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The Vertical Campus
垂直园区

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Over the past 15 years, Mr. **Haase** has worked around the world on numerous office, residential and hotel towers. Currently living in Seattle, one of the most technology-centric cities in the world, he has focused his research on how the employees of technology-based companies live, work and play.

Mr. Haase has been a guest architectural critic at the University of Washington, and the Senior Designer of multiple technology-focused high-rise buildings in the Seattle area for LMN Architects.

过去 15 年来，哈斯先生对于无数办公室、住宅和酒店的设计有相当的理解。目前住在西雅图，世界上最以科技为中心的城市之一，他的研究专注于科技公司雇员的各种面向，包含生活、工作和娱乐。

哈斯先生曾受邀为华盛顿大学的客座建筑评论家，也是在西雅图的LMN 建筑师事务所当中，担任科技高层建筑的资深设计师。

Abstract

Tech companies of all sizes are leaving the loft and heading to the high-rise. As small startups grow larger and set their sights on attracting the best talent available, it is often the case that a ping pong table and free snacks are not going to cut it anymore. A new tech work force is being introduced to the market, and this millennial generation has higher expectations. Accessible retail, restaurants, and close proximity to housing are key attributes for this generation's desired work/life balance and with increasing urban real estate cost, high density office towers are often the solution. This paper will focus on how the high-rise can change to keep pace with the needs of the upcoming generation of tech workers. In addition it will also discuss case studies with technology industry leaders Microsoft and Amazon; two companies that have grown from low-rise campuses to large high-rise vertical campuses.

Keywords: Technology, Tower, Vertical Campus

摘要

各 种规模的高科技公司开始陆续走出阁楼型态而转型到高层大楼。随着小型创业公司的成长，更着重于如何吸引优秀人才，通常光是具备乒乓球桌和免费零食并不够。新的科技工作模式正在进入市场，同时千禧年族群具有更高的期望。这一代为了追求工作与生活的平衡，关键点在于随处可及且离家近的零售店和餐厅，随着都市房地产成本增加，通常解决方案是利用密度高的办公大楼。本文将着重于高层大楼如何改变到可以跟上未来下一代科技工作者需求的步调。此外它还将个案讨论科技业龙头微软和亚马逊；这两家科技公司如何从扁平园区型态发展成大型垂直高楼园区的模式。

关键词: 技术、高塔、垂直园区

History of Microsoft and Amazon

In April of 1975, in Albuquerque, New Mexico, William Gates and Paul Allen founded a small start-up called Microsoft and eventually moved to Redmond, Washington, about 20 minutes outside of Seattle. In 1980 Microsoft partnered up with IBM, and bundled Microsoft's software with nearly every IBM computer that was shipped.

In 1994 in Bellevue WA, about 5 minutes down the road from Microsoft's headquarters, Jeff Bezos was completing a cross-country drive from New York after quitting his job on Wall Street. It was during this road trip that he developed a business plan for what would eventually evolve into online book retailer Amazon.com.

Although these two start-ups were nearly 20 years apart, these two technology companies have now found themselves in similar positions. Both companies are headquartered in the Pacific Northwest region of the United States, with sizable corporate campuses only 20 minutes apart and each with approximately 100,000 employees around the world.

微软和亚马逊的历史

在 1975 年 4 月，在新墨西哥州的阿尔伯克基，威廉·盖茨和保罗·艾伦新创一家小公司名叫微软，最后搬到距离西雅图约 20 分车程的雷蒙华盛顿。1980 年微软与 IBM合伙，几乎每个出厂的 IBM 计算机都搭载微软的软件。

1994 年在华盛顿州贝尔维尤，其距离微软总部大约 5 分钟路程，杰夫贝佐斯辞去华尔街的工作之后，完成以纽约为首的跨乡公路旅行。就是在这次旅行当中，他发展出一套商业计划案，事实上就是后来发展成在线图书零售商的亚马逊网站。

虽然这两家初创企业相隔近 20 年，但这两家科技公司发现彼此有相似的地位。两者的总部在美国的太平洋西北区，距离庞大企业园区仅仅 20 分钟，每家都有约 10 万名员工分布在世界各地。

1986 年微软上市后，其雇员比例快速成长。在西北太平洋区可说是城市扩张的全盛时期，微软开始迅速扩大其足迹至雷蒙的郊区办公室。最终它将扩大到超过 900 万平方呎的办公空间，总部得以容纳大约 30,000~40,000 个员工。(Microsoft，2013 年)

