Title:	Do We Need 700 Meter High-Rise Buildings?
Author:	Jovi Chu, Design Director, Shum Yip Land Company Limited
Subjects:	Architectural/Design Urban Design
Keywords:	Cost Density Economics Megacity Megatall Social Interaction Supertall Vertical Urbanism
Publication Date:	2016
Original Publication:	Cities to Megacities: Shaping Dense Vertical Urbanism
Paper Type:	1. Book chapter/Part chapter 2. Journal paper 3. **Conference proceeding** 4. Unpublished conference paper 5. Magazine article 6. Unpublished

Do We Need 700 Meter High-Rise Buildings?

我们需要700米的超高层建筑吗?

Jovi Chu | 朱伟贤
Design Director | 设计总监

Shum Yip Land Company Limited
深业置地有限公司

Shenzhen, China
深圳, 中国

Jovi Chu has been involved in design and property development for over 20 years, dedicating his career to overseeing the development of world-class high-rise complexes. He currently serves as the Design Director for Shum Yip Land Company Limited. Before joining Shum Yip, he worked to develop projects such as Taikoo Hui in Guangzhou and China World Trade Center in Beijing.

朱伟贤从事设计与地产开发长达20余年，他将自己的事业致力于世界一流的高层建筑综合体开发的监督。他目前担任深业置地有限公司设计总监一职，在加入深业置地之前，他参与了广州太古汇及北京中国国际贸易中心等项目的开发。

Abstract | 摘要

Through analysis of dense urban high-rise building complexes as well as research on the relationship of those structures to a city's social organization, this paper puts forward a thesis that the source and vibrancy of high-density cities arises from the opportunity for social proximity to build positive relationships among residents. Based on the principle of sustainable development, this paper discusses how to deal with space and development models, and proposes to build a high-density vertical city that raises the standards of livability.

Keywords: High Density, Livable City, Megacities, Vertical City

本文通过分析一些基于高密度条件的城市建筑综合体实践，结合对城市结构与社会组织关系的研究，提出推动亚洲高密度城市活力的源泉来自于人群聚集所带来的人与人之间的紧密关系。依据可持续发展的原则，探讨应对高密度城市的空间和发展模式，提出利用宜居城市标准构建高密度的垂直城市。

关键词：高密度、宜居城市、巨型城市、垂直城市

Hope and Challenge of the Megacity

In this era of globalization, the importance of urban areas is increasing progressively. In 1950, 30% of the world's population lived in cities; this number reached 47% in 2000. By 2010, more than half of the world's population lived in cities. According to predictions, the proportion of urban population worldwide will reach 60% in 2030, and 85% in the middle of this century. Because of its important position on regional development and socio-economic life, the "megacity" has drawn special attention. Megacities are the those with a population of 10 million or greater. In the sense of physics, society, politics and economy, the super-scale megacities bring new vitality and new complexities through the interactions of various populations, societies, politics, economies and ecological processes, and which also breed high-efficiency urban life and economic activities (Douglass, 2000).

Simultaneously, megacities also face numerous challenges, including the problems of urban management, sustainability, polarization, poverty, service facilities, and public security. Those overseeing the development direction of the megacity must now concern themselves with how to switch from prioritizing "getting big and beautiful" to "becoming outstanding and strong," for urban construction, as well as for combining the sustainable development goal of building livable cities.

Other challenges for megacities stem from high density and concentration of people. This

巨型城市的希望与挑战

在全球化时代，城市和城市地区的重要性日益提升。1950年，全球30%的人口居住在城市，2000年，达到了47%。到2010年，世界人口有超过一半居住在城市，根据预测，城市人口在2030年将达到60%，于本世纪中叶达到85%。其中巨型城市由于在区域发展和社会经济生活中的重要地位，引起了特别的关注，所谓巨型城市是指人口在800万以上的城市。在物质、社会和经济意义上，超规模的巨型城市带来了新的活力、新的复杂性，通过各种不同人口、社会、政治、经济和生态进程之间的交互活动，巨型城市孕育了高效的城市生活和经济活动 （Douglass M,2000）。

同时巨型城市面也临许多的的挑战，包括城市管理问题、可持续性问题、两极分化问题、服务设施问题、贫困问题、治安问题。城市建设如何从做大、做美转向做优、做强，与可持续发展目标相结合建设宜居城市是巨型城市的发展方向。

