

IMPORTING URBAN GIANTS: Re-Imaging Shanghai and Dubai with Skyscrapers

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Abstract

Shanghai and Dubai have recently marked a new epoch in the history of skyscrapers. Through the examination of these two cities, this paper attempts to identify the key driving forces for constructing skyscrapers in newly emerging global cities. The findings indicate that in addition to economic factors, globalization, political support, tourism, branding, openness to Western culture are the primary drivers that spurred the proliferation of skyscrapers in Shanghai and Dubai. While globalization has facilitated the spread of homogeneity and standardized architectural practices, it has also simultaneously pushed star architects to create unique architecture as exemplified by some of the iconic skyscrapers in Shanghai and Dubai. Moreover, these two cities are compared and criticized for using skyscrapers as a means to attain international stature and to enhance global imageability at the expense of environmental well-being and quality of life. The paper recommends embracing a “glocal” approach that strikes a balance between the local needs and global forces so that a distinct local identity is ensured while global forces are addressed.

Keywords: Globalization, architecture, skyscraper, place identity, culture.

INTRODUCTION

Overview

Today, skyscraper construction is a global phenomenon. For roughly 115 years America reigned supreme as the tallest nation in the world; however, recently, there has been a geographic shift of skyscrapers from Western to non-Western countries. In 1990, 80% of the 100 tallest skyscrapers in the world were built in North America; by 2010, however, about 80% of the tallest were built elsewhere. An aggressive race to earn the world’s tallest building title continues, while at the same time, cities are constructing higher buildings in greater numbers (see Figure 1), (Al-Kodmany and Ali, 2013; Wood, 2011).

The goal of this paper is to establish a better understanding of the forces that shape recent vertical developments in non-Western countries. It examines Shanghai and Dubai because they have recently been among the most active places in constructing skyscrapers and other large-scale projects. The paper attempts to provide an extensive account of the cultural, political, and socio-economic factors that led to vertical developments and tries to answer important questions of why and how predominantly low-rise cities have suddenly become the home of skyscrapers. This analytical discourse is intended to facilitate a better understanding of the skyscraper phenomenon in the 21st century city, so that lessons learned from Shanghai and Dubai will benefit other global cities.