It was in 1986 that Microsoft went public and their employee base started growing at warp speed. It was still the heyday of urban sprawl in the Pacific Northwest and Microsoft started rapidly expanding its footprint in Redmond's suburban office parks. Eventually it would expand to over 9 million ft^2 of office space to house approximately 30,000-40,000 employees at its home base. (Microsoft, 2013)

In 1997 Amazon too went public, just before the dot com bubble burst. When they came out the other side of the bust on solid ground, they started taking market share and expanding. First Amazon starting working in smaller office spaces throughout Seattle, but eventually grew so large that it became more efficient to consolidate. By the end of 2013 they had grown to occupy 14 midrise buildings in a dense urban campus that housed approximately 15,000 employees (Figure 1).

Growing Up

Fast forward to today and with such close proximity and similar workforce skill sets, it is easy to imagine the fierce competition between these employers, and the multiple spin offs that have developed in the region. Today the Pacific Northwest finds itself with double-digit technology job growth. All of these technology firms have spent significant time, money and energy on recruiting the next generation of talent. And what could be used to recruit the previous generation of programmers is not working with the millennial generation. To over simplify an entire generation, what most millennials want is a work/life balance, and what makes this generation unique is that they are actually willing to demand it. As urban theorist Peter Katz puts it, millennials have little interest in "returning to the cul-de-sacs of their teenage years". (Kotkin, J. 2013)

This is not the generation that grew up learning to code in their basement, this is a group that spends 4 years studying computer science at a university and are now willing to give in to a corporate overlord, in exchange for a good paying 9-5 job. In addition to not wanting to spend all waking hours at work, they are not interested in spending their free time stuck in rush hour traffic only to spend their evenings in a suburban wasteland. The next-generation workforce want to be within walking distance of home, shopping, and restaurants and feel part of the community. In short a good majority of the new tech work force want to be urban dwellers.

A group of technology sector employees working in Silicon Valley, who were interviewed for this paper, indicated that, the number one drawback to working for some of the largest and best regarded companies in the industry was having to "work in the Valley." Most commuted the 30-40 minutes every day from San Francisco and often considered looking for a different job simply to be closer to home. The alternative of moving to the suburbs was, in most minds, "completely out of the question."

It is this fact that is forcing many technology firms to rethink their approach. Companies like Microsoft, Google, Facebook, Apple, IBM and many more that are based in suburban office parks are being forced to set up private bus systems to transport their workforce from city centers in an attempt to retain employees. Most are even now setting up branch offices within these cities to be closer to employees. Cities like San Francisco, Los Angeles, New York, Seattle and many other cities are recruiting technology groups out of the suburbs and into the city center with lucrative incentives and tax breaks. Tonly Hsieh, of Zappos may have put it best when he said "the idea went from 'let's

Figure 1. Amazon's Urban Campus, Seattle WA, USA (Source: LMN Architects)
图1. 美国华盛顿州西雅图市亚马逊城市园区 (来源: LMN Architects)

1997 年亚马逊刚好在科网泡沫爆破之前完成上市动作。他们采取稳扎稳打的方式，开始考虑拿下市场占有率并逐步扩大。亚马逊起步是从较小的办公点遍及西雅图，但最终增长如此之大必须要统一起来才更有效率。到 2013 年年底他们扩展到拥有14栋中层建筑聚集于密集的城市园区，安置大约 15,000 名员工。(图 1)

成长

快 转到当今来观察，有这样的密切接近且类似的工作技能，很容易想象在这些雇主当中的激烈竞争，并在该区域已发展出多样化的转让股权另开公司的例子。如今西北 太平洋区发现本身的科技就业机会是以两位数在增长。所有这些科技公司在招聘下一代人才上花了大量时间、金钱和精力。而且招募条件对于之前上一代的工程师和千禧年族群并不一样。若要简化来说，大多数千禧族群想要的是工作与生活的平衡，此族群之所以独特是在于他们是真的愿意去追求两者的平衡。正如城市理论家彼得凯兹所提，千禧族群对于"回到青年时期的懵懂黑暗期"兴趣不大。(科特金，J.2013)

这 一代不是从小在地下室学习写程序代码长大的，这是一群花费 4 年时间在大学中进修计算机科学，且不想额外加班只为了换取一份薪水不错的朝九晚五的工作。除了不想花所有醒着的时间都在工作之外，他们也不想让自己下班的 时间都花在通勤尖峰时段，只为了回郊区的家度过晚上时光。下一代的工作模式是要能透过走路就能到家、购物场所和餐厅，使其为社会的一部分。简而言之，大多数新型的科技工作者想成为城市居民。

