
LESSONS FROM EUROPE FOR CHINA?

New Urban Sub-Centres for a Polycentric Network City

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ABSTRACT

This paper compares two cases: It relates to the development of new urban sub-centres in China, and the relationship of these sub-centres to 'Network City' theory. As cities move towards more polycentric systems, the case of Potsdamer Platz Berlin, compared to Zhenru Sub-Centre in Shanghai, is discussed. Both are transport-oriented developments promoting mixed-use density and transport-oriented development. According to the documentation by Shanghai municipality, this new urban centre, which is currently in its planning phase, is supposed to become a 'sustainable sub-centre for a growing metropolis.' The author, who has intimate knowledge of the Berlin case, was asked to advice on the Chinese project, based on the Potsdamer Platz experience. After some hesitation, a series of careful recommendations were formulated for the design and development of the Zhenru Sub-Centre, knowing that it is rather difficult to translate from one case to the other. The conclusion includes five recommendations for the urban design of such sub-centres, to ensure a delivery of economical, social and environmental sustainable outcomes.

KEYWORDS

New urban sub-centre, network city theory, China's rapid urbanization, sustainable city

INTRODUCTION

Urbanization is a defining feature of the 21st century. Between 2010 and 2030, some 90 per cent of total global urban growth will take place in developing countries—projected to triple their entire urban area (UN-Habitat; The World Bank, 2009). This unprecedented urban expansion poses a historic challenge and opportunity to cities, nations and the international development community, and provides a once in a lifetime opportunity to plan, develop, build and manage cities that are ecologically and economically sustainable, and socially more inclusive.

"We are headed for the death of cities" (due to the continued growth of personal computing and distributed organizations advances) "cities are leftover baggage from the industrial era."

—George Gilder, 1995

The trend towards urban network configurations, away from the mono-centric city centre model, can

be observed in many large cities around the world. This can be seen both in urban structures and their underlying patterns of activity and mobility, but also in relation to the increasingly pluri-centric nature of decision-making structures. It seems that the move towards poly-centric network urbanization is a necessity for large cities, when they grow beyond 3 or 4 million people (as cities like Sydney, Melbourne, Singapore are all in this range of size, they are now moving towards poly-centric models, away from the previous single city centre model).

Since today all major cities seem to compete with each other to attract investments and a talented workforce, the development of specially branded metropolitan/urban sub-centers, separate from the historical city core, has emerged as a strategy to upgrade, diversify and increase the attractiveness of the metropolis. If these new sub-centres are developed as transport-oriented clusters, with a strong focus on public transport, compactness and achieving the right mix of programme, it may be possible to achieve sustainable outcomes for such developments.

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However, with greenhouse gas emissions escalating, the appropriate restructuring of our cities is crucial. A frequently heard question is: what models should we learn from? For instance, are Stockholm, Barcelona, Freiburg, or Singapore expressions of today's best practice? In addition, are any of them a model relevant for the future of, say, Chinese cities, with their entirely different constraints, context, demographical change and speed of action?

Successful urban design appears to be mainly a question of design quality and getting the right programme mix. Analysing such urban mix, we need to be careful in deciding for new precincts what should the proportions be of:

- Public and cultural buildings, representing government and institutions;
- The integration of transport, where stations have previously been called 'the cathedrals of the 19th century';
- The percentage of commerce/retail/workplaces;
- The percentage of residences (with a wide range of typologies); and
- Green spaces and open public spaces.

URBAN TRANSFORMATIONS DURING THE 1990s: CASE STUDY POTSDAMER PLATZ

"Only in the light of the public sphere did that which existed become revealed, did everything become visible to all."

—Jürgen Habermas

London, Paris and Berlin have all evolved as centres of civic architecture, each with its own variation on the theme of urban space and density. The development of these city centres owes much to the equilibrium between ideas about public and private spaces. We can easily identify their different approaches:

- *British*: 'Long-life, low-energy, loose-fit' approach, as espoused by Alex Gordon in 1974, with a concern for a more humane built environment, against high-rise tower blocks (such as the much disliked The Barbican).
- *French*: 'Grand gestures' of urban planning (e.g. from Haussmann to La Defense), with a Paris-centric focus even before Mitterrand's Grands

Projects, until the late 1980s (an example for this is Ricardo Bofill's theatrical public housing Abraxas in the banlieues).

- *German*: After World War II, most of the destroyed German cities (in East and West) were rebuilt according to the supposedly new guiding vision of rising car traffic, in an attempt to overcome not only the narrow old towns, but also its own dark history. It created the supposedly new idea of re-urbanization. This changed sharply with the 1973 Oil Crisis, when environmental performance started to emerge as the key generator of all urban form. Today, Germany's decentralized settlement structure is highly polycentric, following the fragmented structure of its federal states.

In Berlin, public discussion about the urban development re-started in 1957, with two opposing models: the IBA in Tiergarten Hansaviertel (in the West), and the Stalin-Allee (in the Soviet-occupied East). During the entire 1990s, until today, the re-unified Berlin was guided by the 'Planwerk Innenstadt,' and the backwards-looking principles of *Kritische Rekonstruktion* (critical reconstruction), developed and implemented by the Senatsverwaltung (formulated by Joseph Paul Kleihues and Hans Stimmann, around 1991–92). The 'critical reconstruction' principles included, besides other regulations, limiting building heights to 22 metres, and limiting volumes and plot sizes by preventing the amalgamation of sites, to retain the historic street pattern. One of the most acclaimed projects of large-scale urban renewal from this period, creating a new 'city within the city,' was the Potsdamer Platz development (built between 1994 and 2000, based on the results of several design competitions).

With the fall of the 'Wall' on 9th November 1989, the Potsdamer Platz site returned to the center of the city, to take on the role and symbol as the central area between former Berlin East and Berlin West. The reconstruction of Berlin's centre in 'Mitte' (heart), had quickly taken on the role:

- to stitch together the two opposed political and urban systems (East and West),
- to re-introduce the quality of the compact, mixed-use European city model as guiding typology, and was immediately

- understood as space of political manifestation (symbol of reunification).

Around 1990, Berlin identified also an urgent need for large-scale commercial buildings, and speed of delivery was essential, was Berlin to become again the capital of a reunified Germany (as was decided by the German Parliament, after heated debate, in 1991). The two leading developers—representing the high-tech companies Daimler and Sony—were from the beginning interested in energy-effectiveness for their parts of this new city district, as ‘green buildings’ are seen to be easier to let (usually yielding higher rents); it was also understood, with rising energy and water costs, that operational expenses of new precincts were increasingly relevant. The explosion of demand of office space in Berlin around 1990 is maybe comparable to the demand we see in China today (although of much smaller scale): new urban sub-centres were needed to satisfy the demand. In Berlin, this coincided with a shift towards an urban architecture where buildings are seen as the new ‘palazzos,’ and where a well-distributed urban density meant delivering a sense of regained urbanity appropriate for the future capital.

Today, Potsdamer Platz has very much its own unique atmosphere: This is the place where contemporary architecture and lively metropolitan ambience meets Berlin history; the area has re-emerged as the symbol of the ‘New Berlin.’

The rediscovery of the ‘European City’ model with its compact block typology and mixed-use character (as opposed to the American, mostly car-dependent model with air-conditioned high-rise buildings), marked a sharp turning point in the urban design of the 1990s: It had a remarkable effect on the urban design discourse during the entire decade. Completed in 1999, it is fair to say, that Potsdamer Platz has a huge influence and effect on urban designers worldwide.

The rediscovery of the European compact mixed-use city model was connected to three main tendencies: Critical Reconstruction, Post-Modernism and Compact City Theory (as was formulated by Aldo Rossi, Christopher Alexander, Heinrich Klotz, Leon Krier and others theorists).

In Germany, the 1973 Oil Crisis had a huge impact on rethinking cities, which were now under-

stood as energy-hungry, stressed systems, not in balance with nature or ecological principles. During the 1990s, the cities of Curitiba, Copenhagen and Barcelona emerged as examples for innovative planning, as leaders of change and of new thinking about the future of regenerated city centres.

The new district at Potsdamer Platz is the result of a 2-stage extensive competition process and public debate. The 19 buildings in the Daimler area were constructed according to designs by ten international teams of architects, under the artistic leadership of Italian architect Renzo Piano (RPBW).

The Potsdamer Platz masterplan developed by RPBW in 1992–93, clearly followed the idea of the ‘traditional European city model.’ To ensure diversity in architectural language, ten different offices were involved in the design of the various parts of the masterplan. Regular ‘design charette’ meetings between all architects over the period of four years ensured the integration and coordination of the diverse, individual contributions. RPBW managed to translate the rigid design guidelines, which were set earlier by the Berlin Senate and the designers Hilmer & Sattler (the result of an earlier urban planning competition as basic framework for the entire urban development), into a contemporary urban district.

It was clear that the proposed public space network of the new district needed particular attention. Piano’s plans laid down the pattern of streets and blocks of the entire complex. It’s worth to remember, that the design starting point was an almost completely empty area with a large number of historical references, which, however, were no longer tangible; the few exceptions on the site being Haus Huth, which had survived World War II unscathed, the Metropol Hotel and the remains of Potsdamer Street.