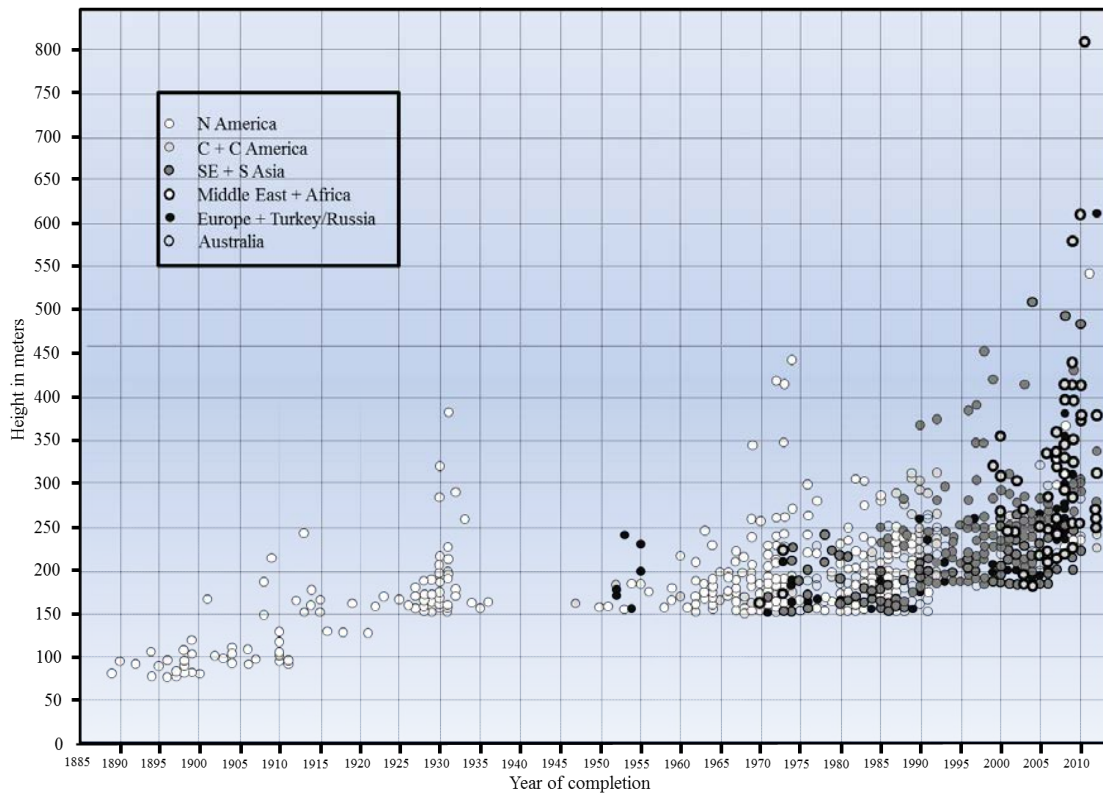


Figure 1: Tendency to build higher and in greater numbers in the past two decades, 1990-2010. An exponential rise in height can be seen since 1990 culminating in the dramatic climb in 2010 with the construction of Burj Khalifa, Dubai. (Graph by K. Al-Kodmany; adopted from Skyscrapercity.com).

Globalization processes have a myriad of tangible and intangible dimensions that influence the proliferation of skyscrapers. Globalization has created a new dynamic that includes openness to the “outside world” particularly to the Western culture. Other consequences of globalization have been the accumulation of wealth, the demonstration of skyscrapers as symbols of prosperity, and global tourism and political views that consider skyscrapers as a means for promoting places. The tallest skyscrapers in Dubai should be understood as part of the city’s ambition to create an image of progress and dynamism where the fastest, biggest, most amazing structures are being built to attract the affluent and the talented. This ambition is essential to the consolidation of the successful Dubai brand, epitomized through the world’s tallest tower, Burj Khalifa (“Burj” means tower in Arabic). Similarly, Shanghai wanted to quickly attain global status and communicate to the world its economic prosperity, industrial advancement, and scientific advancement. The underlying force behind the boom in skyscrapers is a national pride in China regaining its status as a great world power and the expectation of international recognition.

With an exploding population migrating from rural areas to large cities, particularly in Asia, problems of residential and commercial/mercantile accommodation and city services continue to magnify. As many Asian cities are experiencing a population explosion and economic expansion, the unprecedentedly rapid increase in the urban scale in the early 21st century has caused the creation of megacities (cities with a population of 10 million or more). A dilemma that faces urban designers and planners of all newly emerging Asian high-rise cities is to come up with a new model of development; that is, how to move away from established Western models and establish new Eastern models of urban growth, or combine Western models with past historical and evolving Eastern models. In the East today, giant skyscrapers of gargantuan dimension and

flamboyant form are challenging conventional rules of construction and theories of traditional architecture that were “imported” from the West (Stiglitz, 2002; Yan, et al. 2009).

Globalization of Architecture

Globalization represents a web of social, political and economic changes that affect everything in our life and almost all disciplines of knowledge. As summarized by Jürgen Habermas: “By ‘globalization’ is meant the cumulative processes of a worldwide expansion of trade and production, commodity and financial markets, fashions, the media and computer programs, news and communications networks, transportation systems and flows of migration, the risks engendered by large-scale technology, environmental damage and epidemics, as well as organized crime and terrorism” (Habermas, 2006, p. 175). The intensification of worldwide social relations has created an interesting dynamic between the local and global spheres. Indeed, the phenomenon that “local happenings are shaped by events occurring many miles away and vice versa” is prevailing so that both “thinking globally and acting locally” and “thinking locally and acting globally” are promoted as strategies to solve worldwide problems (Giddens, 1991, p64).