针 对一群在硅谷工作的技术员工，基于这份研究接受访谈时表示，在该行业中有些最大和最好的公司工作，最大的缺点就是得「工作在山谷中。大多数人得每天得从旧金山通勤 30-40 分钟，而且想换不同的工作只是为了离家近。因为在大多数心目中，搬到郊区的替代方案是完全不可能的。

这 样的情势之下，迫使许多科技公司重新考虑他们的做法。诸多公司如微软、谷歌、Facebook、苹果、IBM 等大厂原本设立郊区办公室都被迫成立私人巴士系统，得以从市中心通勤其员工来试图留住员工。大部分甚至还在这些大城市中设立分公司得以贴近员工居住地。像是旧金山、洛杉矶、纽约、西雅图和其他很多城市正在招聘技术人马走出郊区，进入城市中心得以享有丰厚奖励和税收优惠。Zappos的汤尼谢说的好: "这个想法从'让我们建立一个校园"到"让我们建立一个城市"。(加拉格尔，L.2012) 随着大量迁徙回到城市和房地产价格从经济衰退的低价反弹，以及人口密度增加，唯一改善的方法就是向上发展。

build a campus' to 'let's build a city.'" (Gallagher, L. 2012) With the great migration back to the city and real estate prices rebounding from the recession's low, density is increasing and the only way to grow is up.

Next Generation High-Rise

When most technology firms think of their ideal office space they would prefer something almost exactly the opposite of the previous generation of high-rise. They picture a warehouse with large open lofts, great natural daylight, fresh air, and an inherently unique architectural character; all of this nestled into a community with coffee shops, restaurants, and late night activities. One start up tenant suggested, "Finding a place that will maximize flexibility, creativity and have an inherent sense of 'cool' is what we look for in an office space". But as a company grows and reaches a significant size, the loft can no longer hold this growing staff. Eventually a company must decide between starting an urban campus or to stay under a single roof. If they prefer the latter, often the only option for significant contiguous space is to move to a high-rise (Figure 2).

As technology tenants' attempt this transition from a low-rise office campus to a vertical one, the largest hurdle to overcome is the perception of previous generations of high-rises. These buildings are seen as dark, low ceilinged, homogenous stacked floors, with strip windows and windowless corridor; in all fairness, they often were. In order to make this transition possible for the majority of technology tenants, our future towers will need to change.

Density

The first and most obvious issues towers will need to address are those of basic infrastructure. When compared to traditional F.I.R.E. (Finance, Insurance, Real Estate) tenants, technology tenants have a significantly denser population. A traditional tech firm occupies space at 1 person per 135sf, nearly 30% denser than a F.I.R.E. tenant, therefore issues such as electrical needs, elevators, live load and restroom assumptions require basic adjustments.

Electrical
Electrical loads are often critical for technology groups due not only to higher density but also to increased plug loads and unusually high cooling loads from servers and personal electronics. Even with energy efficient electronics and cloud storage, typical plug loads of 2.5W/sf that would be adequate for F.I.R.E tenant are increasing to 5W/sf. for most tech tenants. Another area tech companies often upgraded for electrical needs are basement layouts. Providing adequate space for additional transformers and emergency generators is key for any technology-focused high-rise. It is often the desire to keep this high priced infrastructure to a minimum in order to reduce upfront costs, but by planning ahead, it can be easy to retrofit if future needs arise. In addition to high voltage concerns, Maximizing flexibility for items such as high-speed internet and Wi-Fi are also significant issues to address.

