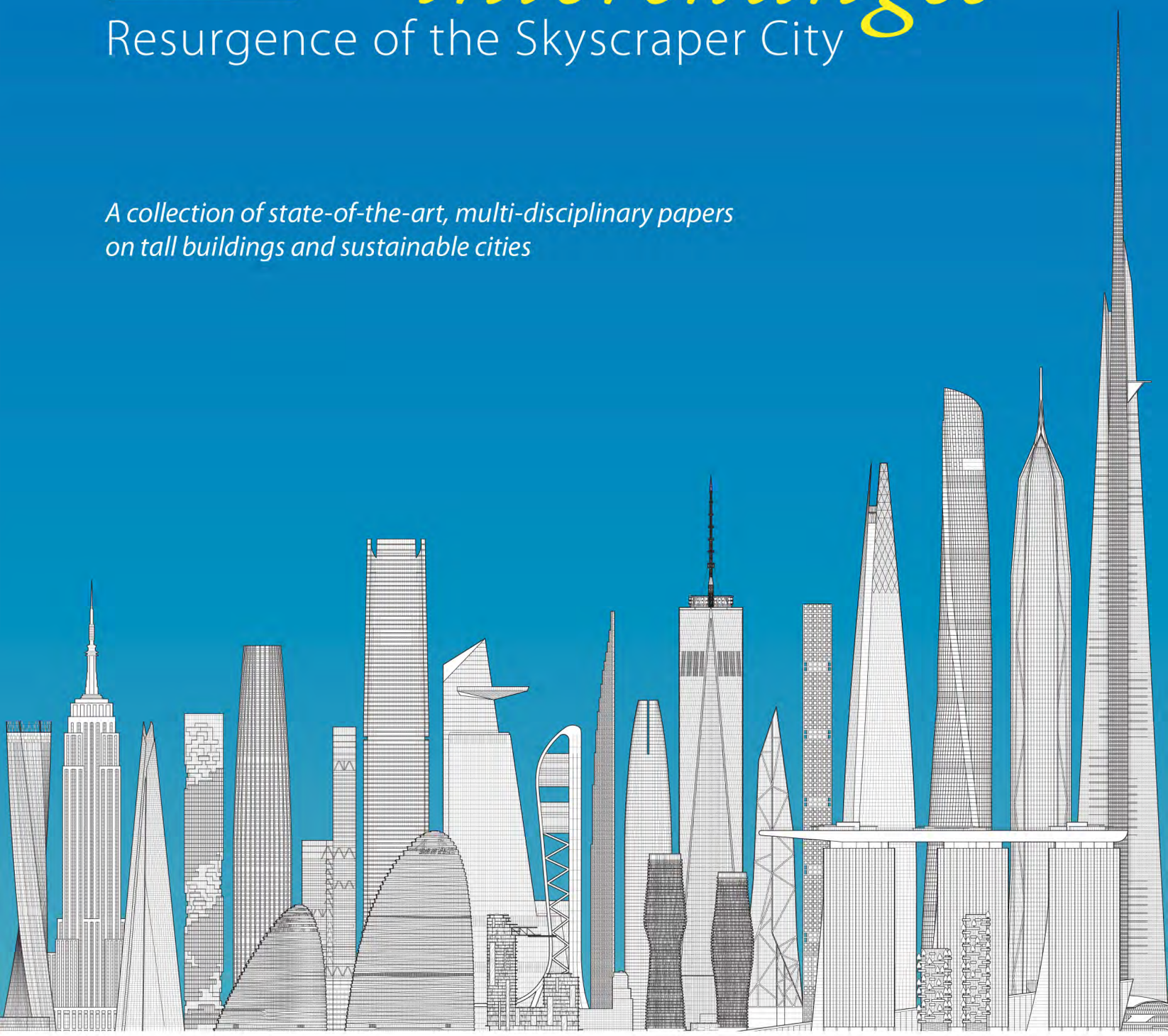
Council on Tall Buildings and Urban Habitat

Global *interchanges*

Resurgence of the Skyscraper City

A collection of state-of-the-art, multi-disciplinary papers on tall buildings and sustainable cities



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Global Interchanges: Resurgence of the Skyscraper City

After a post-recession hiatus in tall building construction in many countries lasting several years, numerous cities in the Americas, Asia, Europe and Australia are again resurgent. From Miami to Melbourne, Bogota to Beijing, Toronto to Turin, tall projects are being proposed and built in significant number. Nowhere is this more evident than in New York, where several new urban typologies are developing simultaneously; the ultra skinny, luxury residential towers exemplified by One57 and 432 Park; the urban-regeneration clusters such as Hudson Yards and the World Trade Center site; the prefabricated high rise and other technical innovations as seen at Pacific Park; as well as numerous others. In addition, the increasing importance of both resilient infrastructure in the face of mounting climate change, as well as quality public space exemplified through projects such as the High Line, are adding to a fascinating mix.

Yet the flow of capital enabling many of these projects is complex, and shows an interconnectedness of our cities way beyond what was evident even just a short decade or two before. Developments in Sydney are as likely to be driven by forces from Shanghai as locally, Canadian pension funds are enabling several tall buildings in London, and Middle East capital seems, once again, to be everywhere. On top of this, after a decade or more of unprecedented vertical growth in Chinese cities, China is now investing in myriad urban centers around the world.

This collection of papers, originally presented at the CTBUH 2015 New York Conference, examines this dual phenomena – the motivations and mechanisms that are enabling multi-national investment scenarios, and the technical innovations that are driving new heights, forms, materials and construction techniques. The publication investigates what all this means for the skyscraper of the future – more adaptable to the sustainable and technological challenges of the age.

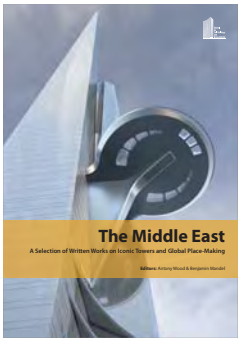
Please note that the following additional three publications form an addendum to these proceedings, and can be purchased separately at: **https://store.ctbuh.org**

Asia & Australasia: A Selection of Written Works on the World's Tall Building Forefront

Wood, A. & Sharry, A. (eds.) (2015) ***Asia & Australasia: A Selection of Written Works on the World's Tall Building Forefront.*** Council on Tall Buildings and Urban Habitat: Chicago.
ISBN: 978-0-939493-45-6. 199 pages, Hardback.

The Future of Tall: A Selection of Written Works on Current Skyscraper Innovations

Wood, A. & Gabel, J. (eds.) (2015) ***The Future of Tall: A Selection of Written Works on Current Skyscraper Innovations.*** Council on Tall Buildings and Urban Habitat: Chicago.
ISBN: 978-0-939493-46-3. 192 pages, Hardback.



The Middle East: A Selection of Written Works on Iconic Towers and Global Place-Making

Wood, A. & Mandel, B. (eds.) (2015) ***The Middle East: A Selection of Written Works on Iconic Towers and Global Place-Making.*** Council on Tall Buildings and Urban Habitat: Chicago.
ISBN: 978-0-939493-47-0. 158 pages, Hardback.

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Introduction

New York: The Skyscraper City as Future Urban Laboratory

New York City has a long history as a hotspot of international business and finance, and the island of Manhattan has been practically synonymous with the word "skyscraper" for more than 100 years. It is still home to some of the world's best-recognized skyscrapers. It will, in some sense, always be a logical location for a tall buildings conference. But in 2015, there are some particularly strong factors that make New York the ideal place to host a conference focused on the theme of "Global Interchanges."

After the terror attacks of September 11, 2001, which affected New York in myriad ways, many people claimed that the "death of the skyscraper" as a practical building typology was imminent. Instead, skyscraper construction around the world has flourished since then.

Worldwide, the number of buildings 200 meters or taller completed from 1930 to 2001 was 282, an average of 3.9 buildings per year. From 2002 to 2015, that number was 679, for an average of 52.2 buildings per year.

In New York City, there were 56 skyscrapers of 200 meters or taller completed from 1930 to 2015. However, in the third quarter of 2015, there were 25 such buildings under construction, almost half the figure that it took 85 years to complete previously. If we look at the taller end of that spectrum, between 1930 and 2015, eight buildings in the "supertall" (300 meters or taller) category were completed during those 85 years. There are currently 14 such buildings under construction or proposed to rise by 2021.

Much attention has been and will be paid to developing economies in Asia and the Middle East, where most of those 679 buildings were built in the last decade and a half. But what is interesting about New York today is that it is particularly representative of the international flow of capital that now dominates the business – much of it from Asia and the Middle East – in a far more significant way than in decades past. As a global financial and media capital, as well as a city whose primary infrastructure dates from the 19th century, it is a laboratory for the study of trends that will affect many cities in the coming years. And that, of course, is the main topic around which the conference – and the papers that this publication contains – is focused.

Parallel Lines

As seen in the map on the right (see Figure 1), across the years there has been a consistently high density, and superlative height, concentrated in the relatively small areas in the southern tip of Manhattan, home of the Wall Street financial district, and between 34th and 59th streets, the Midtown area, revolving about the city's two main railroad stations and the entertainment district at Times Square.

On the one hand, the traditional cores persist, with an accompanying increase in height and density. It is not a coincidence that these are also the highest-priced areas for both residential and office space. At the same time, the two cores are beginning to grow towards each other. While in 1980 there were just a few tall buildings between Canal and 14th streets, now there are several over 200 meters. Even more strikingly, there are now buildings hitting the 200-meter mark and creating mini-clusters in Brooklyn, Queens and Jersey City – though Manhattan still clearly dominates (see Figure 2).

Also revealed is the fact that, while the cores have retained their historical density due to their good transit connections and the self-reinforcing desire of productive people to be near each other, what has changed is the heavy sprinkling of residential and mixed-use buildings into formerly office-only areas, particularly Downtown (see Figure 3). So if the skyline silhouette from a distance might not surprise a New Yorker who fell asleep in 1940 and woke up today, the activities taking place in those buildings and on the streets around them certainly might.

A New Typology: the "Superslim"

The wealthy global elite have chosen New York as one of the prime locations for investment in real estate. The financial crisis of 2008–9 was based largely on high levels of debt related to securitized forms of home loans and other real estate holdings. As ironic as it may seem, the reaction of the global wealthy to the turmoil of the last crisis has been to plunge right back into real estate, but with an important distinction. This time, they're paying largely with cash, not credit, and they are buying physical assets directly. In an increasingly politically and financially turbulent world, those with wealth to invest find that the safest investments with the best appreciation potential are real estate projects in countries with solid rule of law,

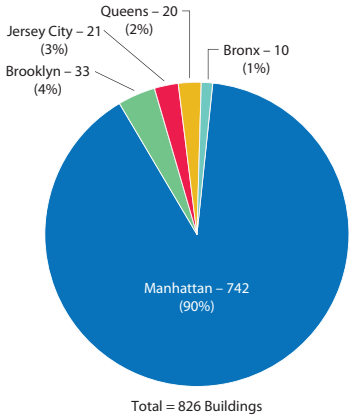


Figure 2. 100m+ buildings[3] in the New York City region[4] by neighborhood (Source: CTBUH, August 2015)