Some researchers consider globalization to be ‘high-modernity’ (Abbinnett, 2003) and the realization of the ideals of the Western Enlightenment, while others believe it to be a new phenomenon of equal but different significance from the Western Enlightenment (Albrow, 1996; Dor, 2004). At this stage, however, it is a new world order clearly dominated by North-Atlantic Western culture and the most evident outcome has been the spread of products and corporations including skyscrapers. The effect is described by Helena Norberg-Hodge as:

“Western consumer conformity is descending on the less industrialized parts of the world like an avalanche. ‘Development’ brings tourism, Western films and products and, more recently, satellite television to the remotest corners of the Earth. All provide overwhelming images of luxury and power. Advertisers make it clear that Westernized fashion accessories equal sophistication and ‘cool’. In diverse ‘developing’ nations around the world, people are induced to meet their needs not through their community or local economy, but by trying to ‘buy in’ to the global market” (Norberg-Hodge, 1999, p195).

In the same vein, architecture has also been globalized. Globalized commercial architecture has developed a symbiotic relationship with a new breed of global star architects. As cities, more than nations, now compete to attract global investment and global tourism, they seek brand differentiation and symbolic modernity. The commissioning of extra-ordinary public buildings by star architects is now an established marketing technique. The names are familiar and include Frank Gehry, Daniel Libeskind, Jean Nouvel, Rem Koolhaas, Norman Foster, Santiago Calatrava, Renzo Piano, and Adrian Smith. Cities’ competitive marketing of these buildings has set up an upward demand spiral. However, these architects’ work is often conceptual displaying their personal creative artistry, and they often overlook the fine grain of culture, identity, or locality unless specifically requested by their clients. Because the goal is to create a global building with fluid and futuristic form that represents the “signature” characteristics of the star architect, local distinctiveness is lost in the process.

The proliferation of skyscrapers in many cities both reflects the globalization of architecture and further perpetuates globalization by serving a population of globally connected businesses and individuals. Skyscrapers are home to many international companies’ headquarters, banks, world trade centers, five-star hotels, shopping malls, brand-name stores, boutiques, restaurants, fitness centers, and multi-screen cinemas. Increasingly, global multifunctional skyscrapers cater to the market needs and functional agendas of international business and industry, the corporate worlds of finance, manufacturing, retailing, travel and hospitality, recreation, and entertainment. In contrast, other urban building types are relatively less impacted by globalization because they are built by, and primarily serve, citizens of local communities.

Because of their sheer size, skyscrapers are visible and dominant elements in the urban landscape. Moreover, they are often designed by renowned architects who increasingly push design boundaries. Cities' competitive marketing of skyscrapers has increased demand and resulted in new skyscraper designs that embrace unprecedented forms of spiral or twisted, tilted, leaning, or chorographical syntactic composition.

Globalization has supported the exportation of exotic design and construction of many buildings including skyscrapers. Today, many state-of-the-art building materials—glass, aluminum, stainless steel, copper, titanium, natural stone—used to clad and finish buildings are readily available throughout the world. It is no longer unusual, for example, to find a building in Dubai with a sophisticated glass and metal curtain wall manufactured in England or Germany and, in its lobby, granite and marble veneers imported from Italy or Spain. While this once would have been considered prohibitively expensive, global shipping of goods and services for building construction has become routine, fast and affordable. In addition, translational graphic and design communication is now possible through digital and mobile technologies that render expert skyscraper design and construction -- usually from the West -- readily transferrable.

A TALE OF TWO CITIES

Although this paper is focused on Shanghai and Dubai -- the two skyscraper cities, a broader view of what is happening in the regions where these cities are located is appropriate. Both these regions have remarkably come a long way since the 1990s in terms of skyscraper construction.

