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# Creating Effective Workplaces in China's Vertical Megacities

## 在中国垂直巨型城市中创造高效的工作场所



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Moira Moser gained an international education as an architect before founding M Moser Associates in 1981. Now a global firm, its workplace design-delivery expertise has seen it lead projects ranging from base buildings, campuses, and lab facilities to individual offices in Asia and around the world. A recognized architect in California, the UK, and Hong Kong, Moser is also a Fellow of the Hong Kong Institute of Architects, the American Institute of Architects, and the Council on Tall Buildings and Urban Habitat.

Moira Moser曾接受国际化的建筑学教育，并于1981年创立了穆氏建筑设计有限公司。作为一个全球型企业，穆氏以其出色的办公空间设计和交付资质为遍布亚洲和世界各地的基础建筑、企业园区、实验室设施，以及办公室项目提供各类专业服务。Moira是美国加州、英国以及香港的注册建筑师，同时还被香港建筑师学会、美国建筑师学会，以及世界高层建筑与都市人居学会分别授予院士称号。



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John Sellery has worked at the forefront of architecture and interior design since 1978. After gaining his BA in Architecture at the University of California, Berkeley, he went on to become a licensed architect in California and New York before relocating to Hong Kong in 1989 and playing an instrumental role in M Moser Associates' development.

John Sellery自1978年起便在建筑以及室内设计领域从事第一线的工作。在加州大学伯克利分校获得了建筑学士学位之后，他分别在美国加州和纽约成为了注册建筑师，并于1989年来到香港，同年加入穆氏。在穆氏的发展历程中，John发挥了至关重要的领导作用并带领团队完成了许多重大项目。



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Christine Bruckner gained her Doctorate and Master of Engineering in Architecture at the University of Tokyo, her Post Professional Master of Architecture at Yale University, and her Professional Bachelor of Architecture at Rice University. Her professional experience embraces base building, campus design, and interior workplace projects for clients around the globe.

Christine Bruckner在东京大学取得了建筑工程的硕士及博士学位，在耶鲁大学获得了建筑学专业硕士学位，在莱斯大学获得了建筑学专业学士学位。她在基础建筑、园区设计以及办公场所室内设计等众多方面都拥有丰富的专业经验和国际背景。



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作为专业的工程师 (P. Eng. – APEGM 加拿大)，为了设计和建造舒适、能启发灵感、并能达成商业目标的空间环境，Nabil Sabet与来自企业及各类机构的客户开展了广泛合作。他的专业技能从项目策略规划及启动，延伸至大型项目的设计及交付、基础建筑、办公室、实验室设施、健康医疗及教育教学空间环境等众多项目。

### Abstract | 摘要

*The buying values of entrepreneurial end-user clients in China and the Pearl River Delta focus on internal environments that will attract the knowledge workers that their businesses require. In 35 years China has evolved from a cheap labor source to a knowledge economy. Businesses now must compete to attract and retain knowledge workers. Thus, the workplace has become a crucial buying value: its light, air, temperature, and environment must enhance the worker's well-being, while IT and communications support their productivity. Buildings and campuses within the megacity must also be sustainably designed and provide the amenities expected in a thriving neighborhood. China's entrepreneurial clients often grow so rapidly that what they initially think they will need as part of a building quickly grows to occupying the whole structure, making internal flexibility within the initial building design critical.*

**Keywords:** Knowledge Worker, Modernization, Sustainability, Urban Habitat, Wellness, Workplace

当今的中国，尤其是珠三角地区的企业客户正愈发关注如何藉由办公空间内部环境来吸引商业发展所需的知识型员工。在过去的35年里，中国已经从曾经的廉价劳动力市场发展成为了如今的知识型经济体。身处其中的各类企业，必须通过竞争来吸引及留住优秀的知识型员工。因而，办公空间日渐成为被重视的购买价值。照明、空气质量、温度和环境都必须为提高知识型员工的健康及舒适所服务，同时信息技术及通讯设施必须为他们工作效率的提升给予支持。巨型城市里的建筑物和园区的设计必须符合可持续发展原则，同时能够提供与周边环境相融合的配套设施，打造“友邻”氛围。中国企业的发展大都非常迅速。他们起初或许只需要整座建筑的一部分便能满足办公需求，但很快就发现需要占据整座大厦。因此，将空间设计的内部灵活性在设计初期就予以考虑，是相当关键。

**关键词:** 知识型员工、现代化、可持续性、城市人居栖息地、健康、办公场所

### Introduction

The buying values of today's entrepreneurial end-user clients in China – and particularly in the Pearl River Delta (PRD) region – focus on workplace environments conducive to attracting and retaining the knowledge workers that their businesses require.

Workplace buildings must not only present a friendly façade to the megacity's urban fabric, but even more importantly, provide an interior infrastructure that supports an effective workplace environment for its knowledge workers.

### 35 Years of Growth

In the late 1970s China ushered in an era of sweeping economic liberalization which led to the country familiar to us today. In the space of just one generation, China's agriculture and heavy industry-based centrally planned economy was transformed into a thriving

### 引言

当今中国市场的企业类客户，尤其是珠三角地区，正愈发关注如何藉由办公空间环境来吸引和留住商业发展所需的知识型员工。

在挑选办公场所时，他们所追求的并不仅仅是那些为大都市添光加彩的华美设计；对其而言，具备能为知识型员工提供高效工作环境的内部构建才是更重要的考量。

### 35年的发展

在上世纪七十年代后期，中国政府开创了经济改革开放的新时期，而这也成就了我們今日所熟悉的中國。在短短一代人的時間內，中國就从以农业和重工业为主的计划经济转型为蓬勃发展的“世界工厂”，并吸引了大量的海外投资及专业人才。

在1979年仍然是人口寥寥的农村地区的珠三角，正是这一转型的最佳例子。现如今该区域最大的城市——深圳，在当时

“workshop of the world” welcoming of both foreign investment and expertise.