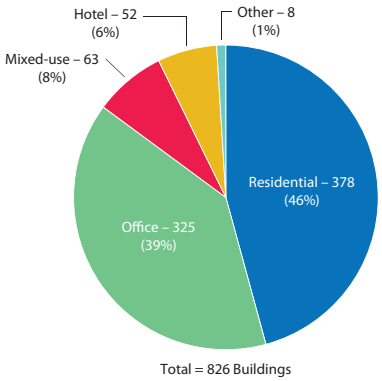
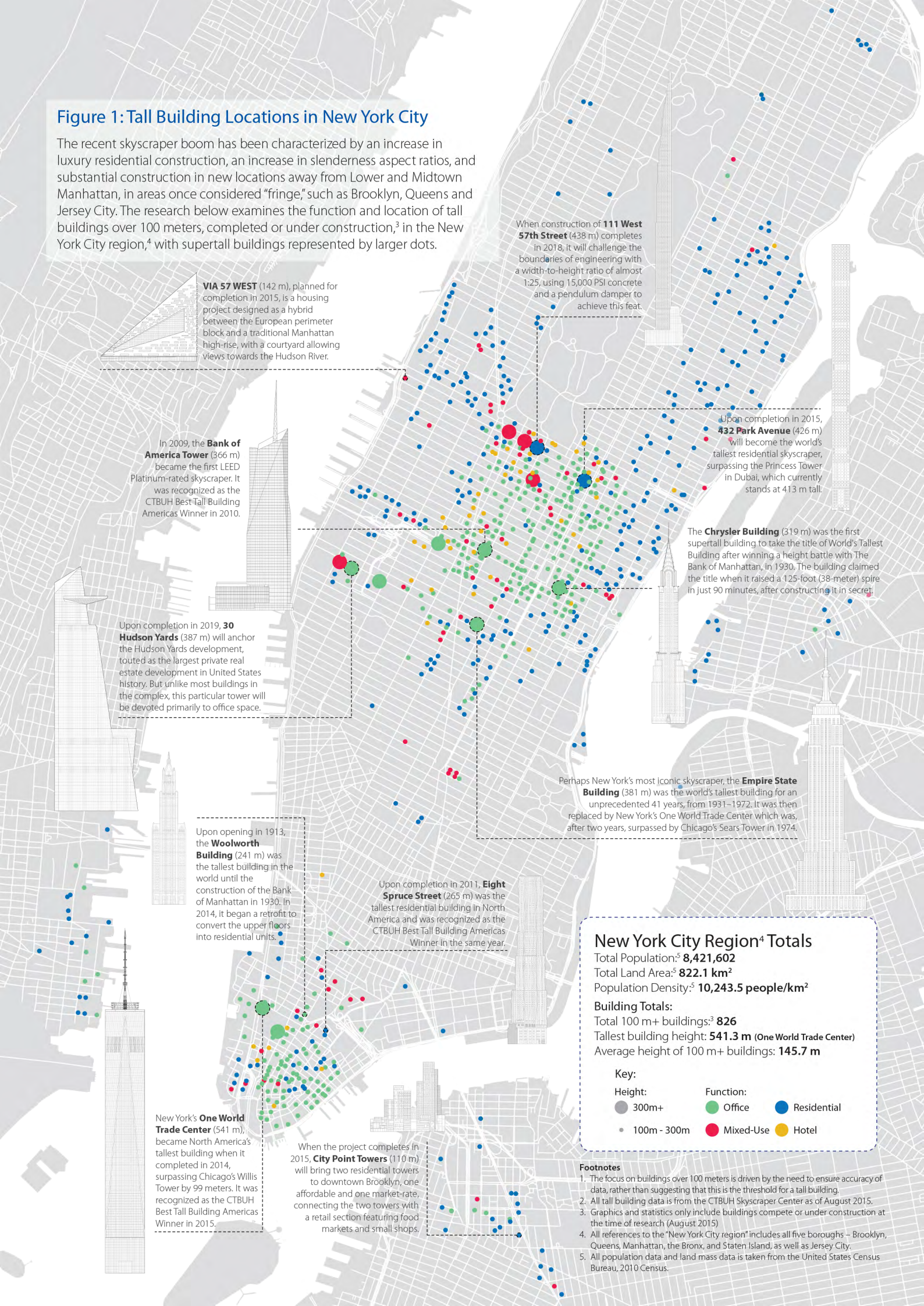


Figure 3. 100m+ buildings[3] in the New York City region[4] by function (Source: CTBUH, August 2015)

Figure 1: Tall Building Locations in New York City

The recent skyscraper boom has been characterized by an increase in luxury residential construction, an increase in slenderness aspect ratios, and substantial construction in new locations away from Lower and Midtown Manhattan, in areas once considered "fringe," such as Brooklyn, Queens and Jersey City. The research below examines the function and location of tall buildings over 100 meters, completed or under construction,[3] in the New York City region,[4] with supertall buildings represented by larger dots.