The Larger Context: East Asia and the Middle East

The global skyscraper now has a stronghold in many Asian cities, particularly in the Pacific Rim countries and the Middle East, which together contain more than two-thirds of the world's 100 tallest buildings. More skyscrapers are being constructed, and some to greater heights, in Asia today than in America, Europe, and Australia combined.

China is leading skyscraper construction, building a skyscraper every five days in the coming three years (Wood, 2011). The construction boom in China is unprecedented by any account in the entire world history of building construction. With only 10 skyscrapers from 1929 until 1945, China was a non-factor in any skyscraper discourse. Today, however, China has exceeded the U.S. in the number of skyscrapers that it contains. The country now accounts for 53% of the world's skyscrapers that are under construction. There are currently 259 skyscrapers (buildings over 150m/492 ft) under construction in China, more than any other single country. Nine of the tallest 20 buildings under construction are located in China, three times more than any other country. China now plans to build the tallest skyscraper, Sky City, in Changsha that will be a 220-story structure standing at 2,749ft (838m). It will house 17,400 people and also boast hotels, hospitals, schools, office space and 104 high-speed lifts. However, according to the Council on Tall Building and Urban Habitat (CTBUH) data, China's global percentage of building completions has begun to drop off slightly. In 2009, China contained 45% of the skyscrapers completed and 26% in 2011. One reason for the recent slowdown is the central government's safety and overbuilding concerns (Wood, 2011). Some newly built cities in China have already turned into ghost cities as people do not want to move there even though the residential high-rise building units have been bought by speculative investors. These are ominous indications that the construction glut has resulted in a housing bubble that will likely burst in the near future. This is making many prominent builders nervous.

In the Middle East, in addition to Dubai, Dubai's sister Emirate, Abu Dhabi, Doha in Qatar, Kuwait City in Kuwait, Manama in Bahrain, and Mecca, Jeddah, and Riyadh in Saudi Arabia are investing in skyscrapers. The intensity of skyscraper construction and the height of the buildings are changing the face of many of these cities (Al-Kodmany and Ali, 2013). The oil rich Middle Eastern countries like the United Arab Emirates (UAE), Saudi Arabia, and Qatar have been building tall towers in their cities as well. Abu Dhabi, Dubai, Doha, Mecca, Jeddah, and Riyadh are some of the cities constructing skyscrapers, with Dubai leading the list. In Mecca, Saudi

Arabia, the 601-m (1,972-ft) megatall (exceeding 600m tall) Abraj Al-Bait Towers Complex across and overlooking the site of Islam's holiest shrine, the Kaaba, has recently been completed. It has a large elevated clock, a seven-star hotel, an enormous prayer area, and shopping mall, and is the tallest building in Saudi Arabia, and has the largest floor area of any building in the world, at about 1.5 million square meters (16 million square feet). The project has been criticized for destroying the historic character of the holy city and the sanctity of the holy site containing the Grand Mosque and the Kaaba in order to make room for the rich. Architect Norman Foster explains in the Economist: "The Royal Clock Tower in Mecca ... dominates the Kaaba with such crassness that the thought must occur, even to a non-believer, that the building is an abuse of Islam more egregious than any burning of the Koran" (Ledgard, 2013). At this writing, construction of the 1,000m (3,281 ft) high Kingdom Tower in Jeddah has recently been approved by the Saudi authorities. When built, it will be the tallest building in the world surpassing the height of the Burj Khalifa. Doha, Qatar -- another skyscraper city -- has seen unprecedented growth in tall buildings, including the Burj Qatar, a supertall building rising 231m (760 ft), the 300m (984 ft) Aspire Tower, the tallest building in Doha at present, and the unfinished Doha Tower, rising 550m (1805 ft). If built, it will be the tallest in Qatar (Al-Kodmany and Ali, 2013).