Elevators
With increased density, elevators become a pinch point for efficiency. In a tower with 5000 tenants, if each individual waited an extra minute every day to get from the lobby to their desk that would be a loss of over 20,000 man hours every year. In the United States, the traditional rule of thumb for a Class A high-rise office building is 1 elevator cab for
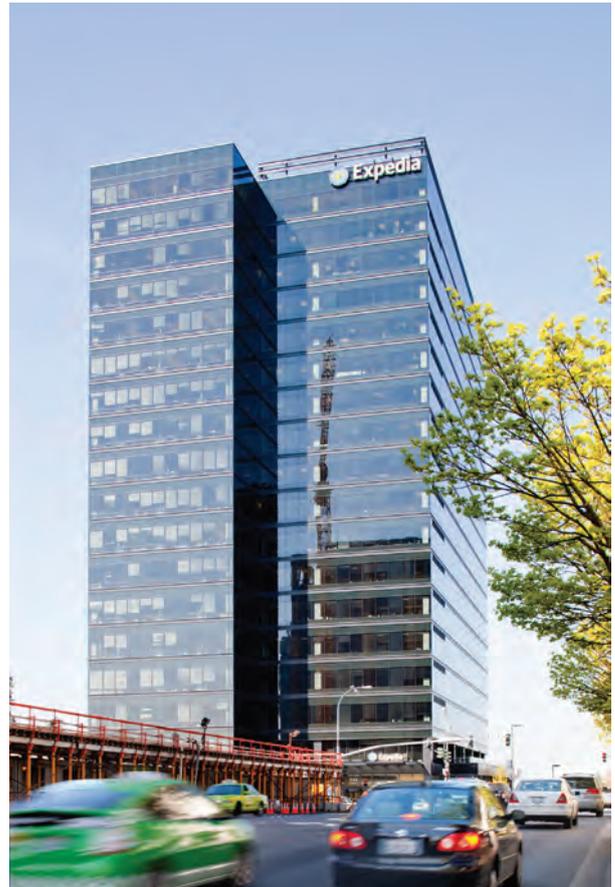

Figure 2. Expedia.com Tower, Bellevue WA, USA (Source: LMN Architects)
图2. 美国华盛顿州贝尔维尤市Expedia大厦 (来源: LMN Architects)

下一代的高层

大多数科技公司心目中认为其理想的办公空间，事实上是完全相反于上一代的高层大楼的需求。他们想象中是有一个仓库与大型开放式阁楼、很自然的阳光、清新的空气和本身独特的建筑特色; 这坐落进一个小区中的咖啡店、餐厅和傍晚活动。租客一开始建议，"我们找寻办公空间的条件在于找到一个地方可以扩大其灵活性，创造性，且保有有一种酷感"。但随着公司的增长且达到显著的规模时，阁楼不能再容纳这些日益增加的工作人员。最终公司必须决定要从城市校园或同在一个屋檐下开始。如果他们更喜欢后者，往往显著连续空间的唯一选择是移到高层。(图 2)

既然技术租户倾向要从低层园区式办公室过渡到一种垂直的模式，最大的障碍是要克服前几代高楼林立的特性。这些建筑物通常都被视为昏暗、低天花板、同质堆积楼层，条型窗和没有窗户的走廊。为了大多数的科技业租户们，要能顺利改善这样的过度期，我们今后的高塔观念将需要更改。

密度

高塔最需要先解决且最明显的问题在于基本的基础设施。相比传统的 F.I.R.E. (金融、保险、房地产) 租户，科技租户有明显密集的人口。传统科技公司占据每1人平均135平方英尺，密度高于F.I.R.E.租客近 30%的空间，因此电力供给、电梯、有效负荷和厕所数量等问题，皆需要基本的调整。

every 50,000sf of office space. To accommodate tech firms with 30% more tenants per sf, the number of elevators should increase to 1 cab per 40,000sf, or 1 cab per 45,000sf with a destination dispatch system.

Structural

With increased density and infrastructure come increased live loads. It is very common for technology-focused floor layouts to consist of large open floor plans densely packed with workstations and an ever increasing quantity of CPUs, monitors and other personal electronics. For this reason, live loads often increase to 80lb per sf for a typical technology tenant, compared to 50 lbs per sf for a more traditional F.I.R.E tenant.

Water Closets

Most local codes set water closet quantity standards that are more than adequate for the majority of tenants. Unfortunately, for most technology companies the distribution of male to female employees is significantly out of balance. One survey points out that "tech companies employ an average of 12.33% women engineers". (Bacon, L. 2013) Considering computer science programs are graduating females at a 1:5 ratio to males, the trend looks likely to continue. It is this data that suggests more water closets should be provided in the men's room than a traditional office tenant might require.

Program

In addition to the increased density, another significant change for a technology-oriented high-rise is the alternative approach to programming. When a technology tenant transitions from a low rise to a high-rise campus, many seek to maintain some of the environmental character and benefits of a smaller building. This includes items such as security, close proximity to retail, community spaces, natural light and ventilation, department identity and connectivity, flexibility, and unique quality of space.

Lobby

Ground Floor
One of the most significant changes to the program of a technology driven high-rise is how we treat the ground floor. In previous generations of towers it was ideal to have a grand ground floor lobby with generous seating and amenities. In this new tower typology, the ground floors are of even higher precious value for well-positioned retail. In suburban technology campuses, companies provide many of the food and beverage services as part of their benefits package. A significant cost savings for urban campuses is the close proximity to a diverse range of dining and entertainment, and there is no better place than the base of the tower for a highly trafficked coffee shop, restaurants, and/or bar (Figure 3). In many cases, owners are using their retail as a loss leader by providing heavily discounted rents to preferred tenants in an effort to attract retail that will cater to technology office tenants (Figure 4).

Another reason to reduce the size of the ground floor lobby is to provide significant security for these highly secretive and competitive companies. Technology firms will spend whatever it takes to minimize their risk of intellectual property theft. By reducing the ground floor "lobby" to a security checkpoint they can greatly reduce this risk. Even with all the news stories about networks being hacked, the number 1 way intellectual property is lost, is by walking out the front door. "Growing awareness that a company takes serious steps to protect digital assets can significantly reduce casual theft by employees" insists Via Forensics, a leading mobile security firm.

电气

对于科技族群来说电力负荷量往往是最重要的，不只是更高的密度，和对于插头装载的需求增加，以及针对服务器和个人电子产品需要异乎寻常的高效冷却负载。甚至是高效能源的电子产品和云端储存，F.I.R.E 租客只需一般插座负荷2.5 w/sf即足够，但大多数科技租户需要增加到5W/sf。另外科技公司也经常要升级电力需求的另一场所即为地下室配置。任何技术导向的高层大楼中，其关键在于提供足够的空间给额外的变压器和紧急发电机。往往是希望把这种高价位基础设施减至最低，以减少前期成本，但透过前期计划，倘若未来有需要也可以很容易改造因应。除了关注高电压，扩展弹性也是重要的课题，像是高速互联网和无线上网。

电梯

随着密度提高，电梯成为效率窄点。在一个有 5000 住户的大楼中，如果每个人从大厅到自己的办公桌每天额外多等1分钟，那每年将损失超过 20,000 工时。在美国，A 型高层办公建筑的传统规则是: 每 50,000平方英尺的办公室空间会有1 台电梯。为了适应高科技公司有多出30%以上的住户，电梯的数量应增加到每 40,000平方英尺就有1 台，或是每 45,000平方英尺就有1 台做调度系统。

Figure 3. 1800 9th Ave, Seattle, WA, USA (Source: LMN Architects)
图3. 美国华盛顿州西雅图市第九大道1800号 (来源: LMN Architects)

Upper Floor Amenities

Second Floor Conference Center and Great Room

Ground Floor Retail

Figure 4. Lower Level Program Section (Source: LMN Architects)
图4. 低层区功能剖面示意图 (来源: LMN Architects)

New Lobby

While it is preferred to minimize the lobby on the ground floor, this does not suggest that a more traditional lobby is unnecessary. More and more we are seeing larger, more flexible and less formal lobbies on the second floor. Sometimes called a "Great Room," the second floor lobby can contain a concierge desk, informal seating, formal meeting space, board rooms, and conference centers. All of these amenities are available to the entire building and act as alternative work spaces for employees throughout the building. This amenity allows an already mobile work force to have even more flexibility of how and where they work. It also allows for a multi-tenant building to share some of the cost for common areas that otherwise would not be justified for a smaller tenant (Figure 5).

Typical Floor

Open Plan

When designing a speculative high-rise tower, it is typical to assume that half of the floor plates will be open floor plans while the other half will have some form of perimeter offices. This assumption typically requires the design to follow a strict 5' (1.5m) exterior grid to maintain efficiency with perimeter offices. The vast majority of technology tenants require an open floor plan and place a high value on quality of space. For this reason, they combine all of their low-occupancy conference rooms, kitchens and back of house utilities near the core, allowing maximum flexibility at the perimeter. This provides access to the maximum amount of daylight and views to the maximum amount of individuals.

Figure 5. Expedia.com Tower, Bellevue WA, USA (Source: LMN Architects)
图5. 美国华盛顿州贝尔维尤市Expedia大厦 (来源: LMN Architects)

Figure 6. 801 Second Ave, Seattle, WA, USA (Source: LMN Architects)
图6. 美国华盛顿州西雅图市第二大道801号 (来源: LMN Architects)

结构

随着密度提高和基础设施带来工作负荷的增加。技术导向公司常见的平面配置多采用组合的大型开放模式，同时搭配密集的工作站和日益增加的计算机处理器、显示器和其他个人电子产品。由于此原因，典型技术租客的工作负荷常常增加到每平方英尺 80磅，有别于传统的 F.I.R.E 租客是每平方英尺 50磅。

厕所

大部分本地设置厕所的数量都有超过足够大部分住户需求的标准。不幸的是，大多数科技公司男女员工比例的分布是大大的不平均。一项调查指出，"高科技公司平均 雇用 12.33%的女性工程师"。(培根，L.2013) 考虑到毕业于计算机科学系的男女比例是5:1，这样的趋势有可能会持续下去。根据此数据建议男厕所当 中应该要提供比传统办公室的厕所还要多。

程序

对于以科技为导向的高层建筑来说，除了增加密度，还有另一个重大改变是程序设计的替代方案。当科技租客从低层转换到高层环境时，许多人还是设法维持小型建 筑的一些环境特色和优点。这些包括安全性，邻近的销售卖店、小区空间、自然光线和通风、部门间辨识性和连通性、灵活性以及优质独特的空间等。

大厅

地面层

对于以科技为导向的高层建筑来说，其中重要的就是我们如何对待地面层。在之前几代的高塔设计中，最理想的是有一个宏伟的大厅与丰富的座位和设施服务。在这新的塔类型学中，地面层若提供给良好定位的零售商将具备更高价值。在郊区科技园区，公司提供的许多食物和饮料服务作为其福利的一部分。能够为城市园区有效约省成本是在邻近有各式各样的餐饮和娱乐，没有比这里更好的地方可以高度贩卖诸如咖啡厅、餐厅、和/或酒吧。(图 3) 在许多情况下，业主提供特别折扣给零售业者，吸引零售业者愿意来服务科技公司的人员。(图 4)

减少地下大厅空间的另一个原因是要为这些高度隐秘和有竞争力的公司提供重要的安全性。科技公司将斥资不惜一切代价将其知识产权盗窃的风险降至最低。透过减少地面空间的"大厅"到成为一个安全检查站，他们可大幅降低这种风险。即使很多的新闻报导网络被黑客攻击，知识产权被侵害，这都是走出大门后发生的。一家领先的手机安全公司坚持认为，"開始重视對一家公司採取嚴肃措施保护数字资产可以显著减少偶然盗窃的雇员這件事"。

新的大厅

虽然是倾向尽量减少大厅的空间，但这并不意味着不需要一个更传统的大厅。我们看到更多更大、更有弹性且稍微非正式的大厅在二楼。有时被称为"很棒的房间"，二楼大厅可以包含礼宾接待、非正式的座椅、正式会议空间、董事局会议室和会议中心。这些设施和服务都提供给整栋大楼的员工，可作为替代性的工作空间。这类设施允许移动装置的使用，可以更灵活运用于工作。它还允许分享一些共同领域给跨多个不同建筑的部门员工，如此不仅限小型租客而已。(图 5)

典型楼层

开放的计划

当要设计一个很精细的高层大楼时，一般来说会假设一半地板开放平面，另一半将会有某种形式的外围办事处。这种假设通常需要设计遵循严格 5' (1.5 m) 外墙以保持与外围办事处的效率。绝大多数科技租户需求开放的平面而且对空间质量很重视。为此，他

Ceiling Heights

Floor to floor heights are also a major concern for tech tenants. Their concern is that the space will feel confined and homogenous with low acoustical ceilings and dark corridors. If a typical high-rise tenant requires 9'-0"-9'-6" ceiling heights, a youthful technology tenant will require a minimum of 10'-0"- 11'0" clear ceiling heights. For example, Amazon's first purpose built office tower averages 10'-0" ceiling heights and allows the flexibility to remove the suspended ceiling altogether to gain the perceived heights with open ducts and exposed structural floors. This also allows for a higher head height on the window perimeter for natural daylight to reach further back towards the core (Figure 6).

Unique Space

Brand identity is a critical component for any business, but in a highly competitive market like the technology sector, making a lasting impression is critical. Becoming anonymous in a stack of floor plates is a real concern when it comes to environmental branding, therefore it is critical for these high-rise tenants to have a flexible architectural framework for creative and exciting new spaces.

Upper Lobby

If a tenant is not leasing the entire tower it is important for them to have a memorable first impression when entering their space. One option growing in popularity is a large multi-story atrium lobby on the upper floors spanning 3-4 levels. Due to smoke evacuation and sound control the floors are not always directly open to each other, but the atrium nonetheless provides a visual link to multiple floors. In addition, this becomes an ideal place for a convenience stair to minimize the trips up and down the elevator. This strategy can also exaggerate the dramatic views that are part of a high-rise building's appeal. To allow for such spaces, structural implications must be considered early in the design process and allow for maximum flexibility.

Amenities

One of the most highly prized and much publicized attributes for a technology office is what has become known as the "Geek Space". This is the space comprised of indoor go cart tracks, pinball machine rooms, video game centers, and many other completely unique spaces that help define the culture of the technology industry. Despite their symbolic importance, these spaces are getting smaller and smaller, used less by employees and more as a recruiting tool, either for interns or as a stop on a company tour. With high-density towers, these spaces become one of a variety of amenities that when consolidated in a single space efficiently serve an entire tower and satisfy the evolving desires of the millennial tech generation.

Sustainability

When asked about why Amazon.com decided to grow in the city, Jeff Bezos responded with "It is a fact that we could have saved money by instead building in the suburbs, but for us, it was important to stay in the city. Urban campuses are much greener." (Miller, B. 2014) In addition to being environmentally friendly with close proximity to housing, retail, and mass transit, technology focused high-rise buildings are raising the bar on efficient energy and water use. Technology tenants have been one of the early adopters of sustainability programs such as LEED and the Living Building Challenge since these are in line with their employee's ethos. As these tenants move to the high-rise they will continue to push the industry to the cutting edge of sustainability.

们结合所有低使用率会议室、厨房和房子后面接近整体空间核心，而将最大的灵活性放置于在外围附近。这提供最大限度的光线，也让大多数人可以有景观欣赏。

天花板高度

楼层间的高度也是科技租客关注的重大问题。他们关注的是，低声学天花板和黑暗走廊会感觉空间狭小和单一。如果典型高层租客要求 9'-0"-9'-6"的天花板高度，年轻科技租客将需求至少10'-0"-11'0"净高度。例如，亚马逊第一个购买的建造办公大楼平均为10'-0"的天花板高度，以及需求能够弹性移除多余屋顶可以感觉更高，例如有开放管线和外露的结构楼层。同时还允许更高的头部高度窗户可以有自然光，以达到进一步进光到核心空间。(图 6)

独特的空间

对于任何企业来说品牌识别是一个重要的组件，但在科技业界这样高度竞争的市场中，更重要的保持延续性的印象。当谈到所谓的环境品牌时，若只在一层层平庸无奇的楼层当中默默无名才是真正令人担心的，因此很重要的是得让这些高层租户有一个灵活的结构框架，提供创意发想和令人兴奋的新空间。

上层大厅

如果租客不租用整栋大楼的话，那么当进入到其空间有个难忘的第一印象是很重要的。其中一种日益普遍的方法就是跨越3-4个楼层的大型多层式中庭。由于排烟和音量控制的地板并一定都是开放式的，但中庭仍然提供了多个楼层的可视化链接。此外，这也成为一个方便的楼梯，以尽量利用电梯上下下下。这种策略也可以夸大高层建筑的戏剧效果而成为一种吸引力。为了多样化利用此类空间达到最大的灵活性，必须在设计过程的前期就要提早考虑结构的影响力。

设施

科技业办公室当中最珍贵及备受瞩目的应用属性是众所皆知的"极客空间"。这是一个具备室内连通小车的轨道，弹球室，游戏机中心，以及许多其他完全独特的空间，得以协助定义出科技业的文化。不管其重要的象征意义，但这些空间都越来越小，员工也不常使用反而是作为一种招募条件之一，甚至给实习生使用或是当成参观公司时的休息站之一。透过利用高密度高楼，这些空间成为多样化设施，能够整合单一的空间得以有效地服务于整个高楼内人员，并且满足高科技千禧族群不断进化的需求。

可续性发展

当问及为什么亚马逊决定在城市中发展，杰夫贝佐斯的反应是："事实上我们可以将大楼盖在郊区来节省成本，但对我们来说，反而留在城市是很重要的。城市园区模式更加可以强调绿色环保。(B.2014·米勒) 环境友好的观念中，除了更接近住屋、零售贩卖点和大众运输、科技导向的高层建筑运用高效能源和有效处理水源。科技租客已经算是前期采取永续计划的成员之一，例如美国绿建筑协会(LEED)和生态建筑挑战 (Living Building Challenge)，这些都和员工的理念是一致的。所以当这些租户转移到高层建筑将持续把产业推向永续性的前端。