New York City Region[4] Totals

Total Population:[5] **8,421,602**
Total Land Area:[5] **822.1 km²**
Population Density:[5] **10,243.5 people/km²**

Building Totals:
Total 100 m+ buildings:[3] **826**
Tallest building height: **541.3 m** **(One World Trade Center)**
Average height of 100 m+ buildings: **145.7 m**

Key:

Height:
- 300m+
- 100m - 300m

Function:
- Office
- Residential
- Mixed-Use
- Hotel

Footnotes

1. The focus on buildings over 100 meters is driven by the need to ensure accuracy of data, rather than suggesting that this is the threshold for a tall building.
2. All tall building data is from the CTBUH Skyscraper Center as of August 2015.
3. Graphics and statistics only include buildings compete or under construction at the time of research (August 2015)
4. All references to the "New York City region" includes all five boroughs – Brooklyn, Queens, Manhattan, the Bronx, and Staten Island, as well as Jersey City.
5. All population data and land mass data is taken from the United States Census Bureau, 2010 Census.

The Logic of Luxury 2.0

Carol Willis
President

The Skyscraper Museum,
New York City, USA

Carol Willis is the founder and director of The Skyscraper Museum in NYC and the curator for more than 20 exhibitions. An architectural and urban historian, she is the author of Form Follows Finance: Skyscrapers and Skylines in New York and Chicago (1995) and has edited and contributed essays to numerous monographs and collections. She appears frequently in television documentaries and radio broadcasts.

Ms. Willis is an Adjunct Associate Professor of Urban Studies at Columbia University where since 1989 she has taught in the Graduate School of Architecture, Planning, and Preservation.

Abstract

This paper recaps the "what and why" of the super-slender type and gives an abbreviated illustration of the mechanics of the "logic of luxury." The second part of the paper considers the impact of the towers on the New York skyline, on streets and parks, and on the broader market for housing. These issues are hot topics in current critical discourse and public debate. Among architectural critics, the towers have few defenders, and civic groups and community boards have called meetings to rally against them. While there are serious considerations of how to address such issues as significant shadows on treasured public spaces such as Central Park and questions of fairness in tax policy that should be raised, in general, the rhetoric of critics needs a reality check. The histrionics that surround the frequent trope of "towers of inequality" and "towers of secrecy" require more dispassionate analysis.

Keywords: Air Rights; Slenderness; Supertall; Typology; Zoning

Over the past decade, New York has created an entirely new form in skyscraper history: the super-slender, ultra-luxury residential tower. I say "New York has created," rather than architects and engineers have invented it, because the type is shaped by the island of Manhattan's particular conditions of place, like the specialized species of the Galapagos.

These celebrity spires are headline grabbers, in part for their "starchitect" designers, but even more for their stratospheric condo prices. In early 2015, two penthouses in One57 sold for $91 million and $100 million, and another at 432 Park Avenue was in contract for $95 million. Indeed, the $100-million number has become a benchmark, and new projects have even ventured $110-$175 million. While some condo owners will enjoy their aeries as a primary residence, many apartments are being purchased as investment properties by wealthy individuals, LLPs, and by international buyers, who will be part-time residents at most. The intense demand for New York real estate and its relative security in world markets has led one expert to dub the sky-high condos "strong-boxes in the sky." For this reason, they have also been targets of criticism by those who view the buyers, as "the rootless superrich: Russian metals barons, Latin American tycoons, Arab sheiks and Asian billionaires."[1]

In a paper presented at the 2014 CTBUH Shanghai conference, and before that in the exhibition "SKY HIGH & the Logic of Luxury," which opened at The Skyscraper Museum in October 2013, I laid out the characteristics of this new type, of which at the time there were about a dozen examples in development. All are now in some stage of construction, save for two that will still be built, but have changed slightly in shape or height[2] (see Figure 1).

This paper recaps the "what and why" of the super-slender type and gives an abbreviated illustration of the mechanics of the "logic of luxury" detailed in my exhibition and Shanghai talk. I update additions to the list and note the next fertile fields for beanpole buildings in mid-Midtown, especially in the area of the 20s and 30s near Fifth Avenue. The second part of the paper considers the impact of the towers on the New York skyline, on streets and parks, and on the broader market for housing. These issues are hot topics in current critical discourse and public debate. Among architectural critics, the towers have few defenders, and civic groups and community boards have called meetings to rally against them. While there are serious considerations of how to address such issues as significant shadows on treasured public spaces such as Central Park and questions of fairness in tax policy that should be raised, in general, the rhetoric of critics needs a reality check.

1: An industry website that tracks highest real estate sale prices weekly and annually is The Real Deal: http://therealdeal.com/blog/2014/07/02/top-manhattan-apartment-sales-june-23-june-29/. The "ruthless rich" quote appeared in Charles V. Bagli, "Sky High and Going Up Fast: Luxury Towers Take New York," The New York Times, May 18, 2013. http://www.nytimes.com/2013/05/19/nyregion/boom-in-luxury-towers-is-warping-new-york-real-estate-market.html?_r=1. A version of this article appeared in print on May 19, 2013, on page A1 of the New York edition.

2: The exhibition "SKY HIGH & the Logic of Luxury" at The Skyscraper Museum (10/13-5/11.14) examined a dozen super-slim, ultra-luxury residential towers on the rise in Manhattan. A virtual version of the entire exhibition can be viewed here: http://www.skyscraper.org/EXHIBITIONS/SKY_HIGH/video_intro.php. Carol Willis's 2014 Shanghai conference paper can be viewed at: http://global.ctbuh.org/resources/papers/download/1952-the-logic-of-luxury-new-yorks-new-super-slender-towers.pdf.

The histrionics that surround the frequent trope of "towers of inequality" and "towers of secrecy" require more dispassionate analysis.

