety of building types, and is, in fact, suited to combinations of the standards of high-rise commercial and residential towers. The Barcelona block at 113 meters on a side, by contrast, was and remains well suited for perimeter block arrangements in combination with some wider building footprints.

On the other side of urban blocks being determined dimensionally from the inside out is their suitability for traffic movement and circulation discussed earlier for several cities. In principle, urban blocks can be arrayed as regular patterns of squares of different dimensions and subdivisions as shown in figure 10. A megaplot at 400 meters on a side, for instance can be further subdivided down to 80 meters on a side while still remaining viable as a block size in an urban context. Portland’s urban grid, for instance, is smaller still in the U.S. As shown in figure 10 though, even in this perhaps simplest of urban block configurations, rather different characteristics emerge with implications for performances, including those discussed. Traffic movement and circulation is clearly defined by an arrangement’s numbers of thoroughfares and intersections. It is well known that, \textit{ceteris paribus}, the number of routes that might be taken during moments of traffic congestion increases substantially with the fineness of the grain of an urban block arrangement and, of course, the number of intersections. Indeed, the number of routes to the number of intersections rises exponentially, as shown in figure 11, suggesting that congested situations can probably be improved dramatically with relatively few additional rights-of-way in a given urban area.

Much the same outcomes follow from regular rectangular arrays, as shown in figure 12. In fact, the rectangular geometries probably mirror real urban circumstances more closely. The 220 by 70 meter block pattern is reasonably close, for instance, to the New York City pattern of 254 by 64 meter blocks. Again, both the numbers of thoroughfares and intersections increase quite quickly from one subdivision down to
the next. Also, the ratio of numbers of way-finding routes within the arrangements of blocks to the numbers of intersections also rises exponentially, as shown in figure 13. However, also of note is the relatively slow rise in this respect up to patterns of 8 thoroughfares and above. As with the regular square block layouts the intensity of intersections rises evenly per area of development, as one might expect. Clearly though and up to a point, finer-grained and accessible arrangements perform better than larger-block and coarser-grained counterparts at least with regard to traffic circulation and pedestrian movement.

Yet another consideration, particularly with regard to the amenable performance of urban block arrangements, including walkability, derives from the quality of the thoroughfares and pedestrian paths associated with particular examples. As shown in figure 14, this is particularly obvious in the various cross-sectional qualities of thoroughfares. In some of the world’s most prominent urban spaces, the streets, avenues and rambles have several carriageways and varying overall dimensions, like the Champs Elysees in Paris at 67.4 meters in width, for example, to the just as renowned Rambla de Catalunya in Barcelona at less than half that width at 30 meters. Far more perfunctory yet necessary service alleys at around four meters in width in many places are on the same scale as, say, medieval streets in Rome. In spite of Chang’an in Beijing and Century Avenue in Shanghai, the typological array and urban dimensional qualities of most thoroughfares in China are both limited. Usually they are imbued with a more functional than spatially well-attuned attitude to their materialization. The walkability of thoroughfares is usually more a matter of the spatial enhancement for those passing by. To be sure this is often dependent upon tree cover, storefronts and well-paved places to walk. However, it is also a matter of the scale, length and other dimensional qualities of the arrangements of streets and urban blocks (Rowe 2014).

Not a Case of One Size Fits All.

Returning to the main theme of this paper, several observations stand out. First, there is no Archimedian point or optimal solution for patterns of streets and urban block arrangements. While finer grains may improve circumstances, at least up to some point, the scale and robustness of designated neighborhood community areas must also remain intact. Also, this appears to be all the more so in China where the distinct spatial character of community has been and remains so strong. The balancing of concepts of a broad spatially defined community and the concept of flexible, accessible urban block arrangements is what is at stake and will depend on particular local circumstances. This immediately obviates the need for one-size-fits-all kinds of blueprints or even blueprints of any kind. Furthermore, attendant issues of traffic congestion and access to communities can be tackled effectively by other means, such as implementation of more and better public transit or opening a few more proverbial gates and similar barriers, many of which are more ceremonial than they are actual.

Of more importance moving forward will be useful examples of striking appropriate and better balances. Retrofitting megaplots with increased numbers of thoroughfares
and points of access, as well as pedestrian pathways, can be undertaken in numerous cases. Relatively minor opening of access to otherwise robust community domains of former danweis through the walls, fences and other barriers that were requisite in former times can easily be accomplished and is, indeed, happening. Re-conceptualization of new and existing megaplot configurations into areas with greater edge porosity and potential for street activity can enliven otherwise vacuous edge conditions to neighborhoods and commercial sub-districts. As suggested by figure 15, arrangements of varying porosity can be devised that open up edges, encourage mixtures of uses along those edges of megaplots and yet still preserve sizeable tracts of unencumbered property for consolidated community use and development. In addition, the manner in which major thoroughfares and local streets are orchestrated together can improve way finding, as well as reduce congestion. Again as suggested by figure 15, this is certainly the case in New York City’s ensemble of Drives, Avenues, and major as well as minor streets.

References.


Illustrations.

Figure 1: Example of a Danwei Community Configuration: The Million Village in Western Beijing of the 1950s.

Figure 2: Road Network of Beijing and Three Study Areas.
Figure 3: Road Network of Shenzhen and Three Study Areas.

Figure 4: Road Network of Shanghai and Three Study Areas.
Figure 5: Intersection Density, Road Length Density, Lane Density and Way Finding in Three Cities.

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Roads were classified into five categories based on functional characteristics, access to land, mobility, travel speed, travel distance served and service to through traffic. They are principle arterials or highways, arterial, collector, local, and street. Source: PRC Ministry of Construction, 1995; Huang, 2005; and Dong et al, 2013.

Figure 6: Examples of Regular Urban Block Arrangements by City.
Figure 7: Simulation of Potential for Despecialization of Use among Urban Blocks.

Figure 10: Regular Square Street Grids, Intersections, Routes and Blocks.
Figure 8: Dimensional Qualities of Perimeter Block Defining Buildings.

Berlin-Kreuzberg, OMA, 1989
8th, 25 units, 48m² - 120m², subsidized, court in maisonette units

Block One, Almere Centrum, de Portzamparc, 2006
3rd-4th, 52 units, 124m² - 213m², private, garden-court

Berlin-Tiergarten, IBUS, 1989
7th, 31 units, 48m² - 116m², subsidized, garden backyard

4th, 74 units, 66m² - 122m², subsidized, garden on parking
Figure 9: Dimensional Qualities of High-rise Commercial and Residential Buildings.
Figure 10: Regular Square Street Grids, Intersections, Routes and Blocks.

Figure 11: Relationships among Intersections and Routes for Regular Square Grids.
Figure 12: Regular Rectangular Street Grids, Intersections, Routes and Blocks.

Figure 13: Relationships among Intersections and Routes for Regular Rectangular Grids.
Figure 14: Sectional Qualities of Selected Streets and Other Thoroughfares.
Figure 15: Street Networks of Varying Porosity and City-wide Connection.