谷歌就是科技公司当中引领永续性的好例子，其参与Red List Building Materials了解那些是对环境有害有益的成分。谷歌贡献数以百万美元来协助如何辨识对空气质量产生有害影响的产品。玛丽戴维奇公司 (Mary Davidge Associates)的安妮雷斯表示，"谷歌首重维持健康的工作场所"，这家咨询公司负责谷歌的永续性设施计划案。当这些计划案不断发展和增长，其对于办公大楼下一代的影响也将继续增长。

One such example of technology firms leading by example on the sustainable front is Google's involvement on the Red List Building Materials. Google has contributed millions of dollars to helping identify products that have a harmful impact on air quality. "Maintaining a healthy workplace is a strong priority for Google," suggests Anne Less of Mary Davidge Associates, a consulting firm that supports Google's sustainable facilities programs. As programs such as these evolve and grow, their impact on the next generation of office towers will continue to grow.

Conclusion

Today Amazon continues to focus on growing its urban campus. In 2013 they added 420,000 sf to their Seattle campus as well as broke ground on what will eventually be a four-block development with 4 high-rise office towers comprising several million square feet. In a letter to his shareholders this year, Jeff Bezos said, "I believe an urban headquarters will help keep Amazon vibrant, attract the right talent, and be great for the health and wellbeing of our employees and the city of Seattle".

This sentiment seems to be catching on. Even for Microsoft, a company born and raised in the suburban office park culture has started to rethink this strategy. Over the past couple years, cities such as Seattle, Bellevue, San Francisco, New York, and others around the world, Microsoft has recognized the benefits of dense urban office towers and has started consuming office space in towers. In December of this year Microsoft will move its San Francisco headquarters into the second tallest building in the city. This mimics Microsoft's move into the 40-story 11 Times Square in New York in 2013 and its move into the 26 story City Center Plaza in Bellevue in 2008 (Figure 7).

It is this aggressive attitude that is catching the attention of our industry and starting to make waves. As this migration heats up, we will need to adjust the way we design and develop high-rise offices to accommodate for this new type of high-rise tenants.

结论

如今亚马逊继续致力于发展其城市园区的模式。2013 年他们在西雅图校园增加 420,000平方英尺，同时也进行四大区域的发展，预计有4栋高层办公大楼占地好几百万平方英尺。今年给股东的一封信当中，杰夫贝佐斯表示，"我相信城市总部将有助于让亚马逊保持活力，吸引合适的人才，带给员工和西雅图城市健康和幸福"。

似乎也有其他公司有想跟进这样的概念。甚至对微软来说，出生和成长在郊区的办公园区文化也已开始重新考虑其策略。在过去的几年，大城市诸如西雅图，贝尔维尤，旧金山、纽约、和其他世界各地的城市，微软已發現到密集城市办公大楼的好处，并已开始着手设立办公区域于高樓建筑中。在今年的 12 月微软将迁入其旧金山总部，位于城市第二高的建筑物当中。这个就如同微软2013年搬到纽约时报广场40层高的大楼，以及在2008年搬进在贝尔维尤26层高的城市中心广场。(图 7)

就是如此积极的态度让我们产业开始受到其吸引并且引发影响力。随着这样的迁移更加热化，我们将需要调整设计的方式以及发展适合新型高层租客的高层办公环境。

Figure 7. City Center Plaza, Bellevue WA, USA (Source: Ron Bailey, Istockphoto.com)
图7. 美国华盛顿州贝尔维尤市城市中心广场 (来源: Ron Bailey, Istockphoto.com)

References (参考书目):
Bacon, L. (2013) **The Tech Industry's Woman Problem: Statistics Show It's Worse Than You Think**, [Online] Available: http://qz.com/143967/the-tech-industrys-woman-problem-statistics-show-its-worse-than-you-think [7 Nov. 2013] Microsoft, (2013) **Fast Facts about Microsoft**, www.Microsoft.com

Gallagher, L. (2012) **Tony Hsieh'S New $350 Million Startup**, Fortune, 23 Jan., page 1

Kotkin, J. (2013) **The Geography of Aging: Why Millennials are Headed to the Suburbs**, Forbes, 9 Dec. P.1

Miller, B. (2014) Bezos to Shareholders on Seattle Headquarters, Marriage Proposals, **Puget Sound Business Journal**, 10 Apr., P1