Interestingly, Dubai and Shanghai rank close to each other in the number of tallest buildings in their cities. According to the Emporis world-wide skyscraper database, which defines skyscrapers as buildings over 100 meters, Dubai ranks as the fifth city in the world for number of skyscrapers (238 skyscrapers) while Shanghai ranks sixth (229 skyscrapers). According to the CTBUH, Dubai ranks third in terms of number of skyscrapers higher than 150 meters, while Shanghai ranks fourth (153 in Dubai; 130 in Shanghai). Dubai currently hosts the world's tallest building, Burj Khalifa (completed in 2010); and Shanghai will soon have the world's second tallest building, Shanghai Tower (to be completed in 2014), (Wood, 2011).

SHANGHAI

The coastal city of Shanghai, now a major skyscraper city with the largest urban population in China, is located at the mouth of the Yangtze River. As of 2010, the city has reached a population of over 22 million. With the open door policy of 1978, the city experienced a commercial revival and took great strides towards building itself into a megalopolis. As the city grew into a major trading hub, the foundation for banking services was laid. Shanghai physically and economically transformed from a monumental relic of colonial ambition into one of the most aggressive international mercantile cities in the world in the span of two decades. Shanghai has increasingly become the new center of Asian finance together with existing centers of Hong Kong, Singapore, and Tokyo.

Shanghai's physical transformation began in 1990 when the Pudong area, to the east of the Huangpu River, was designated as one of China's Special Economic Zones with tax incentives and exemptions to entice foreign direct investment. By the end of 2010, 149 countries and districts (Hong Kong, Macau and Taiwan) had invested in Shanghai; 305 cross-national corporations and 213 international investment bank and companies had established their headquarters in the city. In 2010, \$15.1 billion Foreign Direct Investments (FDIs) were invested in Shanghai (Zhang 2007b).

Plans for improved infrastructure and new high-rise development accelerated after China's leadership made the reconstructing of Shanghai a key policy by which to lead the nation into the new century. After economic reforms in 1979, the city underwent a construction boom. During 1991-1996, international bidding projects amounted to about 40% of the total design projects in Shanghai. Since the turn of the 21st Century, Shanghai has become an international laboratory for experimental architecture and urban design, particularly in the Pudong district. Shanghai is now home to 16 skyscrapers taller than 250m (820 ft), with Dubai being the only city in the world to have more (Wood, 2011). With money pouring continuously into new urban development projects, the skyline is constantly changing.

In sum, the history of Shanghai has closely echoed that of China itself. Shanghai has always played a special role in history because of its strategic location, outside influence, and its

cosmopolitan community. Therefore, Shanghai has been regarded as the key to understanding the progression of skyscrapers and the architectural history of China.

Shanghai: Case Studies

Shanghai Tower

Shanghai Tower (also called Shanghai Center) is under construction in the Pudong District and was designed by Gensler and engineered by Thornton Tomasetti who worked with the Architectural Design and Research Institute of Tongji University, Shanghai. When completed in 2014, it will be the tallest building in China, rising to 632m (2,074 ft) and having 121 stories; and the second tallest in the world, next to Burj Khalifa in Dubai. Shanghai Tower is a multi-use building comprised of offices, hotel, retail, sky gardens, public space, etc. The tower will have a twisting curtain wall that will be rotated approximately one degree at each floor around stacked floor plates. Nine indoor zones provide public space for visitors, including an atrium featuring gardens, cafes, restaurants, retail space, and panoramic views of the city. This new tower will undoubtedly be a new icon on Shanghai's skyline. It will anchor the Lujiazui area and will become one of the foremost commercial destinations of the world. The tower sits next to two important and ultra-tall skyscrapers: the Shanghai World Financial Center and Jin Mao Tower (see Figure 2), (Xia, et al., 2010).



Figure 2: Shanghai Tower, currently under construction. When completed in 2014, it will be the tallest in China and second tallest in the world after Burj Khalifa. Consistent with the present trend for skyscrapers, the tower has “out-of-the-box” form. Its spiraling shape with a curved façade heralds the emergence of China as an economic powerhouse. Left of Shanghai Tower we see Jin Mao Tower and Shanghai World Financial Center respectively. (Photograph and sketch by K. Al-Kodmany).