巨型城市的另一个挑战，与城市问题相联系的高密度困境，高密度意味着拥挤、制约、紧张、压力，高密度 等同于土地的超负荷利用，资源的穷尽式开采，公共及私人空间的无止境争夺，使高密度成为生存的梦魇。然而城市化进程却不断加速进行，一方面，紧缩城市为城市空间提供了多样性的选择，也为丰富的城市空间形态提供了条件。城市高密度地区提供了密集而丰富的生活，并且这种生活意味着高效率，节约了时间和精力。另一方面，高密度城市也面临交通瘫痪，空气污染，城市

Figure 1. Shum Yip Upperhills Complex Rendering (Source: Shum Yip Land Company Limited)
图1. 深业上城综合体效果图（来源：深业置地有限公司）

is often associated with urban problems; e.g., high density implies congregation, conflict, tension and pressure. It is equated to land-utilization overload, exhaustive exploitations, and a ceaseless scramble for public and private space; a kind of existential struggle for survival. Nevertheless, urbanization is accelerating. On the one hand, compact cities provide various choices for urban space, as well as conditions for rich spatial form. Urban high-density areas provide and the grounds for a rich life, which also means high efficiency in both time and energy. On the other hand, high-density cities face problems such as traffic jams, air pollution, and overcrowding of urban public space. Therefore, addressing and mastering the art of high density is necessary for successful urban development.

Development Concept of the Vertical City

In 1976, the British academic Reyner Banham published Megastructure, which promoted a wave of theoretical research around megastructures. In 2011, Rem Koolhaas published Project Japan, which again attracted the attention of Western academia to megastructure theory.

On September 16-19, 2014, of the International Conference of the Council on Tall Buildings and Urban Habitat (CTBUH) was held in Shanghai with the theme "Future Cities: Towards Sustainable Vertical Urbanism," which proposed thinking and planning cities and architecture in three-dimensional terms. The conference content emphasized that skyscrapers are not single-function tools, nor are they best understood as an intersection of two-dimensional plans, partitions and height limits (Qi Liu 2014). The horizontal reach of each level in skyscrapers should respond to the features of the city and its external environment, which vary with height as well as lateral distance (Figure 1). A skyscraper has different impacts of wind, sunlight, rain, temperature and urban fabric, both on 360-degree planar areas and at the range of 360 meters' height; architectural design must indentify and respond to these factors. It involves rethinking the city for sustainable vertical urbanism, not from a two-dimensional aspect, but from the point of view of a verticality that includes infrastructure.

公共空间过度拥挤，因此城市建设需要处理高密度的艺术。

垂直城市的发展理念

1976年英国学者雷纳·班纳姆（Reyner Banham）出版了"Mega Structure"推动了关于巨构理论的研究热潮，到2011年库哈斯（Rem Koolhaas）出版了"Project Japan"再次引发了西方学界对巨构思想的关注，一个时期一旦同时出现两个或者以上的社会因素汇聚，则马上会出现与城市巨构相关的理论研究。

2014年9月16日至19日，世界高层建筑与都市人居学会（CTBUH）2014全球大会在上海举行了主题为"未来城市：迈向可持续的垂直城市主义"会议。提出了人们需要从三维立体的角度来思考和规划城市与建筑——它们不能仅作为承载单一功能的媒介，或成为二维平面区域划分与限高要求的产品（刘棋，2014）。摩天大楼的每一层级的水平界面都应当回应城市和外部环境的特征，而这些特征随高度的不同变化（图1）。风、阳光、雨水、温度以及城市肌理无论是在建筑高度的360度平面区域还是360米的高度

Figure 2. Shum Yip Upperhills Lofts (Source: Shum Yip Land Company Limited)
图2. 深业上城 LOFT（来源：深业置地有限公司）

Each building in vertical cities should be a contributor of public space (Figure 2). To realize the positive role of a city as well as resolve the challenges it faces, it is necessary to incorporate the local physical and cultural environment, reduce the strain on the relationship of humanity to nature, and integrate technologies and ecological principles, for a future that will be more harmonious between man and nature. By collecting data on many aspects, such as operational energy consumption of family, implicit energy of building materials, infrastructure construction and operational energy consumption, traffic and transportation, quality of life, reference information could be provided on multidimensional levels. By adopting intensive functions, integrating lifecycle costs, optimizing the sustainability of materials, the purpose of saving energy and land, and improving environmental quality and efficiency could be achieved.