Nowhere was this transformation more intensive or readily apparent than in the Pearl River Delta (PRD) region, which in 1979 was sparsely populated and almost entirely rural. The region's largest city today, Shenzhen, was then a relatively small “backwater” market town (Figure 1).

Impetus for the dramatic growth of both the city and the region came in 1980, when the central government designated Shenzhen as China's largest Special Economic Zone (SEZ). In essence, local SEZ governments were enabled free market economic policies – and to accept foreign investment – to a much greater degree than the remainder of the country.

As the 1996 Chinese government paper Development of the Shenzhen Special Economic Zone explains: “The major role assigned by the central government to Shenzhen was that it become the nation's ‘window’ to the outside world, its ‘area of experimentation’ in the process of reform and development of the economic system, and a demonstration to the rest of the country.

“... Shenzhen was successful primarily because of its special preferential reform policies... to both encourage and absorb foreign investment relating to taxation, land use, foreign exchange, marketing of products, entry and exit, economic autonomy” (Li, 1996).

The “experimental” basis of the Shenzhen SEZ was not the only aspect that made it and the ensuing PRD megacity markedly different from other “boomtowns” in the developing world. Unlike the latter, the growth of the SEZ was from the outset planned for attracting and developing business, with requisite regulations, zoning, and infrastructure already implemented or envisioned rather than evolved ad hoc. Provisions for the necessary influx of labor from elsewhere in the country were similarly anticipated and planned for.

Hukou, a registration system for China's population, had (and has) its own indirect impact on the unique development of the PRD megacity. Because hukou does not give individuals access to public education or health services outside their town of origin, there is a tendency for single young adults, fathers or both parents to leave their families to come to SEZs to work. On the positive side, this pursuit and availability of jobs has allowed places like Shenzhen to grow without the accretion of surrounding favelas as in Rio or slums as in Delhi.



Figure 1. Shenzhen in the late 1970s and today (Source: Shenzhen Municipality Bureau of Archives/XIYU Photography)  
图1. 19世纪70年代的深圳和今日的深圳 (来源: 深圳市档案局/XIYU摄影)

亦不过是一个名不见经传的小城镇而已 (图1)。

珠三角的急速发展始于1980年。当时, 中央政府正式批准将深圳设立为中国最大的经济特区; 从实质上给予深圳地方政府相较于中国其他地区更高的自由度, 去推行市场经济体制和吸纳海外资本。

中国政府在1996年公布的一份《深圳经济特区发展》文件指出: “中央政府给深圳的定位是向世界展示中国的‘窗口’, 是经济体制改革和发展的‘试验田’和‘排头兵’。”

“……深圳的成功很大程度上得益于其改革政策的推行……通过税收政策、土地使用、外汇管理、产品营销、进出口贸易以及经济自治等手段来鼓励和吸收海外投资” (Li, 1996)。

深圳之所以能发展成为珠三角地区的巨型城市, 并迥异于其它发展中国家的“新兴城市”, 其“实验性”的本质并非唯一原因。与其它城市不同, 深圳的发展是基于前瞻性的招商引资计划, 其相关的必要法规、区域设立以及配套设施均为提前实施和规划, 而非事后制定。至于所需劳动力从国内其他地区的引入, 亦是预计到的和有所计划的。

户口, 作为中国政府的人口登记制度, 对珠三角巨型城市的独特发展模式亦带来了间接影响。受户籍制度的限制, 人们很难在原籍以外的地区享受公共教育和医疗服务, 因此由单身年轻人、父亲或父母双方离开家人而非举家前往到深圳打工成为了一个趋势。从积极的角度看, 这种求职和就业的可能性使深圳免于陷入像里约热内卢和德里那种被贫民窟包围的窘境。

在成立后的近三十年里, 深圳的经济得到了快速且稳健的发展。这首先得益于非熟练但廉价的工人、海外物资和海外资本的涌入, 而随后深圳则逐渐成为拥有熟练工人的全球轻工制造中心。近年来, 珠三角地区的工业已经构建形成了完整的供应链, 并储备了大量为全球市场服务的从事高科技配件生产以及终端产品组装的熟练工人。

## 对知识型经济的需求

在2008年, 中国政府宣布了合并珠三角主要城市的计划——将深圳、东莞、惠州、珠海、中山、江门、广州、佛山以及肇庆合并成一个都市圈。当时的报道称: “这一计划映射出一些颇激动人心的数据: 到了2030年, 珠三角地区将会形成一个巨型城市圈, 可容纳6,600万人口, 占地54,733平方公里, 国内生产总值达15兆人民币, 人均国内生产总值将超过22万人民币, 实现超过90%的城镇化进程。” (Time Out Hong Kong, 2013年9月11日)

正如深圳在1980年所声明的一样, 这一计划对之后数十年珠三角地区的经济、社会和城市环境的发展变化均产生了深远的影响。

如今促使珠三角转型的最重要动力是知识型经济的崛起。这亦是其它地区发展趋势的反映, 但深圳的步伐更大。知识型经济在珠三角地区的重要性正逐渐增强, 且中央政府在2008年的《珠江三角洲地区改革发展规划纲要 (2008–2020年)》中亦特别提到:

“该地区将会……着力推进科技进步, 增强自主创新能力, 率先建立创新型区域。

“2020年, 率先基本实现现代化……服务业增加值比重达到60%。”

“这一区域将会……促进科技服务业的发展……国家级软件基地……鼓励国内外大型企业……在珠江三角洲地区设立总部或分支机构。” (The National Development and Reform Commission, 2008)

珠江三角洲对知识型经济企业发展的重视使其逐渐成为高科技创新的全国“引擎”。Wong (2015) 称珠三角地区为“……世界第二大经济体的高科技创新中心。”这里的许多企业都是本地发展起来的私营企业, 例如腾讯和阿里巴巴。与这一区域以往的产业不同, 他们所关心的并不是拥有大量物业和有形资产: 他们的业务是建立在创新服务上的, 因而也是建立在知识型员工的聪明才智上的。



For almost three decades after its establishment, the Shenzhen SEZ economy has developed quickly and steadily, underpinned first with cheap unskilled labor and foreign materials and capital, then becoming a global light manufacturing center with skilled labor. In more recent years, industry in the PRD has evolved into a complete supply chain, with a large pool of highly skilled labor working to both manufacture high tech components and assemble end-products for a global market.

## Demands of the Knowledge Economy

In 2008, the Chinese government announced a plan to merge the major cities of the PRD – namely Shenzhen, Dongguan, Huizhou, Zhuhai, Zhongshan, Jiangmen, Guangzhou, Foshan, and Zhaoqing – into a single megalopolis. According to contemporary reportage, “The plan projects some quite mind-blowing statistics for the Pearl River Delta by 2030: one megacity, 66 million people, 54,733 square kilometers, a GDP of RMB15 trillion, a per capita GDP exceeding RMB220,000, and an urbanization level in excess of 90 percent” (Time Out Hong Kong, 11 Sept. 2013).

Like the original announcement of the SEZ in 1980, this has marked a fundamental shift in how the PRD's economy, urban environment, and society will develop across the next few decades. The major driver of change in the PRD today is the rise of the knowledge economy, mirroring its development in the rest of the China, but at a greater pace. The knowledge economy's increasingly dominant role in the PRD was acknowledged and endorsed by the central government in 2008's Outline of the Plan for the Reform and Development of the Pearl River Delta (2008-2020): “The region will concentrate on promoting scientific and technological progress and strengthening the abilities of independent innovation to take a lead in developing an innovation-oriented region.

“Till 2020 the region will have basically realized modernization ahead of other regions...with the service industries accounting for 60 percent [of GDP].”

“The region will...boost the development of science and technology services...the national base of software...and encourage large enterprises both from home and abroad...to establish their headquarters or branches in the PRD” (The National Development and Reform Commission, 2008).

This focus on business growth in the knowledge economy gives the PRD region the role of becoming the “engine” of technology and innovation for the entire country. Wong (2015) referred to the PRD as “a high-tech and innovation hub for the world's second largest economy.” Many of the businesses at its core are primarily home-grown private sector entrepreneurs such as Tencent and Alibaba. Unlike their industrial predecessors in the region, these concerns neither own significant real estate nor engage in the manufacture of tangible goods: their businesses are predicated on innovative services, and therefore, on knowledge worker talent.

## The Workplace is Key

The growth of these high-tech entrepreneurs, as well as that of the new knowledge economy in general, has been extremely rapid. Knowledge workers themselves now represent a major, and still growing, segment of China's total working population. As Jack Ma, Executive Chairman of e-commerce giant Alibaba – one of the companies at the forefront of this shift – recently observed in the South China Morning Post, “[China is growing in] the services industry and the high-tech sector...young talents are flocking to these areas.”

The same article continues: “Ma said that the deciding factor in a true economic transformation would be...the ability to unleash the entrepreneurial spirit among the young and an environment to help it flourish.”

Nevertheless, the demand for knowledge workers still far exceeds supply. Consequentially, competition for their talents is intensive. For China's tech companies, for example, recruiting directly from universities has become routine, and even here, many qualified candidates can find themselves weighing five or six job offers.

In terms of workplace design, this has led to the understanding that a workplace environment that will attract the best candidates and encourage them to stay becomes a crucial buying value for an increasingly large proportion of clients in the PRD.

The impact of these values marks a considerable change from past PRD commercial building norms, beginning first with the relationship of the building to its surroundings.

## 工作场所是关键

这些高科技企业——乃至整个新兴知识型经济——都已经急速发展。知识型员工如今天代表着中国整体劳动人口的主要部分，而且还在不断增长中。正如活跃在此次经济转型中的企业——电商巨头阿里巴巴的执行主席马云最近在《南华早报》里所言：“[中国正在发展]服务业和高科技产业……年轻的人才正在不断涌向这些地方。”

文章继续说道：“马云讲到经济转型的真正实现，其决定因素是……能否释放年轻人的创业精神，并为其提供发展的土壤。”

然而，知识型员工依然供不应求，因此企业之间对人才的争夺异常激烈。对于中国的科技企业而言，校园招聘已经成为了一个惯例。许多优秀的求职者在那里甚至能同时获得五或六份入职通知。

就工作场所设计而言，这也就不难理解为何藉由办公环境来吸引并留住最优秀的人才成为珠三角地区客户愈发重视的一个关键购买价值。

这种价值观为珠三角地区商业建筑标准的改变带来了极大影响，而这种改变始于对建筑物与其周边环境之间关系的重新审视。

## 与城市环境之间的关系

巨型城市的不断发展使得“友邻”正成为商业建筑和企业园区日益重视的概念。由于许多流入人口受过良好教育，因此为珠三角地区带来了得天独厚的优势。

成为“友邻”的其中一个方面是可持续性，这不光受政府多方引导的影响，同时亦是整个社会密切关注的话题。《中华人民共和国可持续发展国家报告》（2012）提到：“可持续发展理念在中国社会已经深入人心，获得了广泛共识，并激发了公众参与”。

因此，为企业营造更“绿色”的观感，或至少不会产生在周边社区带来破坏的负面印象，是其打造正面形象的重要资本。对于那些对珠三角经济至关重要的年轻知识型员工，可持续发展同样也是他们所关心的问题——这或许也是影响他们选择雇主的“购买价值”之一。

无论是在工作亦或是生活中，大多数的知识型员工都始终如一地与外界保持着多方面的联系。在某种程度上，他们的工作与生活、工作场所与社交空间之间的界线是模糊的。



Figure 2. Tencent Guangzhou campus (Source: M Moser Associates)  
图2: 腾讯广州办公园区 (来源: M Moser Associates)

### Relationship with the Urban Environment

The evolution of the megacity has brought increasing importance to the concept of commercial buildings or campuses as “good neighbors.” In the PRD’s case “good neighborhood” has gained additional impetus with the influx of well-educated, socially sophisticated, and extensively connected knowledge workers.

One facet of “good neighborhood” is sustainability, which is subject to several major government initiatives as well as being a topic of keen interest across society. The People’s Republic of China National Report on Sustainable Development (2012), maintains “... the concept of sustainable development has reached deeper in the Chinese society, gaining wide recognition and public participation.”

Perception of a business’ presence as “green” – or at least not damaging to the surrounding community – is thus an important asset in building its positive stature. This is equally true among the young generation of knowledge workers who are essential to the PRD economy – it is one of the “buying values” that may influence their choice of employer.

Constant, multifaceted connectivity with the outside world is an inherent characteristic of both the work and lifestyles of most knowledge workers, to the extent that the lines dividing work and life, workplace and social space, workplace and home, become blurred.

For the workplace, supporting this connectivity entails either a location within very close proximity to amenities such as cafés, restaurants, and shopping, or the provision of equivalent amenities within the building or campus itself. The latter might be discreet and for the exclusive use of the building or campus’s occupants only or they might be at ground level, welcoming the local public to

mix with building occupants, while solidifying the business’ status as a “good neighbor” and member of the community.

Often, this can be accomplished through the adaptive re-use of older manufacturing structures or the development of a new business campus. An interesting example of the former is the Guangzhou campus of web service innovator Tencent, which lies within a former industrial site that itself has been repurposed in its entirety for the use of knowledge industry businesses, also open to the public for use as a peaceful “urban oasis” for walking and leisure (Figure 2).

The new Shanghai campus of a major computer manufacturer is perhaps even more closely interwoven with the surrounding community, offering the public free access to park-like expanses around its perimeter, garden areas between its buildings (Figure 3), and the use of its in-house gym facility. Roadways bordering the campus connect it and the

对工作场所而言，要保持这种联系有两种办法：一是将办公场所设立在离咖啡馆、餐厅和购物中心距离较近的地方；二是将这些设施整合在办公场所中。如若采用第二种方法，这些设施可仅供相关人员使用；此外，亦可以考虑将它们设立在首层，同时供周边居民使用，进一步稳固企业“友邻”和社区成员的形象。

通常，这可以通过对旧有建筑进行改造再利用，或是发展新的商业园区来实现。对于前者，网络服务的创新者腾讯的广州分公司就是一个有趣的案例。腾讯广州分公司的办公场地前身是一片旧工业区。通过改造再利用，现已完全服务于这家知识型产业企业，并同时向公众开放，成为了人们散步休闲的“城市绿洲”（图2）。

某著名电脑制造商的上海园区与周边社区的融合或许更为紧密。它向公众开放了围绕在园区周边所扩展出来的公园式区域，还有建筑物之间的花园区域（图3），以及其内部的健身设施。园区边界上的道



Figure 3. New Shanghai campus of a major computer firm, showing public landscaped areas (Source: M Moser Associates)  
图3: 某著名电脑制造商的全新上海园区，展示了向公众开放的花园区域 (来源: M Moser Associates)



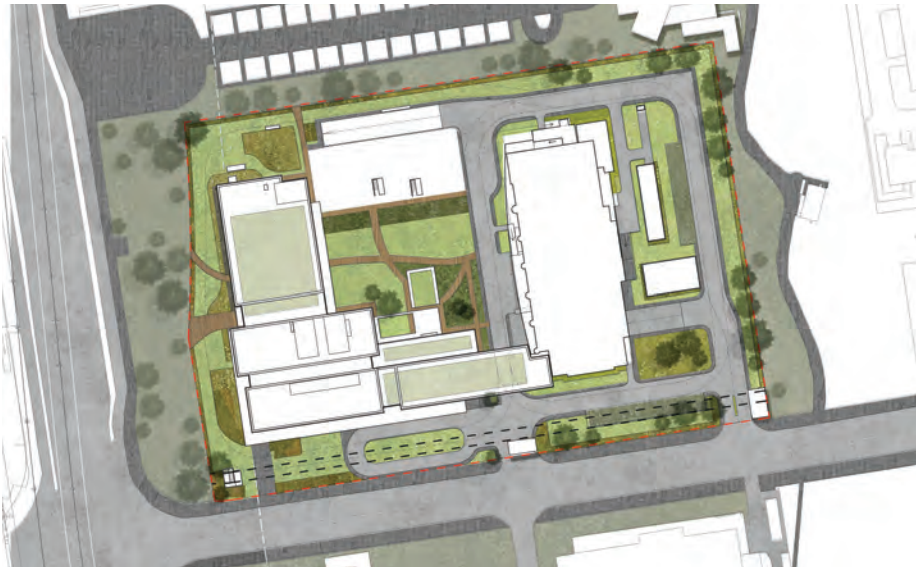


Figure 4. Shanghai computer firm campus site plan, showing road connections and landscaped public zones (Source: M Moser Associates)

图4. 电脑制造商的上海园区的平面位置图，展示了道路的贯通和向公众开放的花园区域（来源：M Moser Associates）

surrounding community to a nearby retail neighborhood (Figure 4).

Another approach is exemplified by an innovative structure being developed by Takson in Guangzhou. Aimed at attracting young talent and start-up tenants, its location is distant from the high-cost central business district – a factor that is leading it to be designed and developed as a self-contained community, complete with gardens, retail spaces, health and fitness amenities, and restaurants. The growth of start-up tenants is also anticipated in the design, which features progressively larger spaces at higher elevations in its four towers (Figure 5).

## The Internal Environment

Comfort, as well as physical and mental well-being, are significant concerns for today's knowledge worker. Among other things, they are accustomed to a highly mobile style of working, migrating as needed within the facility to the setting that best suits their needs of the moment in terms of comfort, technology and space. Should one area of a workplace seem too noisy, warm, or isolated, for example, the knowledge worker would typically wish to relocate at will to another, more agreeable setting. Equally fluid are their work patterns, with irregular periods of leisure and social activity interwoven into periods of focused work.

A workplace that does not support these habits and needs – all closely related to the worker's "well-being" – is unlikely to appeal to the in-demand knowledge worker. The concept of "wellness" – creating a healthy workplace

environment – is therefore of great interest to businesses competing for their talent.

Dedicated certification systems can be a useful tool in guiding designers and clients toward viable "wellness" solutions for their projects. The most prominent of these systems is WELL, a performance-based system with similarities to LEED, but whose purpose is to measure and monitor the features of the built environment that impact human health (with a focus on air, water, nourishment, light, fitness, comfort and mind)?

Given the above, the impact of "wellness" on workplace design is potentially extensive, ranging from a building's location and orientation, to architectural factors including the building's floorplate, fenestration, and vertical core, to still more details pertaining to the internal workplace and its systems.

路将周边社区以及附近的商店连为一体（图4）。

Takson在广州的项目则为我们展示了另一种方式。旨在吸引年轻人才和创业者，这一项目选择远离成本高昂的中心区。为此，其必须建立一个自给自足的社区——包含花园、商店、健身房以及餐厅等一系列设施。这个设计方案同时还考虑到了创业者日后发展的需要，在四栋大厦的高层均提供了日后空间逐步扩展的可能性（图5）。

## 内部环境

当今的知识型员工对舒适性以及身心健康尤为关注。除此之外，他们习惯于高自由度的工作模式。他们经常因应具体工作需求而移动，去选择在最能满足其工作舒适度、科技支持以及空间需求的配套环境中办公。例如，有些人喜欢热闹欢快的工作环境，而有些则喜欢氛围适中、动静相宜的，甚至有些可能会喜欢稍微有点隔离感的环境。不同的知识型员工会根据各自的偏好来选择更适合自己的工作环境。自在流动是他们的工作模式，同时将休闲、社交以及工作融合在一起。

如果一个工作场所无法很好地满足以上这些与员工的“健康”密切相关的习惯和需求，便无法吸引到企业所需的知识型员工。因此，“健康”的概念，或者说具体到营造一个让员工身心健康的工作环境，是让正在进行人才竞争的企业倍感兴趣的议题。

专门的认证系统可以成为一个有用的工具，指引设计师和客户为其项目确定明晰的“健康”方案，而其中最具影响力的就是WELL认证。这是一个同LEED认证一样基于绩效的认证系统，但是所不同的是



Figure 5. Takson's Guangzhou development (Source: Ronald Lu & Partners)

图5. Takson的广州项目（来源：Ronald Lu & Partners）

## Air Quality

The high levels of pollution in China's megacities mean that employers offering clean indoor air have an edge in attracting and retaining knowledge worker talent.

Achieving acceptable indoor air quality, however, is not solely a matter of providing enhanced fresh air rates: it is the outcome of a broader approach that also encompasses the workplace fit-out, infrastructural systems, and the fabric of the building itself in an effort to minimize the presence of volatile organic chemicals (VOCs).

VOCs may be present in structural building materials, sealants such as those used for windows, adhesives, and paints. Carpets, fabrics, finishes and furniture used in the office interior may similarly off-gas compounds which, over time, can expose workers to carcinogens, and immediately impact them with persistent eye, nose, and throat irritation.

As it is unlikely that in-demand knowledge workers would remain long in a literally poisonous work environment, the selection of no- or low-VOC materials and products is an increasingly common demand among clients in the PRD.

Similarly, commercial buildings with enhanced air filtration systems offer distinct advantages to end-user clients. According to some studies, improved ventilation can result in decision-making tasks completed 23 percent faster (Satish et al, 2012), and in short-term sick leave being reduced by 35 percent (Milton DK et al, 2000). Air quality in specific areas within the workplace – such as enclosed meeting rooms – can be enhanced with the installation of CO2 and occupancy sensors, which can automatically adjust airflow to a level appropriate to the space's population (or absence of). In addition to enhancing the comfort of workers and the habitability of all areas of the workplace, these systems can also significantly improve energy efficiency.

Enhancing air purity takes on an even greater importance when it is considered in relation to temperature. Though some studies show that individual thermal control alone can result in a seven percent increase in staff performance (Wyon, 1997), due to regulatory constraints in China, such individual control can only be made in commercial buildings that are purpose-built, owned, and operated by the occupant. More commonly, entrepreneurial end-user businesses in the PRD will occupy all or part of an existing landlord-owned, landlord-operated structure

with landlord-controlled central heating and air conditioning. In such cases, consistent air purity and superior ventilation within the workplace can be regarded as somewhat offsetting the periodic discomfort of a too-warm or too-cold environment.

## Light

It has long been understood that natural daylight in the workplace can affect health and productivity. Light is also an integral element of modern concepts of wellness. However, just as too little natural light will result in a gloomy, claustrophobic atmosphere in the workplace, so too will too much light result in negative consequences, such as an environment degraded by excessive heat gain and glare. Therefore, a building's orientation, fenestration, and shading are not simply aspects of its exterior, but are all critical influences for its interior environment.

Even when repurposing the megacity's older stocks of industrial buildings to workplace environments, there are opportunities to open up floors and bring natural light from overhead into interior spaces (Figure 6).

In terms of creating a desirable, WELL-compliant environment for knowledge workers, lighting systems in the workplace will preferably use mercury-free components and offer a high degree of individual control. The latter feature not only support worker mobility, but also takes into account the nature of their activities. For example, workers whose eyes are focused on an illuminated screen may not require the 300-400 lux intensity of standard uniform office lighting.

Current technology also enables the tone and intensity of interior lighting to be automatically adjusted to harmonize with natural daylight,

WELL认证是衡量和监控对人体健康产生影响的建筑物环境特性，其中包含了空气、水、营养、光、健身、舒适和精神七大类要素。

基于此，“健康”对办公场所设计的影响非常广泛，大至建筑方位和朝向，以及建筑的楼面板、窗户布局和垂直核心的分布，小至办公空间内部环境和设施系统，都需要考量。

## 空气质量

鉴于中国大城市的污染严重情况，如果能为员工提供一个空气质量良好的室内办公环境，将会非常有助于吸引和留住优秀的知识型员工。

然而，要使室内的空气质量达到可以接受的标准，仅靠提高新鲜空气的流入量是不够的。提高办公室内部的空气质量是需要更广泛的努力，这包括了办公场所的物品配置、基础设施系统以及建筑物本身的构造。经由这些方面的努力，才能将挥发性有机化学物质（Volatile Organic Chemicals）的危害降至最低。

VOCs可能会存在于建筑物料中，例如用于窗户的密封剂、粘合剂以及油漆。办公室室内使用的地毯、织物、饰面和家具都可能释出类似的化合物。长此以往，员工将会暴露在各种致癌物中，并导致眼睛、鼻子和喉咙的不适。

显然，这些炙手可热的知识型员工是不可能让自己长期在这种有毒的环境里工作的。选择不含（或少含）挥发性有机化学物的建筑物料，正逐渐成为珠三角地区客户的普遍需求。

同理，那些配备了高级空气过滤系统的商业建筑同样能为使用者带来独有的优势：相关研究发现，经过改进的通风系统可以使决策制定速度加快23%（Satish et al,

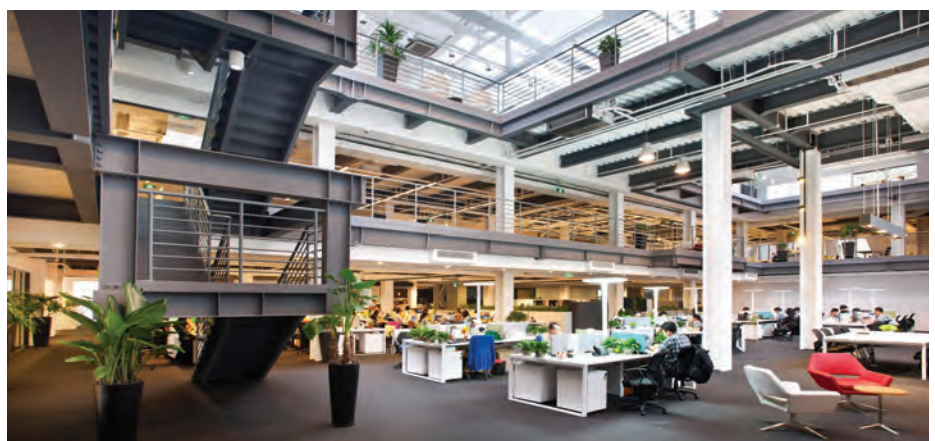


Figure 6. Arvato's Shanghai facility. An example of how natural light can be introduced into a repurposed industrial structure vertically (Source: M Moser Associates)

图6：欧唯特上海办公空间，展示出自然光是如何被垂直引入经过改造的工业厂房式建筑内（来源：M Moser Associates）



creating an impression of continuous natural light even in areas of the office where daylight may not penetrate. This can be a particularly attractive feature for workplaces in existing or repurposed buildings with less than ideal fenestration, or with views partially blocked by neighboring structures.

As with ventilation, though on a wider scale, occupancy sensors can be used to automate lighting systems and improve energy efficiency, as well as the general ease of use and comfort of the workplace.

## Ergonomics & Vertical Communication

Ergonomic considerations are not limited to the fixed dimensions of a chair or desk; they also relate to movement between various working positions, and in turn to creating this diversity of work settings.

Variety is important because today's knowledge workers possess both the technology and the desire to choose where they will work on a daily or even hourly basis, not only on a single floor but also between floors. Communication and collaboration can take place in a vertical as well as horizontal sense. Stairs can be used to facilitate this type of quick vertical communication, provided that they are suitably positioned and are not simply the back-of-house exit stairs as minimally required by code.

Many entrepreneurial clients in China's private sector are growing so rapidly that their initial spatial needs may also rapidly expand in any given location, in some cases progressing from occupying part of a building to occupying the whole structure in a matter of several months. It is critical to anticipate this growth within the initial design concept by providing flexible internal space and internal circulation.

Flexibility can be of particular importance in the design of these workplaces' vertical circulation. The more the design allows for the possibility of rapid business growth, the more effective the building can be. This will obviously have further impact on factors such as vertical transportation, the separation of private and public entrances, and the use of the building core area.

## The Floorplate

The relationship of the building core to the overall floorplate itself can be rethought in light

of the demands of rapidly growing businesses employing knowledge workers.

The idea of a central core surrounded by space that can be divided into small units may be effective for cellular businesses where staff are more-or-less permanently seated at workstations. This scheme is rarely effective for the large-scale knowledge-based businesses where staff informally move about and collaborate in a myriad of settings.

## IT & Communication

A benefit of the intensively planned nature of the PRD megacity's growth – and the existence of a communications monopoly in southern China – has been the generous provision of an up-to-date, reliable, standardized basic IT infrastructure. Its existence and the ease with which a new workplace may “plug in” is one key reason why the region is desirable for tech-intensive start-ups and more established knowledge-based companies.

The form IT infrastructure takes within these workplaces varies greatly according to the distinct requirements of the individual business. One common characteristic buying value for these clients, however, is the provision for greater worker mobility within the workplace, which itself is partly a consequence of the knowledge workers' preference for portable devices such as laptops, tablets, and smartphones. Provision for a reliable wireless broadband coverage across the workplace is therefore a commonplace need among these clients. As the knowledge worker may be present in the office during irregular hours, it is usually desirable for this coverage to be available around-the-clock, seven days a week.

The free-ranging mobility of the knowledge worker also may affect the provision of electrical power within their workplaces. Unlike the worker who spends eight hours at the same desk, the knowledge worker may not have any need for power supply connections in their immediate proximity. Instead, the emphasis may be on providing a more limited number of shared power points for the purposes of recharging mobile devices' battery packs.

## The Effective Workplace

If the building itself, whether a high-rise or not, can provide a structure supporting a healthy internal environment, the effectiveness of the

2012)；此外，还能在短期内使病假率降低35%（Milton DK et al, 2000）。在某些特定的办公场所区域中，例如封闭的会议室，空气质量可以通过安装二氧化碳浓度感应器来提高；这一设备可以根据空间人数的多少来自动调节空气的流入量。这些设施除了可以提高员工的舒适程度以及办公场所整体区域的宜居性外，还能显著改善能源效益。

当提升空气质量与温度控制双管齐下时，更能取得相得益彰的效果。相关研究表明，独立的温度控制设备可以使员工的效率提升7%（Wyon, 1997）。但由于相关法规的限制，在中国，只有那些由业主亲自运营的、基于特定目的而建造的商业建筑才能配备独立的温度控制设备。更常见的做法是，珠三角的企业客户会租用部分或整座由业主运营的物业，并由业主来控制中央供暖和空调系统。在这类案例中，良好的空气质量和通风系统被视为避免工作场所由于温度过高或过低引发不适的有效方法。

## 照明

人们在很早以前就已经意识到自然光会对员工的健康和生产力产生作用。照明同样是现代健康概念中不可或缺的一部分。自然光不足会使整个办公场所变得阴郁和幽闭，然而，自然光太过强烈同样会使环境由于过多的热力和眩光变得恶劣。因此，一座建筑物的朝向、窗户布局以及遮阳物不仅仅与其外观有关，同时还会严重影响内部环境。

即便是在将大城市里的老旧工业建筑改造为办公场所，仍然可以通过打通楼层地板来进行采光（图6）。

在为知识型员工打造一个符合WELL标准的舒适环境时，最好应该采用不含汞的照明产品，并且能让个人根据各自的需要进行灵活调节。后者不仅能保证员工的机动性，同时还顾及到了他们的工作特点：那些时刻都注视着显示器的人们可能并不需要300–400勒克斯强度的办公室照明。

如今的科技使得我们可以通过自动化手段来调节办公室内部的照明系统，使之与自然光更加协调，甚至让那些自然光不能惠及的办公区域也能持续获得自然光的感受。对于那些窗户布局不合理，又或是窗外景致被周边建筑所遮挡的现有或再利用建筑而言，这是一个极具吸引力的特性。

通过与通风系统相配合，即使是在广阔的空间，人体感应器依然可以应用于照明自动调节系统，以提高能源效益和使用的便捷度，并改善整个办公场所的舒适性。



workplace design will further depend on an understanding of what the particular client's business requires.

