

Title:	High Intensity Urban Order
Author:	Patrik Schumacher, Principal, Zaha Hadid Architects
Subject:	Architectural/Design
Keywords:	Skybridges Vertical Transportation Vertical Urbanism
Publication Date:	2016
Original Publication:	Cities to Megacities: Shaping Dense Vertical Urbanism
Paper Type:	<ol style="list-style-type: none">1. Book chapter/Part chapter2. Journal paper3. Conference proceeding4. Unpublished conference paper5. Magazine article6. Unpublished

High Intensity Urban Order

高强度城市秩序



Patrik Schumacher

Principal | 合伙人

Zaha Hadid Architects
扎哈·哈迪德建筑事务所

London, United Kingdom
伦敦, 英国

Patrik Schumacher is principal of Zaha Hadid Architects and is leading the firm since Zaha Hadid's passing in April 2016. He joined Zaha Hadid in 1988, has been a co-author on most projects and was seminal in developing Zaha Hadid Architects to become a 400-strong global architecture and design brand. In 1996 he founded the Design Research Laboratory at the Architectural Association where he continues to teach. He is lecturing worldwide and recently held the John Portman Chair in Architecture at Harvard's GSD. Over the last 20 years he has contributed over 100 articles to architectural journals and anthologies.

帕特里克·舒马赫是扎哈·哈迪德建筑事务所的负责人。自2016年4月扎哈·哈迪德女士逝世后扎哈·哈迪德建筑事务所由帕特里克·舒马赫领导。自1988年加入该事务所后，他是扎哈·哈迪德建筑事务所众多项目的主要合作设计者，在扎哈·哈迪德建筑师事务所的成长过程中起到了开创性的作用，使其发展成为一家全球400强建筑与设计品牌之一。1996年，他创办了英国建筑联盟学院的“设计研究实验室”，并且坚持在学院任教。与此同时，他在世界各地演讲授课，并于近期担任哈佛大学设计研究生院所设立的约翰·波特曼建筑学访问教授席位。在过去的20年里，他为建筑期刊和文选提供的文章已逾百篇。

Abstract | 摘要

Density via high-rise structures remains a primary agenda in our era of urban concentration. It is crucial to understand the societal forces that drive concentration: the communication requirements of Post-Fordist Network Society. In contrast to prior Fordism/Modernism, urban intensification is now a matter of communicative intensification rather than dense packing. Current agglomeration economies are economies of scope rather than scale. This has consequences for the high-rise typology. The standard typology belongs to the bygone Fordist paradigm of segregation and repetition, resisting complexity. The volume is generated by extrusion: the multiplication of identical floor-plates, surrounding a core that blocks communication across the individual floor-plate and between floor plates. As space programs differentiate with soaring internal and external communication needs, the solid central core becomes more and more an obstacle to navigation and communication. This core needs to be exploded and replaced by navigation voids that turn towers from shelves into vertical streets.

Keywords: Agglomeration Economies, Communication Intensity, Mega-Void, Navigation Void, Post-Fordist Network Society, Vertical Street

在当今城市集约化的时代，由高层建筑而形成的密度空间仍然是一个主要议题。“后福特主义网络型社会”的沟通需求是驱动这一集约化进程的社会动力，理解其缘由是至关重要的。与前福特主义或现代主义相比，城市集约化进程不再是昔日的密集堆砌，而需要应对沟通加剧这一趋势。目前的聚集经济效应属于界域经济，而非规模经济。这种变化影响着高层建筑的类型。标准类型学已经过时，它代表着隔离、重复、抵制复杂性的福特主义范式。这种建筑体量往往通过挤压产生：相同楼板生硬地叠加，中央核心筒阻碍了同一层以及楼层之间的沟通。功能空间随着不断扩大的内、外空间的沟通需求而应有其各自独特性，中央核心筒阻碍导向和沟通的劣势日趋明显。这种传统核心筒需要由导向型中庭空间所取代，从而使新型高层建筑由现有的书架型转变为竖向街区型建筑。

关键词：聚集经济效应、沟通强度、大型中庭空间、导航空间、后福特主义网络社会、竖向街区

What Drives Contemporary Urban Concentration?

Since the 1980s, we have witnessed a sustained drive towards urban concentration in global hub cities. Within a contemporary network society, the productivity of everybody depends on being plugged into urban professional and cultural networks that only exist in big cities. What each of us is doing needs to be continuously recalibrated with what everybody else is doing. All further productivity gains depend on this, and it requires a new level of communicative density that is only available in the metropolis. This underlies what economists measure as “agglomeration economies.” In the provinces, entrepreneurs and workers are cut off and thus relatively unproductive. Since the neat division into work and leisure has disappeared and we feel the vital urge to remain connected to the network 24/7, it is as important for us to live in the city as

是什么推动着现代城市集约化进程？

自上世纪八十年代以来，我们亲眼目睹着一种持续的驱动力，它推动着全球各大枢纽城市朝着城市集约化方向不断迈进。在现代网络化社会，个体的生产率都取决于嵌入城市专业和文化网络之中，而这种网络仅在这类大城市中存在。我们每个人的行为都需要不断地与他人行为相互校正调整。生产力的进一步提高有赖于此，为实现这种关联，我们需要新层次的沟通密度，而这种沟通仅存在于大都市之中。这些都以经济学家所称的“聚集经济效应”为主要依据。在省县城市，企业家与工人队伍的沟通往往被切断，导致生产力相对低下。在当今社会，工作与休闲的清晰界限逐渐消失，为保证全天候的联通，在城市中心居住与生活极为重要，是我们不可避免的选择。“后福特主义网络社会”对沟通的极大渴求驱动了现代社会高集中度的城市化进程。所有的社会活动都涌向城市中心，并且多多益善。空前发展的城



Figures 1 & 2. ZHA, Soho Galary, Beijing: This cluster of four towers is connected via bridges. Bridges dominate at the upper edge of the retail zone and are thus signalling the transition between retail and offices. Retail areas are also connected on both ground and lower ground. Each tower encloses an atrium that connects both upwards to the top retail floor and downwards into the lower ground. Escalators pull into the atrium for easy navigation. Each atrium is covered by a glass dome. The void continues above as an open light-well or courtyard for the offices. (Source: Hufton + Crow)

图1、2 为扎哈 哈迪德建筑事务所设计的北京银河SOHO的视图：这座由四座大厦构成的建筑群通过天桥连接。天桥位于零售区的上部边缘，代表着零售区与办公区的过渡。零售区同时连接着首层与地下层。每座大厦围合而成的中庭空间上通顶部零售楼面，下通地下层。自动扶梯方便了访客在中庭内穿行。每个中庭空间都有一个玻璃穹顶，中庭体量不断向上延伸，为这座办公楼提供了一个开放式的采光顶及庭院。（来源：建筑摄影工作室Hufton + Crow持有该版权）

it is inevitable for us to work in it. The driver behind contemporary urban concentration is thus the insatiable communication requirements of Post-Fordist Network Society. Everything piles into the center, the more the better. This spells a new desire and thus the architectural task for an unprecedented degree of urban intensification.