Piano’s concept established a convincing solution for the visual link with the nearby Kulturforum, as well as the inclusion of large water bodies in the development. All around Marlene-Dietrich-Platz, the architects grouped the buildings of most public nature: the theater, casino, restaurants, hotel, retail outlets and cinemas. This piazza was conceived as the heart surrounded by an ensemble of independent buildings.

As a key element of lively urban culture, the design of the ‘street’ was given much attention

(its profile, width, design quality materials, etc.); the streetscape was again regarded as an important public space, which should not be dominated by vehicles, but by the '*Berlin Flaneur*.' Short distances between places within the quarter, achieved through strong pedestrian connectivity, and a variety in the architectural language of the individual buildings has helped. Other architects' offices were invited and commissioned to plan different buildings, including: Arata Isozaki and Steffen Lehmann (Tokyo/Berlin), Christoph Kohlbecker (Gaggenau), Hans Kollhoff (Berlin), Ulrike Lauber and Wolfram Wöhr (Munich), José Rafael Moneo (Madrid) and Richard Rogers (London), among others. A set of design guidelines for the different blocks were agreed on in design charrettes; these included that the facades had to be primarily of terracotta, brick and warm-coloured sandstone (no use of granite), so that the buildings would express a distinctive warm and inviting atmosphere. Nearly all of the buildings have been designed with arcades at ground level. Sidewalks up to eight meters wide provide enough space for various outdoor events.

The inclusion of water areas has a positive impact on the microclimate (a water area of 1.2 hectares provides a balance to the district's urban density). In the phase of optimizing the planning, with regard to the usage ratios, a programme mix as combination of offices, residential and commercial/retail of 50:20:30 was agreed upon. Unrestricted access to the ground floors of all buildings was an important element in the concept of harmonious coexistence of public and private space. Invisible for residents, most of the deliveries to the buildings in the district arrive underground in order to keep the streets free of delivery vehicles.

The Potsdamer Platz project was supported by experts in construction ecology right from the start. An ecological concept was developed and implemented, covering both the period of construction as well as the operation of the buildings following completion. Construction materials were chosen with due consideration of health and environmental aspects; energy consumption and the emission of pollutants were minimized.

What did we learn? The result has been that, as urban designers, we need to respect the following basic and holistic approach:

- Not to cut-off the new centre from its surrounding context (not to create an 'island' or 'city within the city');
- Connectivity is everything, with a focus on pedestrians, cycling, public transport;
- Due to a general planning tendency towards systems and networks of centres, inter-linking becomes crucial;
- There is a new understanding and valuing of public space: a high quality public realm is again appreciated;
- A vibrant city needs large-scale and small-scale, bottom-up and top-down approaches, all at the same time; and an integrated set of solutions.

It needs to be mentioned that there is extensive research documentation on Potsdamer Platz available (by leading authors and critics, such as Balford, Lampugnani, Kieren, Nerdinger, Zohlen, Buddensieg—just to name a few), and the reader will already be aware of some of it. It is not the purpose of this paper

FIGURE 1a. Aerial photo, showing Potsdamer Platz Berlin: a new city district within the city, with the aim to stitch Berlin's two halves together; built 1993–1999; total 800,000 sq m floor space. Masterplans developed by Renzo Piano Building Workshop, Helmut Jahn, Giorgio Grassi et al. An example of a privatised (quasi) public space at the heart of Berlin; a circumstance that has already received widespread debate in the mid 1990s.



to repeat a widely discussed body of work. However, it is of interest which conceptual parts of Berlin's regeneration project might be relevant for China's urbanization today, putting the expertise and experiences gained to the advantage of the Chinese cities.

At Potsdamer Platz, a set of simple concepts to achieve sustainability on the urban scale was implemented, including:

- Aiming to reduce solar gain in summer and heat loss in winter, through orientation, compactation and high insulation;
- Maximizing natural ventilation and day-lighting (the end of deep plans), using passive design principles from the conceptual design stage and narrow, maximum 15 metres wide blocks;
- Developing an 'Energy Masterplan' at the beginning, to map out the best strategy and position of the BHK (*Block-heizkraftwerk*, a high-efficient gas/co-generation plant delivering district heating and energy);
- Using non-polluting materials and focusing on material flows, to avoid waste;
- Reducing car-dependency through a strong focus on public transport and walkability;
- Using grey-water cycles and green roofs for all buildings; and
- Managing waste-streams in a better way, e.g. retaining rainwater run-offs in the district, recycling through better urban water management systems, etc.