So rapidly are ways of work changing within China's entrepreneurial business culture, that simply duplicating something that has been benchmarked elsewhere is no longer viable. To be effective, a workplace must be a unique creative, innovative solution, made to match and support the culture and goals of a particular end-user client.

Critical to the effective workplace and to attracting and retaining knowledge workers is enabling the individual choice of work settings, as well as the individual control over that immediate environment (Figures 7, 8).

## Conclusion

It is no longer sufficient to simply design a tall commercial building for its symbolic presence on the megacity skyline – the helicopter view is not the main selling point. The interior environment is equally as important to the end-user client as the exterior. Today's entrepreneurs in China's private sector are looking for buildings with internal environments that will help them attract and retain the knowledge workers required

## 人体工学以及垂直贯连

人体工学所关注的不仅仅是桌椅的固定角度，它还涉及不同工作位置之间的移动，以及打造一个与之相适应的多样化工作环境。

在科技手段和个人意愿的支持下，如今的知识型员工可以以天，甚至可能以小时为单位来决定他们的工作模式，而且不只是在一个楼层，他们也可能在不同的楼层之间来回穿梭。因此，办公室的多样性显得尤为重要。沟通协作可以是垂直模式或是水平模式。只要安装的位置合理，且不会类似于鲜少使用的消防梯，楼梯一定可以为快速的垂直贯连提供便利。

许多中国私营企业的增长都非常迅速，相应地，他们对空间的需求也迅猛扩张。在有些例子中甚至可以见到，企业从最初租用大厦的一部分，发展到最终租用整座大厦，仅仅只需数月时间。因此，在设计的最初阶段便预估到企业日后的发展，并为其提供灵活的内部空间及内部贯连是非常重要的的一环。

在与办公场所的垂直贯连有关的设计中，这种弹性显得非常重要。设计方案越能配合企业的迅速成长，整个建筑就越加具备高效性。这显然会对建筑的空间垂直分布、分设私人及公共入口的考虑以及对建筑核心区域使用的决定产生进一步的影响。

## 楼面板

当企业快速成长，并聘用了大量知识型员工时，需要对建筑物的核心区域在整体楼面板内的位置关系重新思考，以求与实际需求相配合。

对于那些工作人员大都有固定位置的蜂窝型办公室而言，核心区域设立在中央，周边围绕着各个独立单元的设计方案也许是合适的。但对于大规模的知识密集型企业而言，由于员工需要经常在不同的位置间走动以进行协同合作，这种设计就未必有效。

## 信息科技及通讯技术

珠三角这种预先规划好的中国巨型城市的发展特性，以及在华南地区深厚的通讯产业传统，为该地区提供了大量先进、可靠以及标准化的通讯基础设施。这个条件非常便于在当地设立新的办公场所，这亦是珠三角区域为创业期的高科技公司以及知识型企业所青睐的原因。

根据每个企业具体需求的不同，在办公场所配置的信息和通讯基础设施也会大相径庭。不过，这类客户常见的需求是要为办公场所内的员工提供更强的流动性，这很大程度上是因为知识型员工更倾向于使用笔记本电脑、平板电脑、智能电话等可移



Figure 7. Variety in work settings allowing choice is a defining characteristic of today's knowledge industry workplace environment (Source: M Moser Associates)  
图7. 工作模式的多样化和可选择性是当今知识型产业的办公空间环境的特性之一（来源：M Moser Associates）



Figure 8. Variety in work settings allowing choice is a defining characteristic of today's knowledge industry workplace environment (Source: M Moser Associates)  
图8. 工作模式的多样化和可选择性是当今知识型产业的办公空间环境的特性之一（来源：M Moser Associates）

by rapidly growing businesses. An effective solution to meet both growth and demand in these areas is to create commercial buildings with healthy internal environments.

动设备进行工作。因此，一个能覆盖整个办公场所且信号稳定的无线宽带是客户的常见需求。同时，由于知识型员工的工作时间可能会不循常规，因此，必须确保无线网络的能24小时随时连接。

知识型员工这种具有高机动性的工作模式，同样会对办公场所的电力供给系统设计带来影响。与那些在固定位置工作八小时的人员不同，知识型员工可能并不需要在他们附近安置电源插座。更有效的做法是为他们配置更多的公共充电点，以便为移动设备的电池充电提供所需。

### 高效的办公场所

无论楼层的高低，只要一栋建筑自身的结构能够为健康的内部环境提供支持，办公场所设计是否有效就将更多地取决于对于客户需求的理解。

中国企业的公司文化和工作方式的变化是如此迅速，以至于简单复制其他地区的标准做法在中国已经不再可行。办公场所

要高效，必须要有一个独特创新的解决方案，使之与特定客户的企业文化和发展目标相匹配。

打造一个高效的办公场所，以吸引和留住知识型员工的关键在于给他们可以自主选择工作模式的权利，并允许他们管控自己的办公环境（图7、8）。

### 结论

时至今日，简单地将商业高楼设计成为大都市地平线上的标志点缀已经不足以满足客户的需求；能够俯览整个城市的景观也已经不是主要卖点。对于客户而言，办公场所的内部环境和外部造型同样重要。当今中国的民营企业正在寻找的，是能够吸引和留住知识型员工以满足企业快速发展所需的办公环境。

为巨型城市的商业建筑打造健康的内部环境，将会是一个有效的应对方案。

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