London, with its relentless growth (and yet endemic undersupply of accommodation) is a paradigmatic exemplar of the urban concentration process in global hub cities. This new urban dynamic is a fascinating challenge for architects, but more degrees of freedom are required that enable urban entrepreneurs (and their architects) to experiment, discover and create the best ways to weave this urban texture and garner potential synergies through innovative intricate programmatic juxtapositions. Only an unhampered market process can offer the freedom and the incentives required to discover and implement the productive synergies that allow our cities to thrive. Only markets have the information processing capacity and agility to assemble a viable complex urban order for this novel societal context. This is why positive, physical Modernist urban planning had to be abandoned, and planning thereafter was confined to operating negatively, by means of restricting private actors. The result is a less regulated form of urbanization. This mode of development is certainly better adapted to the new socioeconomic processes than

the bankrupt, simplistic order of Modernist planning and urbanism. However, it produces an urban scene that is perceptually hard to digest, a paradoxical and menacing phenomenological sameness despite the rich diversity of its contents.

Post-Fordism's communication density becomes physically manifest in high-performance urban centers like the City of London. London is a paradigmatic exemplar of the urban concentration process in global hub cities. As more and more large iconic structures pile into the financial district, the urban landscape becomes more and more chaotic, an unintentional bricolage. The planning process is evidently failing to stem the visual chaos and unable to establish any semblance of urban order. The historical task of urban intensification is thus met only physically but not yet architecturally in terms of making density navigable, livable and thus truly productive.

White Noise Urbanization

While the new diversity and open-endedness of post-Fordist social phenomena is being accommodated, the unregulated agglomeration of differences has produced the global effect of white-noise sameness everywhere, without allowing for the emergence of distinct urban identities. The result is a disorienting visual chaos

市集约化进程带来了全新的设计渴求与设计任务。

伦敦这座城市以其持续高速的（且住宅建筑普遍尚供应不足）增长成为全球枢纽大都市中城市集约化发展的一个典范。这种新的城市活力也为建筑师们带来令人着迷的挑战，对更多自由度的需求鞭策着城市企业家（和他们的建筑师们）不断地试验、发掘并且创造最佳方式来编织这座城市的肌理，并且通过巧妙、创新的功能性并置方式来 积累潜在的协同效应。唯有无阻碍市场化进程可以提供发掘和实施这种富有成效的协同效应所需的自由和鞭策，从而使我们的城市蓬勃发展。这就是为什么主动性强的现代主义城市规划不得被摒弃的原因所在，而此后的规划因为限制私营行为而变得被动。也因此形成了我们现在规则性较少的城市化模式。这样的发展模式自然是更好地适应了新型社会经济的发展，远远优于现代主义的破产式城市规划所实现的简单秩序。然而，随之产生的城市景观却越来越令人不解，虽然其内容丰富多彩，却形成了一种相互矛盾的、来势汹汹的雷同现象。

“后福特主义”的沟通密度在高性能都市中心体现得淋漓尽致，诸如伦敦金融城。伦敦是全球枢纽大都市中城市集约化发展的一个典范。随着越来越多的大型标志性建筑驻扎在这一金融地区，其城市景观变得越来越混乱和分散。其规划过程显然未能阻止视觉混乱程度的发展，也未建立起任何所谓的城市秩序。城市集约化这一历史性任务发展迄今，就实现灵活、便捷及

that might best be termed “garbage spill urbanization.” Like in a garbage spill, the urban agglomeration’s diversity of ingredients is no longer perceptually decipherable. Tokyo is perhaps the most notorious (and often celebrated) example of visual urban chaos that spells both vitality and menacing disorientation. There is indeed an underlying, market-driven programmatic order, due to the market participants’ persistent hunt for synergies. However, due to an over-abundance of material construction possibilities and attendant stylistic choices, this order is rendered obscure.

This phenomenological disarticulation of the city’s organizational complexity hampers the full potential for complex social ordering because it compromises the vital communicative capacity of the built environment. Social functionality depends as much on subjective visual accessibility as it does on objective physical availability. Social cooperation requires that specifically relevant actors find each other and configure within specific communicative situations. The failure to grasp this instrumentality of the built environment’s appearance has for too long hindered architecture’s proactive pursuit of formal articulation as a key competency of the discipline. This insight motivates the attempt to articulate a complex variegated urban order that allows for intuitive navigation and orientation within an information-rich built environment that makes its offerings visually accessible; that is, the design agenda of Parametricism¹ and parametric urbanism.

There is no doubt that new computational ordering devices such as gradients, vector fields, and methods of associative modeling and geometric data-field transcoding allow designers to generate intricately ordered urban morphologies with distinct identities that could in principle make a much larger amount of programmatic information perceptually tractable. However, this raises the question of how this desired increase in urban order can be implemented in the face of a receding state planning apparatus.

A Market-based Multi-Author Urban Order?

One obvious way in which the vacuum left by state planning can be filled is by means of “private planning,” a process whereby private development corporations or consortiums unify larger development areas within a coherent, market-controlled urban business strategy. Although isolated insertions continue, there is a tendency to try to merge and integrate developable land parcels within historical centers, and also a tendency towards larger and larger privately master-planned development sites in the wider expanse of the global megacities where development is concentrated. In this sense, private planning is on the rise and thus affords opportunities for visual as much as programmatic integration. The example of London’s great estates offers an encouraging historical precedent here – of private, market-based, long-term urban asset

高效的高密度模式而言，或许仅有实体数量，但非建筑考量。

白噪声现象的城市化进程

当多样的、开放性强的后福特主义社会现象被逐渐接受的时候，这种未受监管的差异化的聚集已经导致如白噪声般千篇一律的、不考虑不同的城市特质的全球效应。由此产生令人迷惑的视觉混乱，或许应称其为“‘垃圾堆般的城市化’”。就像是处于一座垃圾站，城市群的多样性元素无法再被感知辨认。东京也许是城市视觉混乱程度最高（也常被正面引用）的例子，这种混乱看似富有活力，但却缺失城市应用的方向性。这确实是一个因为市场参与者不断地追逐协同效应而产生的，受市场化驱动的秩序模式。然而，由于物质建设的可能性和随之而来的众多风格选择，对这一秩序模式的诠释异常模糊。

这种城市组织复杂性的普遍断层彻底妨碍了潜在的系统社会秩序的建立，因为它损害了建筑环境的重要沟通性能。社会功能既有赖于客观实体的功能可用性，也同样依赖于感性视觉的访问开放性。社会合作需要特定相关的个体能找到彼此，并沟通空间可以合理配置。建筑学科应通过建筑环境外观来实现社会空间的关联，未能发现这一核心问题已经阻碍、减缓了建筑界对形式表达的追求。这种认识促使我们试图阐明复杂的城市秩序，这一秩序使得我们可以在一个信息丰富且视觉开放的建筑环境内直观地导航和定位，这就是参数化主义¹和参数化城市设计的议题。



Figures 3 & 4. ZHA, Jockey Club Innovation Tower, Hong Kong: This tower accommodates the Design School of Hong Kong Polytechnic and thus mandates the maximization of internal communication. The tower is composed of two fused slabs and offers three internal atria, each lit with daylight from above. All class rooms have windows to the outside as well as glass walls into one of the atria. The tower lands on a complex, multi-level terrain and allows an outdoor path to move through its base. Several terraces offer break out areas and visual connections back into the campus. (Source: Ivan Baan)

图3、4. 为扎哈·哈迪德建筑事务所设计的香港赛马会创新大厦视图：这座建筑为香港理工学院所在地，因此致力于实现其内部沟通的最大化。该大厦由两个熔接楼板构成，设有三个内部中央大厅，每个大厅都有自然采光顶。所有的教室都设有玻璃墙通向其中一个中央大厅。大厦坐落在一个复杂且多层次的地形之上，有一条户外小径穿行上下。几个露台不仅提供了休憩区，并且将视线带回校园。（来源：摄影师Ivan Baan持有该版权）

1: For theoretical elaboration and extensive illustration of the concept of parametricism consult: Schumacher, Patrik, Parametricism: A new global style for architecture and urban design, in Neil Leach (ed), AD Digital Cities, Architectural Design Vol 79, No 4, July/August 2009. Reprinted in: Carpo, Mario, The Digital Turn in Architecture 1992-2012 (AD Reader)

1：有关参数化主义的理论阐述和广泛例证请参阅：《参数化主义》—舒马赫，帕特里克著：建筑和城市设计领域的一种全球新风格，详见尼尔·利奇（ed）《AD数字化城市》2009年7月/8月《建筑设计》第79卷，第4号。重印：马里奥·卡尔波，《建筑学中的数字化转型》1992–2012（AD杂志）

management and planning establishing an urban order that is inclusive of a visual architectural order. However, the question remains: is the degree of order that parametric urbanism aspires to possible beyond the level of integration achievable via private planning? More generally, is an aesthetically ambitious urbanism at all possible in the face of free-market dynamism?

The market process is an evolutionary process that operates via mutation (trial and error), selection (via profit vs loss) and reproduction (via imitation of profitable solutions). It is self-correcting and self-regulating, leading to a self-organized order. We might therefore presume that the land-use and thus the programmatic dimension of the urban and architectural order is best determined by architecture's private clients within a market process that allocates land resources to the most valued uses. However, in the absence of stylistic and methodological coherence we cannot expect the underlying programmatic order to become legible as spatio-morphological order. For this to happen we must presume a hegemonic stylistic and methodological paradigm that has the versatility and ordering capacity to translate the social order into a complex variegated spatial order. A shared paradigm offers the prospect of coherence across multiple authors working for multiple clients. No controlling hand needs to be presupposed.

Parametricism can thus draw from and exploit the powerful analogy of unplanned, multi-author parametric urbanism within a multi-species ecology. Consider the way that various features and creatures within a natural environment coalesce to create a complex variegated order based on rules – in turn based on the complex interaction of multiple laws of nature – that establish systematic correlations between the different organic and inorganic subsystems that make up a natural landscape. The topography correlates with the path of the river; the river, together with the topography and sun orientation, differentiates the flora; and the differentiation of the flora – with the river and topography – shapes the differentiation and distribution of the fauna, which in turn impacts back on the flora and thus often also on rivers and even on the topography. While this causality is complex and not easy to unravel, correlations are being established in all directions, providing information for those who want to navigate such a landscape.

The key here is the build-up of correlations. Each new species of plant or animal proliferates according to its own rules of adaptation and survival. For instance, moss

毫无疑问，新的编程类排序工具，例如渐变、矢量场和关联性建模以及数据的几何性转码方法，使设计者能够生成错综复杂的有序的城市形态；这些形态具有显著的特征，从原则上说可以创造更为大量、且感知可控的编程信息。然而，这同时提出了一个问题：面对逐步倒退的国家规划机制，如何落实提高城市秩序这一期望？

以市场为基础的多设计者参与的城市秩序

一个显而易见的方法是城市规划所留下的真空地带可以由“私营规划”来填补，这一过程通过私营开发公司采用协调性高的、由市场控制的城市商业策略，统一更大的开发领域。尽管孤立突兀的开发案例时有发生，但整合可开发历史悠久的城市中心地块已经成为一种发展趋势，在全球更多以往开发集中的巨型城市中出现越来越大规模的民营总体规划开发用地。从这个意义上讲，私营规划区域的增多，带来了将视觉感受与功能布置完美整合的可能性。伦敦的地产开发提供了一个鼓舞人心的历史先例 – 由私营部门以市场为基础、长期的城市资产管理和规划实践建立起的城市秩序是一种融合了视觉与建筑考量的秩序。然而，问题依然存在：是为了在某种程度上，私营规划能否实现这种参数化城市进程所渴望的整合秩序？从更广的层面上说，一种富有艺术美感的城市化进程在自由市场面前，究竟是否可行？

有关参数化主义的理论阐述和广泛例证请参阅：

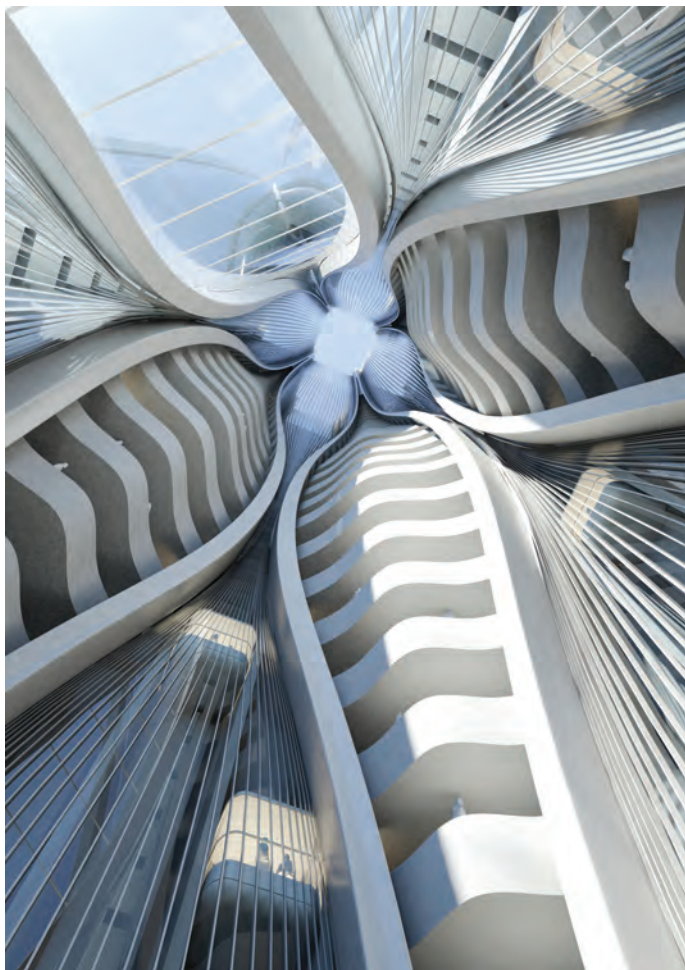
《参数化主义》—舒马赫，帕特里克著：建筑和城市设计领域的一种全球新风格，详见尼尔·利奇（ed）《AD数字化城市》2009年7月/8月《建筑设计》第79卷，第4号。重印：马里奥·卡尔波，《建筑学中的数字化转型》1992–2012（AD杂志）

市场化进程是一个演化渐进的过程，它通过突变（试错）、选择（利损）与复制（模仿盈利的解决方案）而持续运作。它自我校正、自我调节，因此成为一种自我组织的秩序。我们可以因此推测，城市化与建筑化秩序的土地使用和用途范围，最好由建筑的个体开发商在一个可以实现最佳土地资源配置的市场化过程中决定。然而，缺失风格化和方法论上的统一连贯性，我们无法保证这一程式化秩序演变成一种清晰的空间形态秩序。要做到这一点，我们必须设计一个强势的设计风格与方法，具有通用性和创建秩序的能力，可以将社会秩序转化为复杂的、富于变化的空间秩序。这样的一种共享模式可以实现多设计者参与、多客户开发的设计成果和谐统一。而无需预设控制方的参与。



Figures 5 & 6. ZHA, Dominion Tower, Moscow: This tower is a multi-tenant office building. The structure is made from perforated walls placed so that floor plates can shift and cantilever affording column-free facades opening the offices into the urban context. The offices also have glass walls on the inside and are thus equally connected into the central navigation void and to each other. Communicative intensity is facilitated and signalled via the stair bridges that cross the day-lit atrium. This heightened visibility of the circulation elements that invite to linger – seeing and being seen – is conceived as hub for cross company informal communication. A cool building certain to attract a cluster of mutually relevant cool companies. (Source: Hufton + Crow)

图5、6 为扎哈·哈迪德建筑事务所所设计的莫斯科自治领大厦视图：这座大厦是一座综合办公设施；其结构特点在于穿孔幕墙的布置使楼板可以侧移进而悬挑出来形成无柱外幕墙，使这座办公楼与城市景观融合。此外，该建筑内部也设有玻璃墙体，既彼此相连，且均与中庭导向型空间连接。通过在自然采光的中庭空间内布置错落有致的楼梯连桥实现了建筑内部的畅通。这种显化的动线通道吸引着人们驻足其间移步换景，欣赏与被欣赏，构成了公司之间非正式社交活动的枢纽。这座别具一格的建筑必然吸引着具有同样气质的公司集群入驻其中（来源：建筑摄影工作室Hufton + Crow持有该版权）



Figures 7 & 8. ZHA, Urban master-plan for Beijing CBD: Our proposal for Beijing CBD comprises a whole group of towers of various heights, all equipped with a central navigation void instead of the standard central core. Balconies allow for visual participation in the central experience and panoramic elevators facilitate the fast browsing of the space. The largest tower shown here is composed as a merged cluster of four towers. One of the four towers sponsors a mega window instead of a bank of panoramic elevators, affording a dramatic visual connection into the urban fabric. (Source: Zaha Hadid Architects)

图7、8. 为扎哈·哈迪德建筑事务所设计的北京中心商业区城市总体规划视图：我们所提出的北京中心商业区规划包括一套大厦建筑群，其中每座建筑的高度不一，同时全部配置了中庭导向型空间，取代标准型中央核心筒式设计。访客从每个阳台上尽可饱览中庭景观，或在搭乘全景电梯上上下下之间也可以快速浏览整座建筑空间。图片中所示的体量最大的这座大厦由四座大厦群组成，其中一座设有一扇巨型窗户，取代了多组全景电梯，透过玻璃窗即可眺望远处的城市景观，其视觉效果引人入胜。（来源：扎哈·哈迪德建筑事务所持有该版权）

grows differentially on the terraced rock surfaces of certain shaded slopes depending on surface pattern, sun orientation, rock formation and so on. A population of a certain species of birds might then settle on these slopes. In the same way, Parametricism envisions the build-up of a densely layered urban environment via differentiated, rule-based architectural interventions that are designed via scripts that form new architectural subsystems, just like a new species settles into a natural environment. This process delivers rich yet fully correlated diversity if designed according to the heuristics of Parametricism. Each new architect/author can be uniquely creative in inventing and designing the rules/scripts of their own project, and participate in their own unique way in the build-up of a variegated, information-rich urban order. This analogy also extends to the navigation of rule-based environments: the urbanite's intuitive orientation within a parametric urban environment functions analogous to animal cognition/navigation in a natural environment.

参数化主义可以从一个未经规划的、多作者的、多物种的生态系统中提取经验。自然环境中的各种特征和生物联合打造了一个纷繁斑斓的具有规则的秩序，这一秩序反之建立在大自然多种法则复杂的相互作用之上，由此建立了构成自然景观的各类有机和无机的次级系统之间的系统性关联。地形与河流流径息息相关；河流与地形和太阳方位这些因素共同界定了植物种类、植物区系的分化、与河流和地形一起，塑造了动物群的区分和分布，进而反之影响着植被、河流，甚至地形。虽然这种因果关系统极为复杂且不易解开，但其间的相互联系从各个方面都有所体现，为那些渴望探索浏览这一景观的人们提供着信息线索。

关键之处在于这种相互关系的叠加。植物或动物的每一个新物种都是根据自身适应和生存法则而繁衍的。例如，苔藓在一些处于背阴斜坡的阶梯状岩石表面差异化很大，这取决于其表面图案、日照方向，岩层构成等等；一种鸟类群体可能会因此定居在此。同样地，参数化主义设想一种密集多层的城市环境的叠加，通过富有差异化和规则性的建筑学科的介绍，其设计成

果因应用参数化编程构成了新型建筑的次级系统，仿佛在自然环境中加入了一个新型物种。该过程受到参数化进程的启发，实现了丰富且紧密相关的多样性设计。每一个新的建筑师和设计者都可以发挥其独一无二的创新精神，发明和设计各自项目的原则和参数范式，并且以特有的方式参与建设一个五彩斑斓、信息丰富的城市秩序。这一类比同样适用于以规则为基础的环境中：空间使用者在一个参数化城市功能环境中的都市直观导向，类似于动物对自然环境中的认知和定位。

从单纯密度到协同强度

城市集约化进程不仅仅意味着密度聚集：它意味着许多互相吸引的城市设施之间的密切合作，共同促使城市中心不断演变为统一的功能体系。这一相互吸引的过程是以城市企业家为媒介的市场化进程。开发商的目标（和其成功的基本原因）在于累积蕴藏在毗邻周边设施的特定城市地块的潜在的协同作用。企业和市场积累越多的自由用以尝试土地资源配置、建筑密度和

From Mere Density to Synergetic Intensity

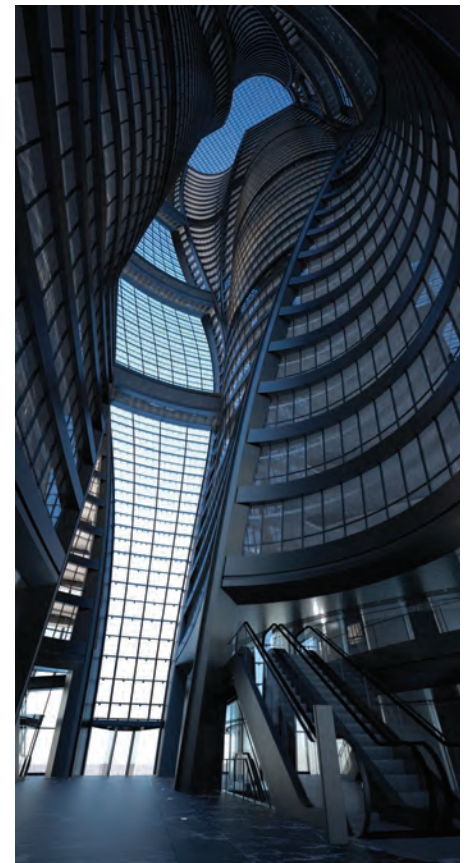
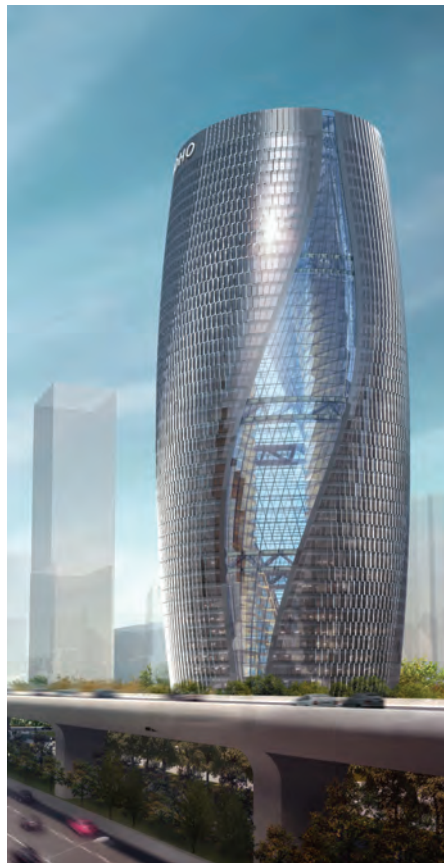
Urban intensification implies more than mere density of agglomeration: It implies close cooperation between the many urban facilities that attract each other and together evolve the urban centre as integrated functioning system. This process of mutual attraction is a market process mediated by urban entrepreneurs. It is the developer's aim (and underlying cause of success) to garner the potential synergies that reside in the selected urban site due to its location among adjacent facilities. The more freedom is granted to entrepreneurs and markets to experiment with land use allocations, density and new real estate products, the more can we presume an intricate programmatic order to emerge (while we should expect bureaucratic planning prescriptions to result in arbitrary adjacencies which do not lead to synergetic co-operations). The theory of market-based urban order starts with this premise. On the basis of this premise the task of the individual architect must be to spatially organize and formally articulate the value-enhancing connections that are implied in the developer's value hypothesis. The new building is to be embedded into its context in such a way that all synergetic relations are established through access relations and visual connections and become also articulate as formal affiliations via strategies such as alignment, similitude, morphing etc. The task of formal articulation is important. It enhances the communicative capacity of the built environment. Mere inter-accessibility and inter-visibility – albeit crucial – are not enough. As the urban scene grows more complex the problem of perceptual tractability and legibility arises and thus the task of phenomenological articulation. Users must grasp what belongs and works together, they must be able to cognitively decompose a complex agglomeration into relevant units of interaction, i.e. they must be able to identify the urban offerings and navigate their synergetic relations. This should be recognized in the architect's aesthetic values guiding the formal resolution of the project.

These values shift with every aesthetic revolution, i.e., with every new major style. The formal heuristic rules and attendant aesthetic prerogatives of parametricism promote this emphasis on making connections and articulating continuities. Every space communicates with many other spaces, every subsystem is correlated with many other subsystems, the formal features of the new building resonate and affiliate with many features in the urban context. This is the ethos – one might even say the categorical

imperative of parametricism: always correlate, never rest with mere adjacency. If we presume that within our complex, dynamic cities successful entrepreneurs manage to establish synergies in ever new and often unexpected ways we can no longer rely on architectural stereotypes and must instead bank on architecture's increasing originality and open-ended adaptive versatility via its new compositional repertoires. Parametricism is unique in the way it expands architecture's repertoire and degrees of freedom (via variable form-finding involving dynamic curvilinearity) while simultaneously increasing its ordering capacity via associative logics and agent based self-organization. Parametricism is well prepared to handle and articulate the new entrepreneurial synergies; it can follow and make legible the entrepreneur's transformation and post-rationalization of found contingencies into integrated assemblages or newly minted units of interaction. Thus parametricism has the ability to build up a legible urban order leading to the emergence of a path-dependent (unpredictable but recognizable)

新型房地产产品，我们就越有理由预测一种复杂精密的秩序典范的产生，（同时，也可以预见官僚式的规划会导致城市设施的随性布置，而非协同合作）。以市场为基础的城市秩序理论正是以此为前提。在这一前提的基础上，个体建筑师的任务应是空间组织，以及从建筑形态上阐述隐含在开发商价值理念中的可以提升开发价值的联通性。新型建筑应该融入到其所处场景之中，从而借助出入关系和通视性建立起各种协同关系，并通过诸如对齐、相似，变形等方法来阐明空间的从属关系。空间的阐述极为重要，它将提升建造环境的沟通机能。单纯的内部连接与通视虽然重要却还远远不够。城市复杂性的提升引发了如何解决可感知的追踪性和可识别性的问题，也就是如何建立现象学上的连接的问题。空间使用者应有能力识别空间的从属关系和连接性，应有能力将复杂的集合分解成有关联的交互区域，也就是说使用者可以识别出城市提供的功能空间与和功能空间之前的协同关系。

这些价值始终伴随每一次美学革命，即每一种新的主导风格而变化。参数化主义的这种建筑形态特性原则和随之而来的审美



Figures 9 & 10. ZHA, Soho Li Ze Tower, Beijing: This tower is addressing the usual SoHo – Small Home Office – product of small office units and shared office spaces in a tall tower typology. To afford the desired communicative intensity that comes with clusters of start-up companies we decided to open up the tower all the way and create China's tallest atrium, 200 meter high. Retail and food & beverage facilities are located at the bottom and around in a sunken courtyard, also reached by the atrium. The atrium and indeed to whole tower is opened up via two gigantic vertical windows that slightly spiral around the gently swelling tower form. Four high level bridges that cross these windows give additional connectivity and spectacular vistas. (Source: Zaha Hadid Architects)

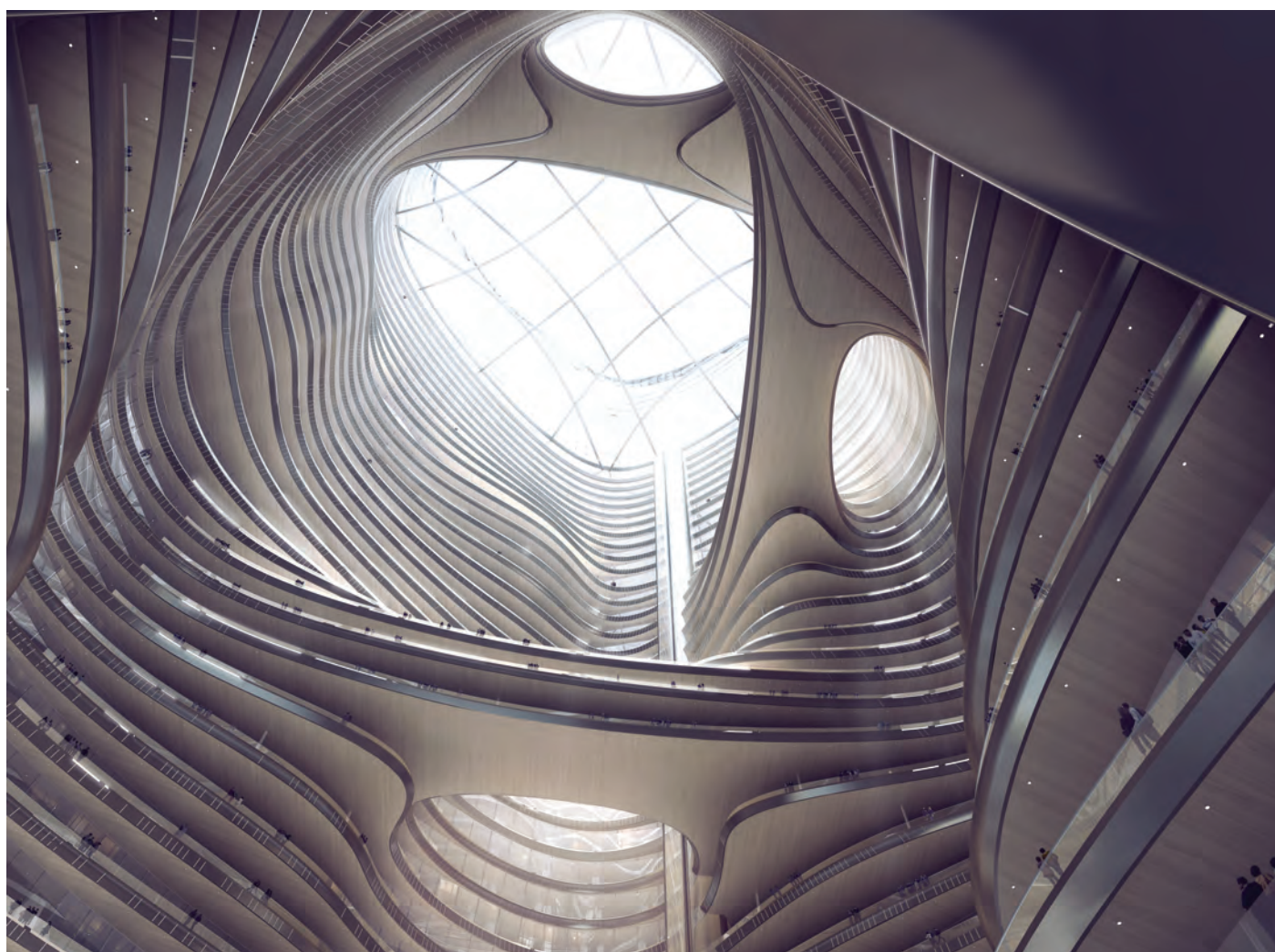
图9、10. 为扎哈·哈迪德建筑事务所设计的北京丽泽SOHO大厦视图：该大厦的设计在传统SOHO（意为“小型办公+居家办公”）理念产品，即由小型办公单元和混合办公空间所组成的高层大厦建筑类型的基础上进一步发展。为了满足众多创业公司集群之间高强度的沟通需求，我们决定该大厦采用完全开放式内部空间，因而打造出这个高达200米的中国目前最高的中庭体量。零售与食品饮料设施位于下沉式庭院的底部及四周，可由中庭进入。建筑中庭乃至整座大厦通过两扇环绕大厦建筑外观的巨型垂直窗户向外打开。四座天桥横跨这两扇窗户，既增强了室内空间的联通性，又提供了壮观的远景。（来源：扎哈·哈迪德建筑事务所持有该版权）

overall urban identity with various local sub-identities. This hypothesis is premised on the hegemony of parametricism, similar to modernism's hegemony in 1960, whereby all architects hired by all developers would follow parametricism's ethos and imperative: establish correlations and maintain continuities. These continuities would then radiate through the city, in ever new creative ways. This is the hypothesis of the city conceived in analogy with a multi-species ecology.

Unleashing Internal Complexity, Mixity and Communicative Intensity

The agenda of urban intensification via synergetic mixity has radical consequences for the high-rise typology of our urban centers. The standard typology belongs to the bygone era of Fordism with its modernist emphasis on functional segregation and endless

特性强调建立连通并且阐释其连续性。每个空间都与其他空间有沟通关系，每个次系统都与其他次系统相连，新建筑的空间特性与城市肌理呼应并保持从属关系。这是参数化主义的精神，也可以说是参数化主义实施的绝对必要性：（空间）始终相互关联而不是单纯的毗邻。将参数化主义在我们复杂、动态的城市内推行，可以使成功的企业家通过不断创新且新颖的方式建立协同作用关系，我们将可以不再依赖教条式建筑类型，通过应用参数化主义所带来的设计工具，我们可以增加建筑独创性，提供有活力的、不断完善的、适应性强的设计。参数化主义的独特性表现在其扩充我们现有的设计工具并提升（通过多样的包含找形在内的动态曲线应用）设计的自由度，同时通过连带的逻辑与个体自组织系统从而实现不断增加秩序机能。参数化主义为处理和阐述新的企业化的协同关系做好了充足的准备；它可以跟随企业的进化并使其清晰可识别，也可以合理解释偶然集合空间或新创造的交互空间的形成。因此参数化主义有能力来建造可读的城市秩序 从而实现由独立（不可预测



Figures 11 & 12. ZHA, Taikang Regional Headquarters, Wuhan: Our most ambitious mega-atrium so far. The top lit atrium is cut open by large paraboloid arches at the lower levels and traversed tangentially by multiple bridges in the upper third. The floor plates are swelling close to the bridge connections as if gradually pushing the bridges forward. Panoramic elevators pull up at the edges of the atrium, at times pulling behind the projecting floor slabs. Total communication: Nearly every space is visible to every other space. (Source: Zaha Hadid Architects)

图11、12. 为扎哈·哈迪德建筑事务所设计的武汉泰康区域总部大厦视图：该建筑拥有我们迄今为止所设计的最为气宇非凡的巨型中庭空间。顶部采光中庭被位于较低楼层的大型抛物线状的拱形结构切分开来，通过且与多座天桥的上部三分之处相切。楼面朝着天桥方向逐步加宽，仿佛推着天桥向前。全景电梯在中庭空间边缘向上拉升，时而又向伸出的楼板后部。每个空间相对于其它空间几乎无不清晰可见，实现了空间之间的自由沟通。（来源：扎哈·哈迪德建筑事务所持有该版权）

repetition, resisting variation and complexity. The standard tower is driven by pure quantity and tight packing. The volume is generated by extrusion: the multiplication of identical floor plates, surrounding a core that blocks communication both across the individual floor plate and between floor plates. As space programs differentiate with soaring internal and external communication needs, the solid central core becomes more and more an obstacle to navigation and communication. The prerogatives of inter-accessibility and inter-visibility between spaces demand sectional connections and visibility across floors. This core needs to be exploded and replaced by navigation voids that turn towers from shelves into vertical streets. The circulatory requirements of the tower must be radically divorced from its structural stability requirements. This technological synergy must be given up to liberate navigation from stability. Structural stability should be delivered via a skeleton - ideally an exo-skeleton that gives character and identity to the tower - rather than via a closed shaft or tube. The skeletal rather than closed tubular structure is also much more transparent and permeable. This is important to achieve visual porosity.

The variety of offerings needs to be made visible in order to become effective. Urban users should be able to browse the programmatic offering of the tower just as we browse urban spaces and streets. This is delivered by the idea of the big atrium pioneered by John Portman since the 1970s. The wider the atrium, the more floors become inter-visible. This leads to the idea of the mega-atrium that is both very wide and very tall. Such atria might also offer bridges that cut across and bring programs of special importance into prominent view. The atrium would also cut down and connect basement levels into the overall orientation space. In mixed-use towers with different categories like retail, food & beverage, entertainment, culture, offices, and hotel functions the atrium might change shape or might be articulated into multiple interlocking atria. Navigation through the atrium should ideally happen in multiple modes: global movement via panoramic elevators, regional movement via escalators, and local movement via stairs and ramps, as well as via bridges and ramps crossing the atrium. Such bridges might also continue as bridges from tower to tower in multi-tower clusters. In addition to bridge links between towers and their atria

we propose that mega-windows should open up our tower atria to vistas from outside and eventually to visual connections between towers. With the same intention of communicating across towers we are proposing outdoor terraces that link towers visually and that link back into the interior atrium of the tower. While each atrium creates a fascinating internal world - an interior urbanism - it remains important to maintain awareness and visual connection with the surrounding urban fabric.

Bridges between towers do not only operate organizationally by creating physical links but also operate in the phenomenological and semiological dimension by articulating what belongs together and by signaling where high connectivity zones like retail areas are located. The use of curvature allows designers to maintain legibility in the face of increasing complexity. While providing flexibility in terms of adaptive swelling and swerving, curves also facilitate legibility by describing convex volumes, concave voids and continuous trajectories in visually more robust ways than straight lines with corners and kinks could. The issue of cognitive tractability and the visual decomposition of complex scenes become increasingly important and can be studied with respect to the psychology of perception, in particular in terms of Gestalt-psychology.² The Gestalt grouping principles of closure and smooth continuation privilege curves over straight lines with corners. Every corner represents a potential point of visual disintegration, leading to the cognitive break-down of figures that are intended to signify relevant units of interaction: the objects of interest lose recognizability and the project as a whole is in danger to fall apart. That is why we prefer to compose with curves, especially when it comes to complex compositions. This bias towards dynamically curved geometries also extends into the realm of urban design. Here too curvature helps to articulate unity and continuity, while affording variability in response to both contextual and programmatic contingencies. An urban geometry based on curves can better navigate topography, river edges, and other irregular contextual conditions. A soft grid offers plot and block size variability, i.e., economies of scope, which is a better default position than a rigid grid that can only offer a one-size-fits-all set of repetitive plots. Swarms, height gradients and soft silhouettes facilitate the visual articulation of urban districts, features, identities. The convergence of the

却可识别的)路径的、包含多种区域性特性在内的城市特性的涌现。这个假说以参数化主义的主导作用为前提,与上世纪六十年代的现代主义的主导作用相似,即所有的建筑师都应遵循参数化主义的设计理念:建立关联性并且保持连续性。这些连续性继而通过城市以全新的、有创造力的形式发散。这种假设视城市为一座物种丰富的生态环境。

不受约束的内部复杂度、混合度和沟通强度

通过混合协作实现的高强度城市这一目标对城市中心的高层建筑设计有开创性的效果。福特主义时代的标准类型学已经过去,在福特主义社会,现代主义主要强调功能的隔离和无休止的重复、抗拒变化性和复杂性。标准型大厦类型一味地追求数量和紧凑堆砌。这类建筑的体量通过挤压空间产生:相同楼板重复累加、中央核心筒阻碍了同一楼层和不同楼层之间的沟通。随着用户对内部、外部沟通需求的提高,用户对空间功能差异化的需求也日趋明显,中央核心筒越来越成为导航与沟通的障碍。不同空间之间的互访和内部通视需求也要求不同楼层之间的切面连接和跨楼层的视觉连接。传统的核心筒必须被废除,取而代之的是导向型体量,将书架型大厦转变为竖向街区型大厦。传统大厦的流线需求必须与结构稳定性需求彻底地分开。我们必须摒弃这一结构技术的局限性,从而将空间导航需求从结构稳定性中解放出来。结构稳定性可以通过建筑外骨架提供(理想的外骨骼可以赋予一座大厦独一无二的特质),而非通过封闭式竖井或核心筒来支持。这种结构骨骼,相较于封闭的管状核心筒结构,也更加透明和透气。这一点对于实现多层次的视觉连接是非常重要的。

各式各样的设施在可视化的条件下方才有效率。城市使用者们应该可以像我们浏览在都市空间和街道一样自如地浏览一座大厦内的功能设施。这在上世纪七十年代先锋建筑师约翰波特曼所提出的大型中庭空间这一想法中有所体现。中庭的尺度越大,就可以实现越多楼层的可视性。这一想法促成了一种极宽且极高的巨型中庭这一设计理念的问世。这样的中庭体量同时可以提供天桥连廊,具有突出的观景效果。中庭也可以向下延伸,将地下层融入到整座建筑的导航空间内。在汇集了商业、餐饮、娱乐、文化、办公和酒店的大型综合高层建筑中,中庭可以变形,或者演变为多层错落有致的前厅。中庭的导向性将会有多种可能性,通过观光电梯形成

2: For a theoretical elaboration of architecture's phenomenological project on the basis of Gestalt-psychology see: Schumacher, Patrik, *The Autopoiesis of Architecture, Vol.2 A New Agenda for Architecture*, Publisher: John Wiley & Sons Ltd., London 2012, in particular: section 6.7 The Phenomenological Dimension of Architectural Articulation.

2: 有关基于格式塔心理学的建筑现象学项目的理论阐述请参阅:《建筑学的自组织系统—建筑学新议题下册》—舒马赫,帕特里克著出版社: John Wiley & Sons出版有限公司, 2012年伦敦, 重点章节: 6.7节“建筑表达的现象学维度”

discipline towards these insights would go a long way towards regaining a sense of urban order in the face of society's restless dynamism of high density urbanization and permanent innovation.

的竖向人群导向，扶梯形成的区域性的人群导向，坡道和台阶形成的小范围人群导向，或者是横跨中庭的连廊的导向性。这样的连廊同时也可以作为一个建筑群建筑之间的联系。除了连接塔楼和其前厅的连桥，我们还提出高塔应该具有巨大的开窗从而让高层建筑之间形成视觉联系，继而呼应高层建筑的室内中庭。开阔的中庭可以创造出迷人的室内世界，一座室内都市，保持着其对于周边都市景观的感知和视觉联系。连接大厦建筑群的天桥不仅是通过打造实际的联系而实现建筑的系统化运作，同时在现象学和社会学层面上，通过高度畅通的特定区域，例如零售区的位置，暗示阐述了空间的从属关系。曲线的运用帮助设计者在提高空间复杂性的同时保持了空间易读性。在给空间的扩张和扭转提供了灵活性的同时，曲线有助于描述凹凸体量和连续性轨迹的可读性，这比直线转角或者折角在视觉上更加有张力。认知和处理复杂场景的视觉解构的问题变得越来越重要，这也是认知心理学的研究范围，尤其是格式塔心理学²。格式塔心理

学中将闭合的和光滑连续特殊曲线从带有折角的曲线中分离出来。每个折角代表一个而潜在的视觉分界点，引发了对图形认知的断点，标示着相互作用的相关单元：这种物化减弱了认知，从而使整个体量产生了风崩离析的危机。这就是我们在面对复杂综合体设计的时候，优先选择曲线的原因。这种流线型几何体的特点同样存在于城市设计的领域。同样的，曲线实现了完整性和连续性，同时保障了文脉和功能的多样性契合。基于曲线的城市形态可以更好地契合地形、河流走向以及其它不规则的周边环境。软性网格布置提供了不同的地块和空间格局，例如区域性范围经济，相对于仅能提供单一重复性地块的死板的网格划分而言，不失为一个更佳的模式。群模式，高度渐变以及柔和的建筑轮廓，无不有利于阐释都市区域、特征与个性的视觉关系。面临高密度城市化进程的不断推进，参数化主义所提出的多学科交汇的解决方法将会重新建立适应当今社会的城市秩序。

References:

Schumacher, Patrik. (2009). **"Parametricism: A New Global Style For Architecture And Urban Design"**, Neil Leach (ed). AD Digital Cities. Architectural Design 79(4), July/August 2009. Reprinted in: Carpo, Mario, The Digital Turn in Architecture 1992-2012 (AD Reader).

Schumacher, Patrik. (2012). **The Autopoiesis of Architecture, Vol.2 A New Agenda for Architecture**. London: John Wiley & Sons Ltd., in particular: section 6.7 The Phenomenological Dimension of Architectural Articulation.