I believe, a decade later, we can be much more ambitious and achieve better outcomes concerning 'Zero-Emissions–Zero-Waste' concepts, and concerning better social inclusion. Recently, more generic, universal building typologies have (re) emerged, which will improve the longevity and flexibility of buildings. Simply by designing buildings that are fit for use for 60 years, instead of only for 30 to 40 years, helps to achieve environmental sustainability and reduce significantly greenhouse gas emissions. Flexible building typologies are the pathway to better longevity of buildings, thus making them more robust and adaptable to user changes.

Vibrant cities are highly complex and often messy places, and one of the prime principles to achieve this is to avoid the creation of mono-functional structures.

FIGURES 1b and c. Images showing Potsdamer Platz high rise towers, designed by Renzo Piano, Hans Kollhof and Helmut Jahn: overall, a new 'City within a City' emerged. Some figures: Around 75 per cent of all visitors arrive by public transport. There are over 10,000 workplaces at Potsdamer Platz. Site area (Daimler site): around 80,000 sq m. Gross floor area, total: approximately 500,000 sq m.



Consequently, 4 types of preferred developments for Sub-Centres have emerged:

- Redevelopment of brownfield sites (instead of greenfield), in central strategic locations, e.g., docklands, former industrial sites, military barracks, etc;
- Intensification through urban infill, for the creation of new public space continuity, carefully inserted into the existing urban fabric;
- Intensification around transport nodes: more compact, transport-oriented developments;
- Retrofitting the existing city (instead of demolition and re-development), maximising

its mixed-use character and maintaining its existing community ties: The careful transformation, through incremental steps, maintaining the identity and character of the place.

The Potsdamer Platz development is not without critical voices: In his excellent essay, Dieter Hassenpflug explores the notion of the re-discovered *Europäische Stadt. Mythos und Wirklichkeit* (*The European Town: Myths and Reality*) and asks the question, if the European town model, such as Potsdamer Platz, could become a valuable example for global (especially Chinese) urban development or—more likely—if these cities are in risk of following the less-appropriate trend of the North American city model. (Hassenpflug, 2000)

INTRODUCING THE PLANNING OF ZHENRU URBAN SUB-CENTRE IN SHANGHAI

Zhenru Urban Sub-Centre is one of the four new, large urban sub-centres of Shanghai.

In the project brochure 'Shanghai Zhenru Sub-center,' published in 2008 by Shanghai Zhenru Sub-center Development Construction Investment Co. (a semi-public company), the project is introduced as 'Zhenru is Shanghai's last Subcenter, a Green Business District in compliance with world-class green construction criteria, taking service industry as pillar industry, making full use of its location advantage as gateway to the Jangtze River Delta, to drive the CBD's sustainable development' (p. 3).

It continues in the marketing jargon: 'With the completion of the other three new subcenters, namely Xu Jiahui, Hua Mu and Jiang Wan-Wu Jiao Chang, how will Zhenru present itself as the last subcenter? It will be a model for Green City build-up, including the north-western transport hub, by adopting the standards for building a world-class e-friendly city in development, learning from many cities worldwide prestigious in preserving the ecological system and leveraging fully our own conditions and strengths, we will step onto a high stage for building an ecological city' (sic).

Zhenru UrbanSub-Centre is one of Shanghai's most ambitious projects, with a site area of 6.2 sq kilometres, and therefore significantly larger than

the Potsdamer Platz site (around 10 times). In contrast to Berlin, the development speed of Shanghai is breathtaking: In 1980, Shanghai city had only 112 buildings taller than eight stories; in 2009 there are over 13,000 buildings taller than eight stories. The scale and pace of change and the level of ambition are quite extraordinary.

The Chinese government has been reluctant for a long time to commit to specific goals for emission cuts. In August 2009, China has finally made public for the first time its target to cut greenhouse gas emissions by 2050—the latest sign that the world's largest emitter wants to make a green leap forward under a new agenda. A recent report by the Energy Research Institute and the Chinese State Council Development Research Centre even formulates that "it is expected policies will ensure greenhouse gas emissions of China to peak around 2030." (Report released Aug. 2009). This indicates, that China will step-up policies for its urbanization process to curtail emissions growth and to push to adopt more green technology. China is now committed to transform itself into a world leader in renewable energy industries. China already makes over a third of the world's solar cells and will soon unveil the world's first mass-produced electric car. The country has already become the largest market in the world for wind turbines. (data: China Cleantech 2009)

Despite all this, the environmental impact of Zhenru Sub-Centre is likely to be immense. In addition, getting the usage mix right for the 6 million sq m floor area of the new Sub-Centre, it will also be a huge challenge to be built to the ambitious standards. Obviously, this new centre will need to be different from the Pudong New Area sub-centre, in its mix of functions and ambience. Therefore, the government has suggested that it be more of a technological, industrial, logistic centre type and service park (see also report by Shanghai Putuo District Government, 2008).

The central business district has always contained 'higher-level' functions of a city, for instance its cultural and administrative functions and its public green space for recreation. However, it is now necessary to think in terms of more than one core centre for the city; we cannot continue to flirt with the romantic idea that everything can be squeezed in one single centre.

The pivotal book by Manuel Castells, 'Network City: The Rise of the Network Society' (1996), has had an immense effect on how we understand and plan our city centres today. The end of the 'object' has been proclaimed by many, in parallel with the rise of the 'IT network.' There is clearly a movement away from mono-centric structures, towards poly-centric cities. The 'Network City' has emerged.

The word "centre", of course, still implies a mono-centric organisation; it indicates that a city or part of a city is organized in a hierarchical form. The use of the term "cluster" would be much better to describe a polycentric network system. Wouldn't the term *Zhenru City Cluster* be more appropriate?

THE NETWORK ('NETWORKED') CITY

A new type of city is emerging worldwide today, the *Network City*: We can find now urban agglomerations in the size of entire metropolitan regions, which may only with difficulty be recognized as cities. These agglomerations correspond to new social formations in a very direct manner, providing habitation for a more and more individualized, inter-connected society. The danger is a dramatically forced urbanization of landscape without any urban qualities, cities without good public spaces, one-dimensional, lacking the rich complexity, which cities always require to have to be vibrant.

In this scenario, cities with traditionally centralized urban forms, through improved communication technologies, are increasingly linking with surrounding centres to create highly networked inter-linked metropolitan regions. As John Worthington points out, 'it appears that the twenty-first century city is a city of paradox: It has points of intense concentration whilst also being dispersed, forming a low-density city in a high-density (data) landscape.' (Worthington, 2009)

From the inclusive city, we have moved to exclusive enclaves. Joel Garreau, in 'Edge City,' describes these emerging (sub-)urban centres, growing around transport intersections, where land is available to support new combinations of functions, such as retail, offices, education, services, logistics and leisure. These clusters are very much real; estate market driven, invariably happening despite the planners. Location takes on a new significance in this dispersed, multi- or poly-centred city.

Worthington noted that significant places in the wider conurbation are 'growing at locations that are, simultaneously:

- *Hubs*: Interchanges with different modes and levels (local, regional, international) of transport.
- *Nodes*: Mix of functions—with overlapping functions over at least sixteen hours.
- *Places*: Memorable gateways—accommodating a distinctive range of symbiotic functions.'

Faced with these paradoxes, planning has tended to focus on reinforcing traditional centres. The discourse has been framed as a choice between centre or periphery, rather than recognizing it can be both central *and* dispersed, each finding their appropriate strengths, linked within a networked conurbation. Bill Mitchell puts this paradox succinctly in 'City of Bits,' when he notes: "We will gravitate to settings that offer particular cultural, scenic and climatic attractions. . . . Sometimes we will network to avoid going places. But sometimes still, we will go places to network" (Mitchell, 1996).

These new centres, unlike traditional urban cores, which have grown organically with a diverse mix of activities, are often uniform in their offering and are conceived as precisely functional 'machines' to maximize the customer experience and financial return to the operator. The new sub-centres are a reflection of the experience economy. The dilemma is that these 'instant environments' at the periphery, with their focus on efficiency, functionality and convenience, have frequently lost the chance encounters and unplanned authenticity of the experience they are aiming to create (as was pointed out previously by Smiley and Robbins, 2002). These super functional, themed locations have lost the qualities they set out to achieve. The public culture of a city is always strongly connected with the field and character of public space the city provides. How can such differentiation be fully anticipated by the designer in the planning phase?

Newly build urban sub-centres run the danger of being too market driven rather than user led, designed to maximize efficiency and be 'over functionalized' within a 'semi-public' cocoon. Maarten Hajer and the urban sociologist Arnold Reijndorp, in their essay 'In Search of New Public Domain,' perceptively describe the new semi-public spaces

and identify the need for a new language (Hajer and Reijndorp, 2004). They describe these new places as a consumer commodity and the urban field as an archipelago of enclaves.

To overcome the lack of space and diminishing car accessibility in traditional cities, more and more businesses are moving to the urban periphery or are locating along infrastructure routes and corridors. A recent report by VROM (the Dutch Ministry for Planning and Housing, 2004) concludes 'the development into a network society is evidenced spatially by the emergence of new urban networks; no longer is everything centred around one city or one conurbation. Instead, various sub-centres are developing and citizens are zigzagging across greater distances based on their individual choices and desires.' The Randstad region in the Netherlands, for instance, has become such a laboratory for emerging urban nodes, with Schiphol Airport and its surrounding sites arguably one of the main urban nodes. The Randstad and the Ruhrgebiet region in Germany are now both highly urbanized, polycentric networks of urban density clusters with a total population higher than Greater Paris.

The challenge for today's urban designers, perhaps, is to understand the attributes of these peripheral nodes, to give meaning to both centre

FIGURE 2a. Architect's impression of the proposal for the new Zhenru Sub-Centre, to be built in Shanghai's northwest. It is one of the four new, large urban sub-centres of Shanghai, consisting of 6 million sq m floor area.



FIGURE 2b. Image showing the central axis, the space between the flanking high-rise buildings; proposal for the new Zhenru Sub-Centre in Shanghai (2008).



and periphery, and offer coherence to the journey between the points. New typologies, such as 'Urban Sub-Centres,' are continuing to emerge, whilst existing nodes will need further intensification, urban infill and retrofitting. Both, if they are to become embedded in the community, will require intelligent programming (briefing) and imaginative urban design.

The 'Zhenru Declaration for Green Environment' (Report, Putuo District, 2008) was an important step in the right direction for Shanghai's last sub-centre.

It will be important to further consider:

- New criteria for vision, construction and urban management.
- Integration and connectivity as driver.
- Urban governance and social inclusion.

We need to connect our systems; however, we have very little time to do so as our fossilized regulations prevent us from doing things differently. It is not a technical crisis; the issue is institutional and requires behavioural change.

To ensure authenticity, rather than having a themed *Disneyesque* environment, we should search for a dominant culture, around which informal sub cultures can flourish. More flexible frameworks that set infrastructure, typologies and value systems, within which a programme of built projects and

FIGURES 3a and b. The site: Site preparations have started for the new Zhenru Urban SubCentre in Shanghai's north-western area. Model photo: The early conceptual masterplan is now in the phase of revision. An International Advisory Panel has been established, including urban designers Qingyun Ma, Ralph Lerner and Steffen Lehmann. (Photos by the author: July 2009.)



events can unfold, are superseding *Masterplans*, as blueprints. The 'Networked City' offers a challenging canvas for urban designers.

5. SOME RECOMMENDATIONS AND STRATEGIES FOR RE-CONCEPTUALIZING NEW URBAN SUB-CENTRES

The UNESCO, the UN nodal agency for education, science, culture and architecture, has made urban sustainability a key topic in its development-oriented activities, and has launched an initiative to address the increasing concern of non-sustainable urbanization, which currently occurs too often in the Asia-Pacific Region. It is a region of rapid change, cultural alienation and environmental crisis, with a threatening divide between city and countryside. In the face of mounting challenges, there is a need to identify effective strategies and propose practical solutions to support sustainable urban development, based on the conditions specific to each area of the region, characterized by great diversity in terms of economy, politics, culture, climate and the natural environment. We need innovative, interdisciplinary planning methodologies for sustainable urban growth. To be able to house the growing urban population, there is an urgent need to build more energy-efficient cities and neighbourhoods based on renewable energy sources.

Sustainable Cities is a key theme of the UNESCO Chair's platform, especially ahead of the UN's Climate Change Conference in Copenhagen in December 2009. The UNESCO Chair promotes binding emission targets and the message is one of 'let's get started,' and that progressive change will lead to ever greater change. There are many examples of increasing worldwide market demand for 'green' architecture for commercial offices and the existing commercial building stock. There is a direct link between climate change and urbanization, the design of buildings, districts (such as urban sub-centres) and cities. The global environment crisis is, in large, tied to the cities we live in.

6. CONCLUSION

To meet its ambitious goals—a 20 per cent increase in energy productivity and a 10 per cent decrease in emissions compared to 2005 levels by the end of 2010—China will need to rely on strong national policies, like the so-called 'green stimulus package.' Nevertheless, it will also require the determination and leadership of the officials overseeing the country's ferocious, unprecedented urbanization—China's mayors and planning directors in the municipalities.

Zhenru Sub-Centre is a major urban development project for Shanghai in times when China

is rethinking the way to develop its cities. After a period of strong interest in formal qualities of new prestige projects, there is now a growing interest in combining practical and efficient planning layout with renewable energy technologies that both, passively and actively reduce the energy consumption of the buildings, reducing the overall energy consumption of new developments.

Zhenru Sub-Centre is currently under construction and the author was asked to make recommendations for its sustainable development, based on his expertise from the Potsdamer Platz development. The conclusion presents five recommendations for the design of such new sub-centres to ensure they deliver economical, social and environmental sustainable outcomes.

1 – Develop compact urban form at transport nodes: A resilient network

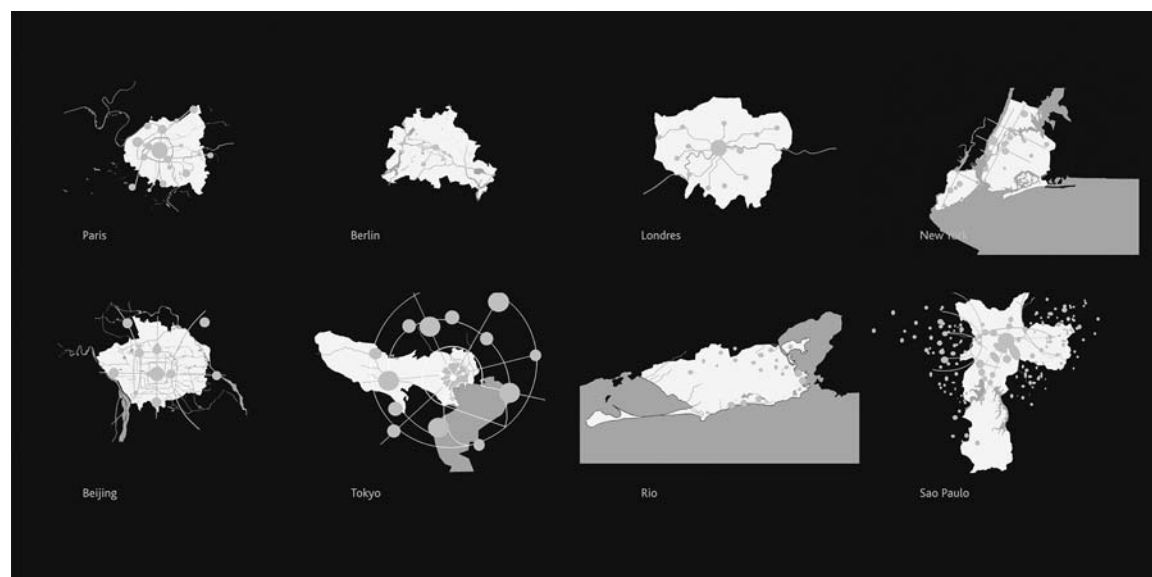
Land use, planning and design controls, together with building codes, require more consistent application by all levels of government to ensure that housing location and types deliver a compact urban form with higher densities around transport networks. This will require an integrated framework cascading

from national to district government levels, with rigorous implementation.

There is a danger of increasing density too much and changing land-cover through development, thus reducing natural urban ventilation and increasing risk of Urban Heat Island. A balance is necessary! (e.g., Hong Kong government has developed the Air-Ventilation Assessment System, adopted in 2008, with the aim to create better airflow and breezeway corridors). The type of hyper-tall urban environment as found in Hong Kong is an extreme, relatively rare case, where many of the sidewalk levels are even shaded from direct sunlight during most daylight hours. Trying to fix the impact of overdevelopment is very difficult; Hong Kong is now engaged in the identification of major air flow corridors which will get special protection, to ensure the remaining natural ventilation is not entirely lost to overdevelopment.

Favouring of inner urban diversity and density, including the reinvigoration of existing inner urban shops, schools and community facilities, needs to be given, and developments should favour boulevards and transport corridors, in support of public transport and walkable cities.

FIGURE 4. The locations of Sub-Centres of 8 large cities, comparison to scale: Paris, Berlin, London, New York, Beijing, Tokyo, Rio de Janeiro, Sao Paulo.



2 – Evolve towards ‘Eco-infrastructure,’ implemented in unison with climate responsive built form.

Currently, legislation discourages the integrated precinct resource management. Regulations need to be changed to allow distributed renewable energy networks and non-traditional water supply systems to be implemented. It is important to develop nationally recognized equitable contracts for ESCO, energy and water supply services that cover all stakeholders to avoid transactional cost issues.

Precinct prototyping of smart grid systems is an immediate need due to the lead-time, and they must be incentivized. Methods for assessing climate change resilience must be implemented by district regulations. Current policy tools, such as the LEED, GreenStar, or BREEAM assessment tools, must be used to affect landscape design, site resilience and resource management.

De-carbonizing the energy supply on the district-scale is a necessity. Low-emission energy generation technologies can turn city districts and sub-centres themselves into power stations, where energy is generated close to the point of consumption. Localized energy generation using renewable energy sources (solar, wind, biomass, geothermal), and complemented by distributed heating and cooling systems, has the potential to reduce the built environment’s energy demand and emissions. Such decentralized, distributed systems, where every citizen can generate the energy they need, will eliminate transmission losses and transmission costs (which always occur with a large grid and inefficient base-load power stations) for the local consumer.