Shanghai World Financial Center

Designed by Kohn Pedersen Fox (KPF) and East China Architectural Design & Research Institute Co. Ltd, the construction of this multi-use tower began in 1997. Due to a series of problems in the midst of the Asian financial crisis, construction was delayed and finally this super-

skyscraper was completed in 2008. In 1994 it was conceived as the tallest building in the world, symbolizing China's economic prosperity. The building is 492m (1,614 ft) tall and has 101 floors. The skyscraper consists of offices, conference rooms, and shopping malls on the lower floors, the luxurious Park Hyatt Shanghai hotel on upper floors, and restaurants around the large aperture near the top. The form of the tower represents an elegant "singular object," looking like a sculpture with playful geometry. Its glass and steel façade emphasizes its monolithic simplicity without any architectural or decorative elements. The building terminates with a trapezoidal opening, which improves the aerodynamic performance of the tower and adds to the iconic character. The Council on Tall Buildings and the Urban Habitat has named the Shanghai World Financial Center the "Best Tall Building Overall" in 2008 (Lepik, 2008).

Jin Mao Tower

Jin Mao Tower, rising 421m (1,380 ft) was completed in 1999. Designed by SOM, this tower is a multi-use development incorporating office, hotel, retail, service amenities, and parking; and is also known as a culturally sensitive building. Together with the Petronas Towers in Kuala Lumpur and Taipei 101 in Taipei, it is part of a series of supertall skyscrapers that shot up in Asia in rapid succession around the turn of the century. The Jin Mao Tower has many parallels to Taipei 101 but none as apparent as its architectural style - oriental revivalism. In the Chinese culture the number "eight" is considered to be a number that represents luck, wealth, and prosperity and Jin Mao represents this in the number of floors—88. Jin Mao continues to pull from the local culture in its stunning reversal of historic pagoda forms throughout the height of the tower. The base of the tower is six stories tall holding yet more uses: hotel function areas, a conference and exhibition center, a cinema auditorium, and a 20,749 m² (226,000 sq ft) retail Galleria. The top of the tower consists of a crown-like steel pinnacle, reminiscent of the Art Deco style. The Jin Mao Tower is a new architectural symbol of China and has set a new standard for skyscrapers in the Far East. It is recognized as one of the two best architecture design projects in mainland China—the other is Xianshan Hotel in Beijing by I.M. Pei (Beedle, et al., 2007) as both demonstrate a successful combination of modern and vernacular spirits.

DUBAI

Dubai, one of the seven emirates of the United Arab Emirates (UAE), is located south of the Persian Gulf coast on the Arabian Peninsula. In the early 1990s, Dubai was a small town of only 9 km² (3.5 sq mi). Today, Dubai is more than 10 times that size and has many innovative skyscraper developments.

Four growth periods have been identified in Dubai (Ali, 2010; Beedle, et al., 2007). These are: 1) *Slow* (1900-1955), i.e., a period of limited expansion; 2) *Compact* (1956-1970), i.e., based on a master plan consisting of road systems, zoning, and the creation of the largest harbor at Jebel Ali; 3) *Suburban* (1971-1980), i.e., an ambitious plan allowing for ring roads around the city, radial street networks to suburbs, and construction of the Shindagha Tunnel; and, 4) *Rapid* (1981-Present), i. e., a large-scale urban expansion and mega scale projects including major skyscrapers. During the last phase, in the early 1990s, the ruler of Dubai developed a new guide for economic and urban development -- the Strategic Plan of 1993-2012. The plan was completed in 2005, and another Dubai Strategic Plan of 2015 was formulated, propelled by visionary leadership, high quality infrastructure development, zero tax on personal and corporate income, and an immigrant-friendly cosmopolitan environment.

Dubai emphasized the creation of a world class built environment consisting of remarkable skyscrapers, shopping malls, hotels, and tourist destinations. However, the effects of the global economic recession were felt in 2009, when real estate prices dropped 40% in just six months. A few ultra-tall tower projects, including the 1,000-m (3,280-ft) tall Nakheel Tower, were put on hold. Dubai also failed to pay close attention to its infrastructure, particularly its transportation system, to keep pace with the large-scale construction of mega-projects. As a result, problems with physical connections among these projects began to emerge. The government is addressing this by creating new infrastructure (the Dubai Metro, bridges and

flyovers, etc.) to reduce traffic congestion (Acuto, 2010). Despite this, four of the six tallest buildings were completed in Dubai in 2012 including the world's tallest hotel, the 355-m (1,165-ft) tall JW Marriott Marquis.

Dubai: Case Studies

Burj Al Arab

This luxury hotel building, located in Dubai's Jumeirah Beach strip, is the city's earliest and most recognizable landmark. The tower, a unique forerunner of skyscrapers in Saudi Arabia, is 321m (1,053 ft) tall and has 60 floors. It was completed in 1999 and stands offshore on an artificial island linked to the mainland by a private bridge. It drew world attention to Dubai when it was built. The tower's form resembles the sail of a *dhow*, a typical Arabian ship. While the exterior has a modern aesthetic, the interior is a lavish collection of luxurious architectural styles of both the East and the West with 22-carat gold leaf and 30 different expensive marbles. A fountain in the lobby area creates a three-dimensional Islamic star pattern and the pointed arch forms throughout the building's interior recall the Islamic architectural style. Structurally, the tower has two wings spread out in a V-form creating a vast mast. The space between them contains a mammoth 180m- (590 ft-) high atrium, the tallest in the world. To protect it from the harsh desert elements of heat, wind, and sand, it has employed materials such as Teflon-coated fiberglass and Dyneon coated with DuPont Teflon. The "all too evident symbolism places the building very much in the vicinity of the 'theme architecture' of Las Vegas," (Lepik, 2008, p. 129), (see Figure 3).

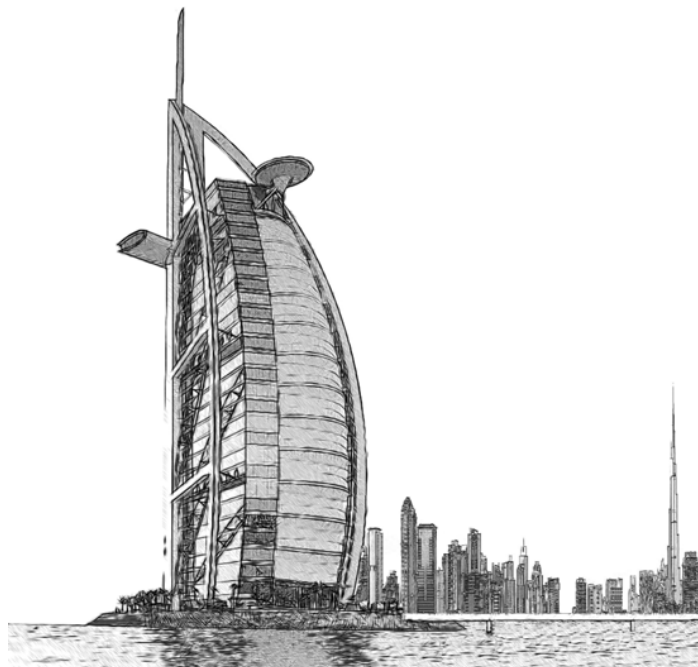


Figure 3: Burj Al Arab, Dubai, a *dhow* (a sailboat in the Persian Gulf)-shaped spectacular luxury hotel. It stands on an artificial island 300m (985 ft) from the coast and is connected to the mainland by a private bridge. Its urban design concept was modeled after the Concord Pacific in British Columbia, Canada. (Sketch by K. Al-Kodmany).

Burj Khalifa

The tallest building of the world, Burj Khalifa was designed by SOM with Adrian Smith acting as chief architect and Bill Baker as chief structural engineer. Its height is 828m (2,717 ft) with 160 floors. The construction of this mega-tower, whose original name was Burj Dubai, started in 2004 and was completed in 2010. The global financial crisis caused Dubai to borrow money from oil-

rich Abu Dhabi to complete the project. Therefore, the tower was renamed to honor the ruler of UAE for his support of the project. The tower's construction was rooted in the government's efforts to draw international attention and foreign investment. The tower was designed as a centerpiece of a large mixed-use development that would include 30,000 homes, 9 hotels, 19 residential towers, the Dubai Mall, 3 ha (7.5 acres) of parkland, and a 12-ha (30-acre) man-made Burj Khalifa Lake. The tower is made of three wings forming a Y-shaped floor plan around a central plan. The three wings act as buttresses and offer panoramic views of the surroundings, including the Persian Gulf. The exterior cladding system was designed to withstand Dubai's extreme summer and consists of reflective glazing, aluminum, and textured stainless steel spandrel panels with vertical fins (Smith, 2007). After a lightning strike in December 2012, the tower was fitted with a 4,000 ton steel spire designed to protect it from lightning (see Figure 4).



Figure 4: Burj Khalifa, Dubai, the world's tallest building. (Courtesy: Adrian Smith + Gordon Gills Architecture; photograph by J. Steinkamp).

FACTORS LEADING TO SKYSCRAPER CONSTRUCTION BOOMS: A CRITICAL COMPARISON OF SHANGHAI AND DUBAI

What are the common threads that led to the development of Shanghai and Dubai as major skyscraper cities? The following discourse explains that a complex web of cultural, political and economic factors at the local and global scales spurred their development.

Global Aspirations and Market Considerations

Shanghai and Dubai have attracted firms and businesses from all over the world, which has resulted in high demand for prime real estate. Dubai's efforts to become an international trade hub started a few decades ago when the previous ruler Sheikh Maktoum bin Rashid Al-Maktoum realized that Dubai had a limited supply of oil and gas reserves. Today, Dubai's economy no longer relies solely on oil, and the share of non-oil GDP exceeds 92% of the total GDP and is rising (Al-Kodmany and Ali, 2013).

Trading activities, the opening up of the market, and the acceptance of foreign ownership of property in Dubai have resulted in an excessive demand for property (Bradley, et al., 2002). Competition for space and agglomeration of socio-economic activities increased property prices. Land prices have always been a principal driver for constructing skyscrapers. This view has been supported by Carol Willis and Cass Gilbert (prominent American Architect, 1859-1934) who explained: "a skyscraper is a machine that makes the land pay" (Willis, 1995, p.63). In Dubai, international investors have driven up the demand for property, which paved the way for vertical development.

Similarly, Shanghai aimed to function as a global finance and trade center (Zhang, 2007a, p. 114). Martona and Wub 2006, p. 16, explained that China aimed to revive Shanghai as "an international economic, trading, financing and shipping center." Shanghai intended to serve as the "dragon's head," leading the development of other cities along the Yangzi River (Zhang, 2007b, p. 12). Indeed, the city has been aggressively seeking multinational investments, corporations, and a flowering of the arts (Martona and Wub, 2006). During the 1990s, more than 2,600 financial institutions, including 51 foreign banks and financial companies, and 163 representative offices, have opened for business in Shanghai. In just a decade, Shanghai attracted more than half of the world's 500 top transnational corporations to open branches. From 1990 to 2000, a total of USD 45.423 billion, for 22,270 projects, was invested in Shanghai (Zhang, 2007b, p. 14). Hundreds of manufacturing bases have been constructed for multinational corporations. These activities have created demand for property in key locations, caused increased property prices, and thus vertical expansion.

Urban Symbols, Place Identity, and Re-Imaging

Cities use skyscrapers to boost their development and global prominence. