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The Tall Building Impact: From Local to Global

An interview with Adrian Smith, Partner, conducted by Peter Weismantle, Director of Supertall Building Technology, *Adrian Smith + Gordon Gill Architecture*

AS+GG's Director of Supertall Technology interviews AS+GG Partner Adrian Smith about the impact that supertall buildings have on a city's identity, economy, ecological impact, and ultimately, its future.

Peter Weismantle: Adrian, you were given the opportunity to speak at the 2015 CTBUH Conference in New York City. Although Chicago created the skyscraper, New York is the first city that was defined by the skyscraper, more than 100 years ago. We are now in the second decade of the 21st century, what would be a relevant topic for your talk?

Adrian Smith: I would like to discuss the nature of cities and the tall building's role in city making. And actually beyond city

making, supertall towers have a relationship with the identity of a country as well. If you think about Dubai, the first building that really put Dubai on the map was the Burj Al-Arab. And that tower made an enormous impact on what is Dubai and where is it today – it gave the city an identity.

PW: It was on their license plates when we first came in 2003.

AS: And Burj Khalifa, for example, upped that. Today you have a city that has multiple landmark identities and multiple icons. I think that as it proceeds and it moves into one of the world-class cities, it's going to have more of those.

PW: Like New York City, which has several.

AS: Exactly, New York is a perfect example. There are some European cities that are good examples too, like Montmartre, the Eiffel Tower, the Champs-Élysées – which are admittedly smaller – but they were made almost exclusively as identity pieces. And that's really what the supertall towers are – identity pieces for cities – because you can house their functions for cheaper in smaller buildings.

PW: I think you proved that in your recent density study.

AS: I also think this discussion needs to show that the role of supertall buildings is unique in the sense that not only do they provide identity for a city, and sometimes a country, but they also provide identity for a particular district within a city.



PW: Can a supertall building, considering the present situation of the world economy, be profitable?

AS: Developers are now realizing that if they own the land around the tower, they will benefit from building the tower. In Chicago for example, you have Willis Tower and the John Hancock Tower that were developed by individuals but they didn't really reap the benefit of the development that occurred subsequently around those towers.

PW: Well they didn't own the land...

AS: Right, and if you go to those towers you will see that the density nodes of Chicago are surrounding those two buildings, and perhaps a third one in the loop. High-density towers tend to attract other density, which in turn creates value. Right now we're seeing in China and Dubai, and in other places, scenarios where the developer is building and looking at the entire vision, which is much larger than the tower itself. They will realistically make money on everything else except the tower, which they'll probably break even on in 10 years, because eventually these buildings do make money.

PW: How do developers make money on these buildings?

AS: By themselves supertall buildings do not generally make a great deal of money for their developers, but they do significantly increase the value of the land and buildings around them. This happened with the development around Burj Khalifa in Dubai. People occupying buildings around the Burj are paying significantly more for the views of the tower, which has made that overall development highly profitable for Emaar Properties in Dubai. Jin Mao Tower in Shanghai was a similar example. And if the developer of the Chicago Spire had owned the adjacent parcels of land, the Spire might have been built on that premise.



Opposite: Burj Al-Arab, Dubai. Source: Adrian Smith + Gordon Gill Architecture

Top: Willis Tower, Chicago. Source: Marshall Gerometta



PW: It is interesting that not only are the developers thinking about the value of the land around it but now they want to control the image of the tower itself – for souvenirs and knick-knacks, etc. – as a part of the intellectual property rights.

AS: Yes, that is right. Although that condition has existed ever since they built special identity features. The Eiffel Tower had many models and drawings and items that were produced of it and the same thing with many of the popular World's Fairs, and certainly the Empire State Building. That is another source of revenue that any developer or owner should not ignore.

PW: The appeal of supertall buildings goes beyond its profitability though... What are your thoughts on that?

AS: That's absolutely right. One of the main reasons to build a supertall building is to create a local, regional, or national landmark, bringing significant attention to its owner and location. The Petronas Towers in Malaysia is a great example of this approach. Petronas made little economic sense and sat two-thirds empty for several years after completion, but the worldwide attention it brought to Kuala Lumpur and to Petronas as an oil and gas company was very significant. It established Kuala Lumpur as a tourist destination and enhanced its reputation as a location for business. It also showcased the attractive lifestyle of this part of the world and bolstered its economy.

PW: How important is having a supertall tower in establishing a city as a global destination?

AS: I think it is very important. A supertall tower represents a meaningful step forward and a symbol of success and optimism for the future. It becomes a symbol of pride.

PW: I agree with that. The interesting thing that I see in Dubai is that people are proud of the Burj Khalifa – and before that Burj Al-Arab – they are really proud of it. Even if they may

Opposite: Jin Mao Tower, Shanghai. Source: Tansri Muliani
Bottom: Petronas Towers, Kuala Lumpur. Source: Adrian Smith +
Gordon Gill Architecture

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Top: Burj Khalifa and its surrounding landscape, Dubai.
Source: Adrian Smith + Gordon Gill Architecture

have had nothing to do with its conception. But it really is something that they point to with great pride.

AS: I think this is something that should be brought up more often. Whenever there is a public discussion about a tall or supertall building – especially if it's an expensive building – I read online the comments asking, “Why isn't this money being used for the poor?” or “Why isn't this money being used in some other way?” The next level of thinking here is, who is building these buildings? Who are the labor forces on these buildings? Who is maintaining them, who is operating them, who is benefiting from them? And if you look at the spectrum of society it runs the gamut from all the way up to the richest people down to the poorest people in terms of who is benefiting from the fact that these towers are being built. It takes people in factories to make exterior wall components that get put on the building. It takes people in factories to put the air conditioning units together that go into these buildings. These are jobs that get spread out around society at all levels – at all income levels. People aren't thinking about it in these terms.

PW: Buildings can be wealth generators, not just wealth sponges.

AS: And once they're up, the story doesn't end there because they have to be maintained; they have to be serviced. Hotels will generate huge employment bases for them. Residential and office spaces will too.

PW: I know there is controversy with globalization. While a building is being built materials systems are coming from around the world. But then after that, the operational long term, the lifetime of the building, is all local, it's all local.

AS: Well it is true that the supertall buildings really need to go more globally than locally to get their materials, especially if you're in a third-world situation. But I was talking with somebody from India recently and he was saying there are many buildings under construction there – glass factories, elevator factories, etc. – that will take care of the technical deficiencies that they have. Not only is the construction of a supertall tower and its surrounding complex spurring an economic development, but you are also spurring the development from within the



country with support structures that satisfy the new needs of that country.

PW: It all goes local eventually. First global, then local.

AS: Yes.

PW: Thinking of the global projects like Burj Khalifa and Jin Mao Tower, are there any challenges to working in distant countries? Is there a cultural learning curve that you have to go through?

AS: To the countries that are developing fast, such as China, India, the United Arab Emirates, and Saudi Arabia, it is very important to understand the culture that you are designing a building for. I believe that by connecting to that culture, we can strengthen its heritage and awaken new feelings of identity and connection within the society we're designing for.

PW: A region's culture can become a catalyst for growth?

AS: Yes, and it is exciting to see the growth and development of new cities because they

often start out with only a culture to rely on. Like with the Burj Khalifa, it was a completely empty site, and everything around it was empty. But we were greatly motivated by cultural influences like spiral imagery and the philosophy embedded in Middle Eastern iconographic architecture and motifs. In developing the initial concept for Burj Khalifa, I searched for elements within the existing context and culture of the area to reflect on and draw inspiration from. Within the Middle East and in Dubai, there are strong influences of onion domes and pointed arches, and patterns that are indigenous to the region, some of which are flower-like with three elements, some with six, and so on. The client definitely wanted Burj to be the world's tallest structure, but I was also attempting to create a building that would stand as a lasting landmark whose iconic status transcends the issue of height. In the finished tower, views of the Gulf and Dubai are maximized throughout the building through the use of this Y-shaped floor plan – and that further increases the value of the units. It's all tied together.

PW: Do you think that supertall towers are the future of cities?

AS: For some cities, yes. A supertall tower represents a meaningful step forward and a symbol of success and optimism for the future. I have also seen the pride in people's eyes when they're involved in creating, owning, building, and operating such grand edifices. We must always strive for greatness and find the means to attain it. If not, we will become irrelevant. And if cities don't continue to build and improve their conditions, they will die. When we lose the spirit to reach for glory, we lose our soul. A supertall tower can increase a city's chance for a productive future. People move to the city to build the tower, they move to the city to service the tower, they stay in communities that surround the tower, they create businesses to support the tower, and you can see the growth and the development of the city itself, not just the buildings. If a city gets to the point where Dubai is now, where it's seen as a safe haven, it's a great place to go for vacation for all of the European countries because none of them have any warmth in the wintertime. Sheik Mohammad wants to really create a world-class city: he wants Dubai to be important like New York, Tokyo, Hong Kong, or Shenzhen – and he wants it to be diversified. It takes all of these components to make a great city. I

Bottom: Hong Kong skyline. Source: Adrian Smith + Gordon Gill Architecture

Opposite: FKI Tower, Seoul. Source: Adrian Smith + Gordon Gill Architecture

think the visionary leaders are saying, “Build it right and they will come,” and Sheik Mohammad is proving that right now, at least over the last 10 years.

PW: What is your vision of a modern city and what is the impact of high-urban density and the use of tall buildings?

AS: Tall and supertall buildings will be a key part of the urban design solution to the challenges we face in the world today. High-density regions typically offer efficient vertical and horizontal transportation systems, encouraging the use of public transit and creating increasingly walkable cities.

PW: Are supertall buildings environmentally correct?

AS: I truly believe that supertall buildings are inherently sustainable, first and foremost because of the issue of land use. Simply put, supertall buildings foster the opposite of urban sprawl. Within a desert environment, urbanization is even more important, given the energy and efficiency loss of all systems associated with covering large stretches of land. Building enclosures are also reduced when a building is tall. Imagine a typical 250-meter tower with around 48 floors like FKI Tower. It obviously has one ground floor and one roof in addition to the four surrounding walls. If you split this building into 16 buildings of three floors, you will have to add 16 ground floors and 16 roofs where energy loads will be added. It’s pretty clear, when you think about it this way, that the energy efficiency of a supertall building

is superior to the equivalent number of low-rise buildings. And if you did build those 16 low-rise buildings, think of the additional land that would be paved over in the process, and the attendant infrastructure – roads, power grids, water and sewers, and so on – that would be necessary to service all of that sprawl. Particularly in terms of land use, building tall makes tremendous sense.

Tall and supertall buildings can also be formed to further decrease their environmental effect and become “super-sustainable.” These structures can take advantage of the faster wind speeds at higher altitudes and drive wind toward building-integrated turbines to generate power. Because they are less likely to have shadows cast on them, high-rises also make efficient use of photovoltaic



systems to absorb solar power. And deep foundations make them ideal for geothermal heating and radiant cooling systems.

Burj Khalifa is not widely credited for its array of sustainability features but the building's form and systems respond in a variety of calculated ways to perform optimally in its environmental context. In response to wind tunnel tests, for example, the tower's shape – particularly its setback pattern – was sculpted to shed the negative wind forces moving around the building. Other aspects of good practice and sustainability incorporated into the design include the fact that a station for the Dubai mass transit monorail is being incorporated into the development; there also will be a local trolley service along the Boulevard to serve the project. Burj Khalifa was the catalyst for these transit features, which will serve the entire city, to be built. The tower's high-performance window wall system, with thermally broken aluminum frames and insulating glass with selective coatings, provides a low shading coefficient while maximizing natural daylight and views. Intake of outside air at higher altitude takes advantage of temperature drop at higher elevations. Natural ventilation of spaces is utilized where possible. We used a site-wide grey water system for irrigation including recovered condensate. And the Burj is one of the first towers in the world to apply extensive stack effect mitigation strategies at the design stage.

PW: What is opinion about this kind of “race” to the top? Are we going to try to go higher and higher?



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Left: Burj Khalifa - perforated louvers at the exterior wall.
Source: Adrian Smith + Gordon Gill Architecture

Bottom: Kingdom Tower among the clouds. Source: Jeddah Economic Company/Adrian Smith + Gordon Gill Architecture

Opposite: Chicago Central Area DeCarbonization Plan.
Source: Adrian Smith + Gordon Gill Architecture



AS: I think so, because the needs of our fast-urbanizing world demands it. For instance, in Jeddah, Saudi Arabia they are replicating what Dubai did in the last decade with the world's next tallest tower, Kingdom Tower. Jeddah has enough land to support 20 million square feet of residential development, so Kingdom Tower will be the catalyst for this new development.

PW: Do you think Kingdom Tower marks a turning point for the future of architecture?

AS: I think it would be wildly immodest of me to say that. But I do think that cities around the world need to think about reining in suburban sprawl, and the best way to do that is by building vertically. In particular, we need new, more progressive thinking in terms of urban design. Even in recent years at AS+GG, we've been invited to be involved in projects in which the master planning for new developments and cities has been done in the same way that has caused major problems for the past half-century: lots of roads, big highways, transportation mainly in cars (as opposed to mass public transit). The master planners in these cases were not thinking about energy



or anything that's different from some of the worst-planned, most sprawling cities around the world. The mistakes of the last half of the 20th century are still being made. We think that the thinking has to change completely in ways that produce zero-energy, zero-waste, zero-carbon cities, or as close to that as possible.

PW: How would you do that in an existing city looking to become a future city?

AS: I'd look first at finding ways to retrofit existing buildings to make them more energy efficient and reduce their carbon emissions. I'd look at the urban matrix – creating the right mix of commercial and residential buildings, public amenities including retail, public parks and plazas, schools, cultural facilities, and other elements of a truly liveable city, where families want to live and raise their children, and where people live near their workplaces. I'd look very hard at public transit and the issue of walkability, with emphasis on above-ground and underground pedways that would be vital in extreme weather. I'd look at maximizing the potential of natural resources as public amenities. I would look at innovative ways to improve and streamline

waste management in the urban core. In our Chicago Central Area DeCarbonization Plan, a comprehensive vision for helping Chicago reach its energy and carbon reduction goals, we proposed re-using a pre-existing network of underground tunnels as a pneumatic waste disposal system, which would greatly reduce our reliance on garbage trucks. I would look at expanding opportunities for community engagement in the green agenda.

In terms of new buildings, I would be excited by the prospect of designing structures in a variety of typologies—including supertall and other tall buildings as well as mid- and low-rise buildings – that take into account their physical, cultural and environmental contexts. In the 45 years of my career, I've always tried to design buildings that reflect the art, indigenous architecture, building materials, and cultural history of the countries where they're located. I've also tried to render these influences in a highly contemporary idiom that takes advantage of the latest technological advances in computer-aided design and building materials. In later years I've developed the concept of global environmental contextualism, which relies on extensive environmental analysis and

passive energy-saving strategies, and also tries to maximize opportunities for onsite energy generation from renewable sources, including sun, wind, and geothermal energy. Good architecture is not about creating a signature style that you replicate over and over, all around the world. It's about learning what a particular site has to teach you.

PW: In summary...

AS: Supertall towers, when done correctly, are the catalyst for the city or district around them. They give an area an identity. They increase the local economy and connect that local community to the global one. If done right, a supertall tower will put a city on the map for tourism, increased business ventures, and increased future development.