The concept works for both existing and new buildings. Small power generators are positioned within communities to provide electricity for local consumption, and the waste heat they produce is captured for co-generation (for CHP; or for tri-generation, when waste heat also produces chilled water for cooling). It is also used for space conditioning via a local district heating or district cooling system. New exergy principles look at capturing and harvesting waste heat and wastewater streams, and the strategic arrangement of programmes within mixed-use urban blocks can lead to the unleashing of such unused energy potential. Urban green-

ery can be used to reduce and mitigate against the Urban Heat Island effect.

3 – Develop a policy pathway to zero-carbon: Targets that are more ambitious

A trajectory to a de-carbonized China needs to be established. This should involve long-term overall targets, together with medium and short-term targets subdivided into sectoral responsibilities. Evolving policy and regulatory frameworks needs to reflect this trajectory.

Given the relatively long life of buildings, their targets (both for refurbishment and newly built) need to reflect their longer-term contributions to the trajectory (buildings that last longer). Higher assessment rating should have requisite energy standards, with zero-carbon emissions attracting the highest rating.

4 – Develop a holistic pathway to climate-adaptive buildings

A clear vision of what constitutes a climate adaptable and resilient building needs to be established complete with appropriate overall regional variations. These adaptive measures need to be embedded within assessment tools and be progressively introduced as experience grows into the regulatory framework. Examples of such measures (suitably quantified) might include:

- Extending the life of buildings, giving them the ability to accept change of uses (long life, loose fit). Among other aspects this impacts depth and massing of buildings.
- Using thermal mass (heat storing) materials into building structures.
- Operating buildings completely passively (without any energy consuming systems operating) for large proportions of the year.
- Reducing the volume of materials needed by buildings, particularly the frequently replaced components. Urban Heat Island reduction measures to allow reduced energy consumption in building systems (electric vehicles, transport modal switching, extensive urban vegetation to mitigate UHI, and associated urban rainwater retention)

FIGURES 5a and b. City structure: A different grain identifies the different large cities, comparison to scale. The unique scale characteristic makes up individual experiences of cities and public space networks. (Source: www.urban-age.net) Below: Different structural concepts of city-making (after: P. Rand).



Paris



Londres



Berlin



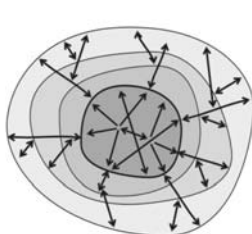
New York



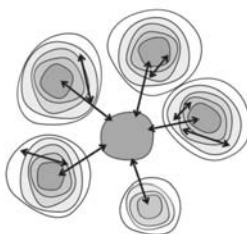
Mexico



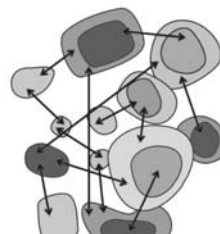
Shanghai



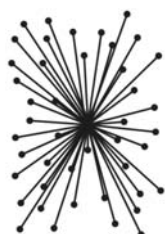
Monocentric city



Polycentric city cluster
with "satellite centres"



Network city



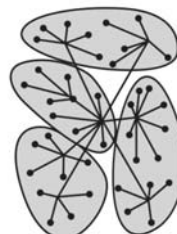
Centralized
structure



De-centralized
structure



Distributed
structure



Hybrid
structure

5 – Built environment education, training and research must take climate change mitigation and adaptation as a main intent

The building industry is currently not trained to renovate existing new low carbon and climate adaptable buildings, nor is it trained to deliver new ones. In addition, professional education does not sufficiently prioritize, or effectively deliver curricula that empower graduates to shape a zero-carbon and climate adaptable urban environment. Reform and expansion of built environment education and training with climate change mitigation and adaptation as its main intent must occur within the next five to ten years.

Mass industry re-training over the next ten years is required to provide the necessary leadership and capacity to engage in the mass renovation of existing buildings. Intensified interdisciplinary research to deliver the framework for the transition to a zero-carbon building sector is necessary. Much of our housing and workplace models (existing stock and current production) are inadequate and repeat outdated models instead of dealing with the immense challenges we face. Research with a focus on future-proofing urban design, architecture and the entire building sector, and celebrating diversity, is needed. Therefore, research has to identify best practice and its application in a holistic way, developing performance-based principles for compact urban form, energy-effective buildings, and more flexible, adaptable building typologies, in order to re-conceptualize a new generation of housing and workplaces. Better methodologies for measuring sustainability, resource management and material flows need to be researched and developed.

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