A New Type

What are the characteristics of the new type, and what are the conditions unique to New York that created it? Sophisticated engineering has made these spindles possible, but it is soaring condominium sale prices, in part driven by an excited international market for real estate investment, that explains their recent proliferation. These super-slender towers are expensive to build, and it took a price platform of around $3,000 psf – first established in 2004 at the Time Warner Center, then at 15 Central Park West – to make their basic economics work. Today, top prices for the first completed 57th Street towers have achieved an astonishing $9,000 to $11,000 psf, and the expectations for new projects are now generally reported in the range of $4,000 to $8,000 psf.[3]

The first group clustered at the southern edge of Central Park and on the wide, fashionable cross-town commercial 57th Street, nicknamed Billionaires' Row. More than anything, their location is predicated on views of the park. Views have value, and in New York, the gold standard is Central Park. Here is the vista from the duplex-penthouse of One57 (see Figure 2). Such trophy assets are in limited supply, whether Picassos, Pollacks, or penthouses. But any apartment with a Central Park view has premium value, even an avenue or two away, or even five blocks south, as in the case of the MoMA tower. Every floor under the penthouse needs to have a view to have value, too, so slenderness becomes the way to lift all their apartments high in the sky. Other areas of the city capitalize on exceptional panoramas, especially downtown, where harbor and river views are arguably even more spectacular, even though not as expensive.

Figure 2. View of Central Park from penthouse of One57 (Source: The Skyscraper Museum)

Figure 1. Shown in the top row, left to right: One57 by Christian de Portzamparc; 111 W 57 by SHoP; 432 Park Avenue by Rafael Viñoly; Nordstrom Tower by Adrian Smith + Gordon Gill Architecture; 220 Central Park South by Robert A.M. Stern Architects; 520 Park Avenue by Robert A.M. Stern Architects; 53 West 53rd by Ateliers Jean Nouvel; 56 Leonard by Herzog & de Meuron Architekten; 30 Park Place by Robert A.M. Stern; 50 West Street by JAHN, 100 East 53rd Street by Foster + Partners; 45 East 22nd Street by Kohn Pederson Fox Associates (Source: The Skyscraper Museum from images provided by Christian De Portzamparc; SHoP Architects; CIM Group & Macklowe Properties; YIMBY; RAMSA, rendering by Neoscape; Zeckendorf Development LLC and Seventh Art; NYC Department of City Planning; Alexico Group; dBox)

Branded design matters in the developers' marketing. Pritzker-Prize winners Jean Nouvel, Norman Foster, Herzog & de Meuron, and Christian de Portzamparc) are featured in the marketing of the towers, and Robert A.M. Stern, a traditionalist associated with high-end architecture, has been tapped for three of the super-slender towers under construction. Glass wall or picture window, though, it's the view that sells the apartment.

The design approach of the super-slenders is not stylistic, as can be seen in this compiled view of a dozen that are now under construction. The façade treatment can be a continuous glass membrane or a masonry curtain wall with punch windows. The structural system can range from internal shear walls and mega-columns, to an exterior bearing wall, to structural expressionism. Some of the towers are exceptionally tall: indeed, and the loftiest one will have a penthouse higher than the roof of One WTC. But to be clear: it's not height that characterizes the type, it's slenderness.

Slenderness is the design and development strategy of these towers, whether they rise to 600 feet (183 meters) or 1,500+ feet

3: The Skyscraper Museum compiled a history of luxury condominium prices from the 1980s to 2013 in a single graphic chart for its exhibition "SKY HIGH & the Logic of Luxury." It can be viewed here: http://www.skyscraper.org/EXHIBITIONS/SKY_HIGH/timeline.php.

Three Points of the Residential High-Rise: Designing for Social Connectivity

Jeanne Gang
Founder and Principal

Studio Gang Architects,
Chicago, USA

Architect Jeanne Gang is Founder and Principal of the award-winning design and planning practice Studio Gang. A graduate of the University of Illinois, Jeanne received her Master of Architecture degree from the Harvard University Graduate School of Design. She is a MacArthur Fellow and recipient of the Cooper-Hewitt National Design Award.

The architect of the 82-story Aqua Tower, Jeanne continues to explore the tall-building typology in projects such as Wanda Vista tower and City Hyde Park in Chicago, 160 Folsom in San Francisco, Solar Carve Tower in New York, and the Miami Design District Residences.

Abstract

In this paper we discuss the terms "exo-spatial design," "solar carving," and "bridging" as strategies for creating more socially connective tall buildings. As a typology, high-rise residential buildings have a unique set of challenges to becoming fully activated urban participants in the cities in which they are located. While there is a general recognition and appreciation that tall buildings provide identity to a city, there is often criticism of how they relate to their surroundings. Critics have posited that tall buildings are insular and foreboding by their very nature. This paper explores several design avenues for architects to consider in order to improve the social aspect of tall buildings. As all cities become taller and denser to accommodate growth, the need to design social space in, on, and around tall buildings must be continually examined if we are to have cohesive urban fabric that supports communities.

Keywords: Connectivity, Energy Efficiency, Passive Design, Social Interaction, Urban Design, Vertical Urbanism

Introduction

Social connectivity is especially important given the changing demographic of city dwellers. Millennials, the current generation moving to cities, are highly social and desire social opportunities that are both virtual and real. Comfortable with sharing, this generation is capable of transforming many established aspects of urban living. With information technology in the palm of our hands, in many ways the transformation is well underway. Indeed, all ages desire social interaction; it's part of being human. Tall buildings need to respond to these desires by becoming social connectors themselves.

It may seem that tall buildings are fully accepted today. Their construction in place of lower-density development has become the status quo. One reason for this is that tall buildings are resoundingly appreciated and celebrated for their ability to address issues of identity and iconography in cities. Yet the original critique about tall buildings was never aimed at their iconic potential; rather it was squarely focused on their perceived inability to contribute to the social well-being of the city.[1] On this point there remains doubt about the tall building type, and the concern of early critics that tall buildings may have negative consequences on the social fabric, even "adverse effects on mental and social health,"[2] seems to linger. Research conducted in a range of disciplines, from sociology to economics to urban planning, continues to critique tall buildings for isolating people from each other, negatively impacting the ground-level civic space with shadows and other environmental problems, and blocking connections between spaces of the city due to impenetrable large podia.[3]

Creating social space was a driving factor in the design of Studio Gang's Aqua Tower, completed in 2009. The research that was begun for that project has developed into architectural strategies for tall buildings that continue to grow within our practice, contributing to a morphology that is continually tracked and updated. We have applied this research to both real and hypothetical projects to date. By sharing these strategies, we hope to offer tools that architects can deploy to make tall buildings more socially connected and responsive to the urban environments in which they are built – and in doing so address the public's ongoing concerns about the tall building typology and respond to our uniquely social generation's desires for the kinds of cities we want to live in.

In this paper we posit three simple points for residential high-rise design, developed through our design research, that specifically address the need for social connectivity, strategies that

1. SUDJIC, D. (2005) Goodbye to all that? The Guardian. [Online] 2nd April. Available from: http://www.theguardian.com/artanddesign/2005/apr/03/architecture. [Accessed June 2015].
2. CAPPON, D. (1972) Mental health in the hi-rise. Ekistics. 33. p.192–196.
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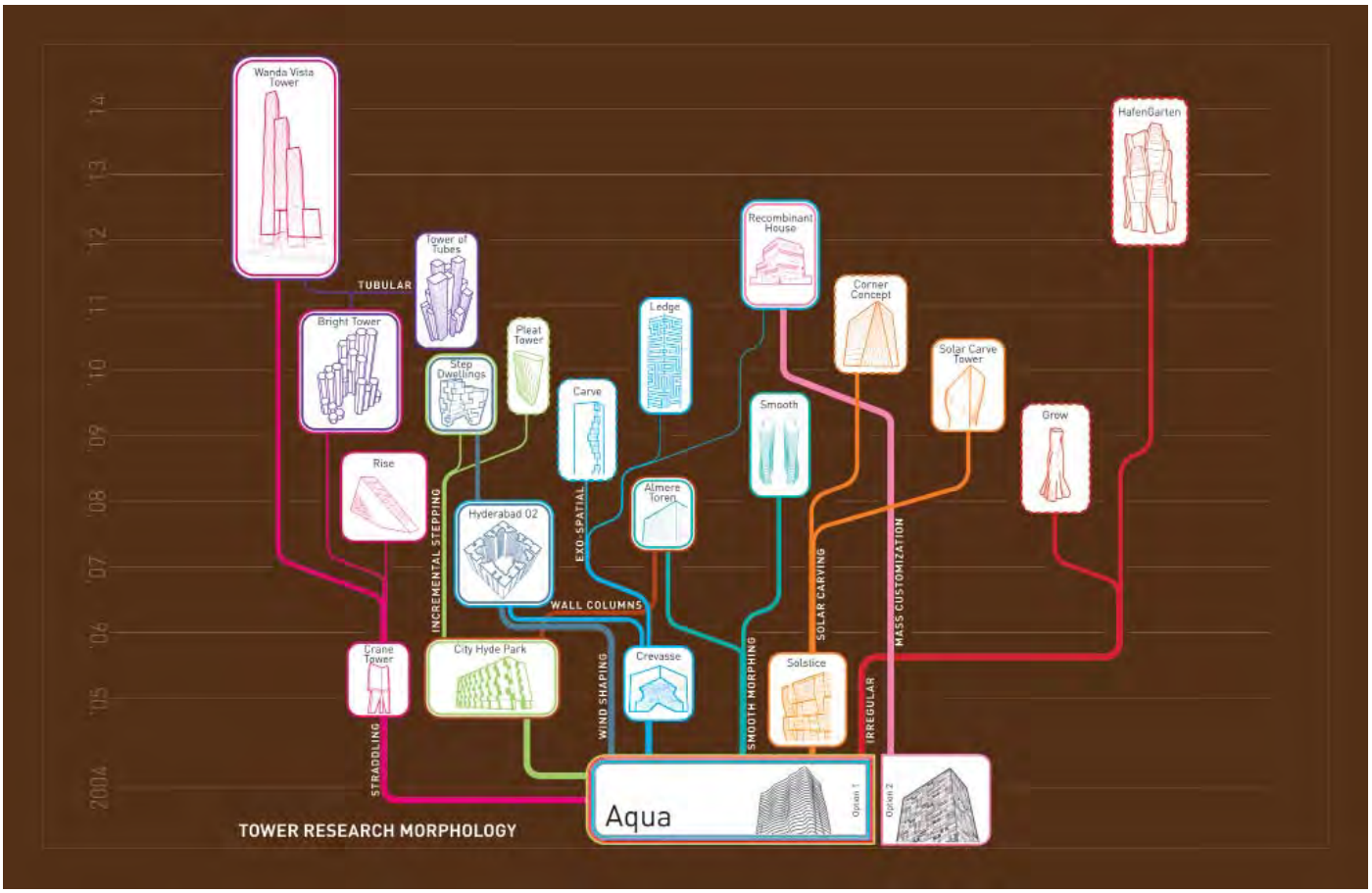

Figure 1. Diagram showing the relationships between general strategies and specific buildings in Studio Gang's tall building designs. (Source: Studio Gang Architects)

we have termed: "exo-spatial design," "solar carving," and "bridging." The Aqua Tower contains seeds of all three strategies in nascent form, as exhibited in its large social balconies on the exterior, floor slabs that are shaped or carved by solar and other environmental conditions, and spanning elements in its podium that allow it to bridge a complex ground condition. We examine how these initial ideas have been implemented in a variety of ways in our current work (see Figure 1).

Exo-Spatial

Exploring the Idea of Outdoor Living and Its Potential Social Dimensions

An exo-spatial building strives to be socially vibrant on its entire exterior surface. It reinterprets architectural elements such as balconies and roof gardens into the urban equivalent of a front porch or a back yard – social spaces that may occur more typically when living closer to the ground. How can something as ordinary as a balcony become something more social?

The exo-spatial concept is based on extending the threshold of the interior to the outdoors and creating a social space within that threshold. First developed for the Aqua Tower, it has been further explored in Studio Gang projects such as City Hyde Park and the Garden in the Machine.

Aqua Tower, Chicago

"What's missing in tall buildings?" For the design of the Aqua Tower, we began by surveying our own office and colleagues and found the overwhelming response to this question was: outdoor space. As the design developed, we found that extensive outdoor space on the exterior surface of the building could provide more than a private amenity for the individual apartment; it could act as a vertical community where residents could see one another and informally interact. The physical manifestation of exo-spatial design, Aqua's large undulating balconies, which vary in shape ever so slightly from floor to floor over the height of the building, are also the tower's most recognizable feature. The terraces seamlessly extend the interior to the outdoors, creating spaces that imbue high-rise living with the character of a neighborhood. From the living room, the balconies act as a visual extension of space from inside to outside, but stepping outside offers an expansive urban experience. The balconies offer oblique visual connections between neighboring units, allowing for informal ties to form between people, as well as vistas to landmarks within the fabric of downtown, strengthening a sense of place and identity. In doing so, the building challenges the notion of the tall building as a gated community and prioritizes social connection. Semi-private spaces like Aqua's terraces serve as "a type of social network,"[4] becoming the locus not only of individual identity, made possible by residents' unique customizations, but of community as well, allowing for the crucial interactions that occur as the result of more public spaces.

City Hyde Park, Chicago

With City Hyde Park, slated for completion in 2015, we challenged ourselves to advance the lively social interactions we explored in Aqua's design while also improving energy efficiency. City Hyde Park advances our exo-spatial design concept and simultaneously proves that outdoor space does not have to compromise environmental performance in cold climates. By minimizing the area where the balcony touches the slab, taking gravity loads directly to the ground, and inserting a thermal break, the conductivity of the slab is likewise minimized and performance is improved.

Located at a busy commercial intersection near Lake Michigan and adjacent to a commuter rail stop, City Hyde Park is a 500,000

4. KOOLHAAS, R. (ed.) (2014) Fundamentals. 14th International Architecture Exhibition, la Biennale di Venezia.

Engineering Without Engines

Bjarke Ingels
Founding Partner

Bjarke Ingels Group,
New York City, USA

Bjarke Ingels started Bjarke Ingels Group (BIG) in 2005 after co-founding PLOT Architects in 2001 and working at OMA in Rotterdam. Through a series of award-winning design projects and buildings, Ingels has developed a reputation for designing buildings that are as programmatically and technically innovative as they are cost and resource conscious. Ingels has received numerous awards and honors, including the Danish Crown Prince's Culture Prize in 2011, the Golden Lion at the Venice Biennale in 2004, and the ULI Award for Excellence in 2009. In 2011, the Wall Street Journal awarded Ingels the Architectural Innovator of the Year Award. In 2012, the American Institute of Architects granted the 8 House its Honor Award, calling it "a complex and exemplary project of a new typology."

Abstract

With the rise of technological solutions, the practice of architecture is often divorced from the cultural, social, and environmental contexts where we build. Buildings have become closed systems, connected to life-support machinery that compensates for the design principles we have forgotten over time. This is particularly true of tall buildings, especially since the rise of the International Style in the middle of the 20th Century. We have much to "re-learn" from vernacular architecture in the regions where we work, but we must also put our latest technological advances to work in realizing these principles. This paper articulates a vision for a world in which tall buildings can be "engineered without engines." It is a call for architects to return to a more central, yet more collaborative role with engineers, rather than let the content of their buildings be driven by engineering standards' conflict with arbitrary shapes.

Keywords: Architecture, Design Process, Form, Climate, Context, Integrated Design

Architecture is the art and science of accommodating the lives we want to live. It sets the stage for our lives. It is the craft of designing and building the world that we want to inhabit. Our cities and buildings aren't givens – they are the way they are because that is as far as we have gotten to date. They are the best efforts of our ancestors and fellow planetizens, and if they have shortcomings, it is up to us to continue that effort. We must pick up where they left off and create the world we want to see for ourselves and our children.

Architecture is much more than designing pretty facades or expressive sculptures. It is the craft of designing and building man-made ecosystems, through which we channel not only the flow of people, but also the flow of resources through our cities and buildings.

We are never starting from scratch. We have a planet to begin with – with climates and landscapes, biomass and minerals. From those conditions we add and subtract, adapt and evolve, modify and manipulate matter to achieve conditions even more conducive to human life.

What are the forces that shape the world around us? What are the bits of information that inform our design decisions? How can we use constraints – as design criteria – and in a Zen-like way – turn the resistance we meet into the driving force of our design? Architecture – like storytelling – strives through conflict. The greater the obstacle, the more engaging the design that overcomes it. So what conditions can inform our work?

Figure 1. The proposed Signature Tower in Kuala Lumpur challenges the universal ideas of the skyscraper (Source: BIG)

First, there's our climate and our landscape.

Bernard Rudolfsky's show at the MoMA "Architecture without Architects – An Introduction to Non-Pedigreed Architecture" highlighted the fact – mostly from an aesthetic point of view – that with the rise of the International Style of Modernism, buildings had started to look the same everywhere. The name "International Style" obviously suggests this, but the implications are troubling, and they extend beyond aesthetics.

Let us take a moment to discuss the origins of this and its perversions. Mies van der Rohe made some amazing typological innovations. He stripped the Manhattan high-rise down to its bare bones. He was good at distilling an idea into its pure essence. He said, "If it's about the view, why don't we make the entire wall the view? If it's about a big, open, inviting lobby, why don't we just make it completely empty and transparent?" So he was taking ideas to the essential extreme.

Traveling around North America, one realizes that van der Rohe did the same high-rise 10 or 20 times. He was so obsessed with perfection that he got stuck with what he believed to be the perfect solution, and then he simply repeated it.

Herein lies the problem of van der Rohe's idea of a universal application of the ideal solution. One misses the problems and potentials of the fact that there are different contexts, different cultures, economies, climates, landscapes and programs. Each parameter changes the equation and distorts the solution away from the universal, perfect solution towards the set of locally optimized solutions. We need to be much more interested in exploring the potential of these differences, rather than always repeating a certain universal ideal (see Figure 1).

The homogenized International Style neglected the usual environmental design responses. Adaptations to local environmental conditions developed over centuries were being replaced by giant mechanical systems. Essentially the buildings were now on life support – supplemented by air conditioning, central heating, and mechanical ventilation. Machines replaced the thicknesses of walls, solar orientation of the buildings, proximity to windows, the operability of windows. Electric lights even made us independent of daylight.

Figure 2. West 57, one of the projects for which the Bjarke Ingels Group was commissioned to design the interiors and exterior (Source: Wade Zimmerman)

Suddenly a building was not "performing" anymore; it was reduced to a mere container of space – a big blank box, tube-fed by a whole arsenal of machines. Building services are essentially a mechanical compensation for the fact that a building is bad at what it is designed for – human inhabitation.

One of the things that has inspired us is looking at the role that architects can play in this conditioning. Rather than simply outsourcing it to engineers or product manufacturers, we should investigate if architectural design can once again play a real active role in the environmental performance of the building.

That kind of thinking is often missing, particularly in tall-building design. The term "perfume-bottle architecture" comes from the fact that for some architects, it seems like the shape of the building and and the content of the building are two entirely separate ideas. In North America, this is exacerbated by the way the profession is organized, in that one architect may design the structure and the envelope of the building, and another architect does the interiors. Whereas in Europe, the distinction between the inside and the outside design is not common. We've been fortunate that in Vancouver, Miami and New York, we were commissioned to design the interiors as well as the exteriors (see Figure 2).

There is a whole series of architectural styles that are neither academic, nor aesthetic, but rather are purely empirical, refined through years of trial and error.

Mediterranean Greek villages, with all of their surfaces coated in white to reflect heat – and flat roofs to ascend for the enjoyment of cool evening breezes…

Igloos, designed using the high insulating properties of packed snow to create a minimum surface area of thermal exposure within a maximum contained volume…

Chinese courtyard buildings in flatlands, where one descends down into the courtyards to find calm from the turbulent winds above…

In Yemen, a field of thin chimneys rises above the city with steep-cut slopes, capped with large flat wind funnels, all facing the prevailing winds, so as naturally ventilate the six-story buildings below without any moving parts. These examples show us ways to achieve an ultimate symbiosis between architecture and its surroundings.

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After a post-recession hiatus in tall building construction in many countries lasting several years, numerous cities in the Americas, Asia, Europe and Australia are again **resurgent.** From Miami to Melbourne, Bogota to Beijing, Toronto to Turin, tall projects are being proposed and built in significant number. Nowhere is this more evident than in New York, where several **new urban typologies** are developing simultaneously; the **ultra skinny,** luxury residential towers exemplified by One57 and 432 Park; the **urban-regeneration clusters** such as Hudson Yards and the World Trade Center site; the prefabricated high rise and other **technical innovations** as seen at Pacific Park; as well as numerous others. In addition, the increasing importance of both **resilient infrastructure** in the face of mounting climate change, as well as **quality public space** exemplified through projects such as the High Line, are adding to a fascinating mix.

Yet the **flow of capital** enabling many of these projects is complex, and shows an **interconnectedness** of our cities way beyond what was evident even just a short decade or two before. Developments in Sydney are as likely to be driven by forces from Shanghai as locally, Canadian pension funds are enabling several tall buildings in London, and Middle East capital seems, once again, to be everywhere. On top of this, after a decade or more of **unprecedented vertical growth** in Chinese cities, China is now investing in myriad urban centers around the world.

This collection of papers, originally presented at the CTBUH 2015 New York Conference, examines this dual phenomena – the motivations and mechanisms that are enabling **multi-national investment scenarios,** and the technical innovations that are driving new heights, forms, materials and construction techniques. The publication investigates what all this means for the **skyscraper of the future** – more adaptable to the sustainable and technological challenges of the age.

Council on **Tall Buildings** and **Urban Habitat**

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