A harmonious community will be built up by incorporating regional cultural characteristics, centering design on the inhabitants, placing customer satisfaction first, and optimizing the interdependency of the various functions of a high-rise (Figure 3). Using different heights, forms, textures and functional diversities, there is ample opportunity to bring all elements of urban life into the air. The previously horizontally sub-divided land will be integrated into a vertical city design. As density increases, green space is freed up on the ground, and there is also opportunity to develop green leisure spaces on at height, mitigating the negative externalities of density. City life can flow efficiently in a high-density environment by creating new public open space, adding functions for public use, and

范围都是不同的，建筑需要对这些因素进行识别并做出回应。可持续的垂直城市主义需要重新思考城市，不是已而为的角度，而是以垂直的角度，包括基础设施的建设。

垂直城市中每个建筑都因该成为一个公共空间的贡献者（图2）。充分认识城市的积极作用及其面临的挑战，垂直城市建设需尊重所在地环境特征、物理特征，重视人性和自然的协调关系，整合技术和生态的未来城市，塑造人与自然和谐共存的垂直城市。通过多方面数据的采集，家庭运营能耗，建筑材料隐含能量，基础设施建设和运营能耗，交通运输，生活质量来提供多维层面的上的参考信息。最大化系统和材料的使用层次。通过集约功能，综合全生命周期的成本、材料优化设计。通过可持续设计，达到节能、节地、改善环境品质、提高效率的目的。

结合地域文化特征，基于以居住者为中心，将用户满意度放在首位，基于人的因素，通过提高高层建筑中各功能的相互依存程度，构建和谐垂直社区（图3）。利用不同高度的形式、肌理和功能多样化，促进城市各类元素都往空中发展，垂直城市设计将过去被分割的土地整合，作为与密度相对的策略，在垂直空间的各层面开发绿色休闲区域，能够极大地缓解密集所带来的问题，通过新的公共开放空间的嵌入、公众使用功能的增加、公共流线与高层建筑的链接，可以让城市生活在高密度的环境下高效的流动，通过增加城市内部的连通性降低资源消耗并提高生活质量，提供有效、公共、开放的休闲空间，引进建筑之间的物质、流线和功能关系为人们营造多样的交往机会。基于高层建筑群的紧凑城市模式建设可持续垂直城市群。

亚洲垂直城市的反思

从《城市设计减少汽车依赖》一文中，彼得•纽曼和杰佛里•肯尼斯将人均出行能源和城市人口密度联系起来，发现北美、西欧和北欧，以及亚洲城市之间的区别。随着城市人口密度的提升，为城市公共交通发展创造条件，进而减少私人汽车保有量，从而降低交通能源消耗（Newman& Kenworthy, 2006）。紧凑城市作为一种以欧洲城市为代表的发展模式，与美国为代表的松散型城市发展模式形成鲜明对比，而亚洲地区的超高密度城市则将城市的效率推向极限。亚洲大量的高密度城市体现了紧凑城市思想的影响，高密度开发、混合的土地利用和优先发展公共交通。在这三个特点的结合下，以效率为最终衡量标准的高层高密度城市开发模式，成为不同于欧洲多层高密度的城市开发模式。

Figure 3. Shum Yip Upperhills Shopping Mall (Source: Shum Yip Land Company Limited)
图3.深业上城购物中心（来源：深业置地有限公司）

linking well-trodden pathways to high-rises. Through increasing connectivity in the city, resource consumption can be reduced and life quality can be improved. By providing efficient, public, open and leisure space, and introducing a physical, streamlined and functional relationship between people and architecture can create various social opportunities. Sustainable vertical city clusters will be constructed based on the compact city mode of high-rise building complex.

Rethinking Asian Vertical Cities

In *Sustainability and Cities: Overcoming Automobile Dependence*, Peter Newman and Jeffrey Kenworthy connected the travel energy per capita with urban population density, and they found substantial differences among cities of North America, Western Europe, North Europe and Asia. As population density rises, there is an opportunity for urban public transportation development to reduce private-car ownership and thus lower transportation-related energy consumption. As a development mode represented by European cities, the compact city stands in stark contrast with the sprawling mode represented by American cities. Super-high-density cities in Asia push the efficiency of a city to its limit. A large number of high-density cities in Asia reflect the impact of the compact city theory of high-density development, mixed-use land and preferential development of public transportation. With the combination of these three features, the urban development mode of high-rise high density, ultimately measured by efficiency, has been an urban development mode different from the one of mid-rise high-density in Europe.

Hong Kong is the representative of high-rise, high-density cities. The interaction among the key elements of clustering, high density, complication and verticality, produces the city's unique features. Mixed-used design of high density in Hong Kong is driven mainly by five core concepts: spatial proximity, compaction, verticality, sky city and centralized mixed use (Shelton, Karakiewicz & Kvan, 2013). The result of a combination of development policy of compact and intensive city and mountainous natural landscape, Hong Kong has become a vertical city with compact connections in three-dimensions, convenient, highly-efficient and highly dense. Though this condition validates the compact city theory in the sense of environmental efficiency, the lack of research of economic and social sustainability, or the the urban structure of vertical cities, may also raise some social issues in Hong Kong that have gone largely unexamined. For instance, weak

social ties caused by lack of communication in a compact community with super-high plot ratios can cause family and social problems. This raises questions about whether the primary objective of high-density vertical cities in Asia should be) the pursuit of spatial efficiency above other considerations.

Through observing Asian cities, we can find many self-organization forms with regional characteristics, based on family or social groups. This is called "pleasant congregation". From the form of Lanes and alleys in Shanghai to the phenomenon of "city villages" in Shenzhen, every block spontaneously creates diverse vertical spatial structures of high density, characterized by inner coordination between communities (Figure 4). These high-density blocks together support the urban street as a place full of vitality. Further discussing the high-density spatial structure growing under self-organization, we find that awareness of public and private boundaries is different between Easterners and Westerners. The flexible and adaptable lifestyles that characterize urban life in East Asia are different from Western concepts of order and norms. The East Asian model of social networks based on large family

香港是高层、高密度城市的代表，集中、高密度、复杂、垂直性，要素之间相互作用产生城市特色。香港高密度混合使用设计主要由5个核心理念推动：空间上的临近，紧凑，垂直性，空中城市，集中型的混合使用（Shelton, Karakiewicz & Kvan, 2013）。复合集约城市开发政策和自然地形结合的作用下，香港成为城市立体联系紧凑、便利和高效的高密度、垂直、立体城市。然而，如同对紧凑城市理论的争议集中在其主要以环境效益为目标，缺乏对经济和社会可持续性的影响研究，香港垂直城市结构同样也会引发一些社会问题。例如在超高容积率的紧凑住区中缺乏人际交流的人情冷淡带来的家庭问题、社会问题。使得人们质疑亚洲高密度垂直城市的首要目标是否是追求空间效率。

观察亚洲城市，会发现许多以家庭或社会群体为单位而又颇具地域特色的自组织形态，这被称为"愉悦的拥挤"，从上海的里弄式民居，深圳的城中村现象，每个街区都通过社群内部互相协调创造出自然生长的各色垂直高密度空间结构（图4）。这些高密度街区共同支撑着充满活力的城市街道空间。深入探讨这些自组织生长的高密度空间结构，其背后有与西方人不同的东方人对私密和公共界限的意识，还有与

Figure 4. Shum Yip Upperhills Rendering (Source: Shum Yip Land Company Limited)
图4. 深业上城效果图（来源：深业置地有限公司）

units and clans contrasts with the Western emphasis on the individual and small families. The motivation to inspire vitality in Asian high-density cities comes not from spatial efficiency, but more from the close relationship between individuals caused by high-density living.

Do we need megatall buildings up to 700 meters? The original plan for Upper Hills had called for a tower up to 700 meters high in the early stage of planning, combining different functions of office, hotel and commerce. But considering the potential damage to the context and lack of acceptance by inhabitants, the author's company modified to the plan to instead two towers of 400 meters and 300 meters' height (Figure 5). According to the analysis of data, these towers are more suitable than a 700-meter tower in the aspect of function and efficiency. Admittedly, another key consideration is the cost. The money that would have been spent on the massive structure required for a 700-meter tower instead was invested in imported elevators and safer curtain wall systems with SGP laminated glass. Under the two-tower scheme, there was still budget left to optimize the structure of the 400-meter tower, which featues eight megacolumns as its main structure, allowing the surrounding greenery to combine seamlessly with the inner office space.

Conclusion

西方的秩序和规范观念相悖的东方灵活而具有适应性的生活习惯，更有不同于西方强调个人和小家庭观的东方大家庭和宗族为单元的社会网络结构。推动亚洲高密度城市活力的源泉，并非仅来自于空间效率，更多的是来自于人群聚集所带来的人与人之间的紧密关系。

我们需要700米高的超高层大楼吗？"深业上城" 在早期规划阶段，曾经考虑要建造一栋700米高的塔楼，当中融合了办公，酒店，商业等等功能。但考虑到周边环境破坏和人民接受的程度，我们还是温和地改为两栋分别400米和300米的塔楼（图5）。从数据上分析，这样的大楼在功能上，效率上比建设一栋700米的高塔来得更为合适。当然，最重要一点是投资成本方面考虑，我们把大量结构的成本转化为用更好的进口电梯，更安全的SGP夹层玻璃的幕墙系统，特别是我们的400米塔楼，以8根大柱的结构系统，让周边美好的绿色资源，以更好的方式和室内办公空间，无缝接合。

结论

在城市化的进程中，许多亚洲城市将选择高密度、高容量、垂直发展的方案，以限制城市的过度扩张、保护农业用地、优化资源配置。这种模式的可贵之处，在于为城市及居民创造更加包罗万象的社区，通过提倡多样性，引入适当产业，促进就业，激发社区活力。

亚洲高密度垂直城市发展的主要动因不只是土地和空间效率。高层和超高层建筑作为垂直城市的一种实现手段，可以给人们带来更多的使用空间，更多的绿地面积；在提高土地使用效率的同时，更要强化城市设计，增进人与人的交流。构建高密度的垂直城市更应关注以下几个方面：

第一，在宏观上考虑气候因素对垂直城市的结构及形态的影响，以被动式节能设计为核心兼顾主动式设计。

第二，利用垂直发展促进城市立体化交通和公共空间体系的发展，在垂直方向增加人与人交往的机会。

第三，在垂直方向组织居住、工作、游憩功能的复合叠加，增加本地就业岗位，减少城市交通量，降低碳排放和能源消耗。

第四，建立垂直方向的城市基础设施，利用重力组织垃圾、污水就地处理，利用可再生能源。

第五，以适应社会结构的生活构成和产业特色为目标建构垂直空间体系，开展多样开发模式参与垂直城市基础设施建设。

Figure 5. Shum Yip Upperhills Towers (Source: Shum Yip Land Company Limited)
图5. 深业上城摩天大楼中心（来源：深业置地有限公司）

In the process of urbanization, many Asian cities have chosen the remedy of high-density, high-capacity vertical development to restrict the overexpansion of city boundaries, protect farmland, and optimize resource allocation. The value of this approach is in its potential to create a diverse community for the city and residents. By promoting diversity and introducing appropriate industry, employment will be promoted and the vitality of the community can be facilitated.

The development of high-density vertical cities in Asia is not only driven by a quest for efficiency of land and space. As an implementation approach to construct a vertical city, high-rise and super-high-rise buildings bring more available space and more greenery for people. They improve the efficiency of land use, strengthen urban design and enhance communication between individuals. To construct a high-density vertical city, we should pay more attention to the following aspects:

Firstly, on the macro-scale, consider the effects of climate factors on the structure and shape of the vertical city. Take passive energy conservation design as a core tenet, and take positive energy conservation design into consideration as well.

Secondly, take advantage of vertical development to promote the development of three-dimensional urban transportation and public space systems, thus increasing opportunities for communication.

Thirdly, overlap residential, working and recreational functions in the vertical dimension. This will increase local employment while reducing urban traffic, carbon emissions and energy consumption.

当代高密度垂直城市应当基于亚洲人的生活方式，积极创造生动的、人性化的立体城市场所空间，克服现代主义、后现代主、新城市主义的局限性，结合高密度城市环境协同城市文脉和文化内涵，建设有活力、吸引力的亚洲城市生活空间。

References: | 参考书目:

Douglass, M. (2000). **Globalization and the Pacific Asia crisis—Toward economic resilience through livable cities**. 19. Asian Geographe.

Liu, Q. (2014). "Future City: Towards sustainable Vertical Urbanism", **CTBUH 2014 Global Conference overview.** Shanghai Urban Management, (6).

Newman, P. and Kenworthy, J. (2006). "Urban Design to Reduce Automobile Dependence", **Opolis: An International Journal of Suburban and Metropolitan Studies.** V01. 2: No.1. Article 3.

Shelton, B., Karakiewicz, J. and Kvan, T. (2013). **Constructing Hong Kong--From vertical city to stereoscopic city.** Beijing: Electronic Industry Press.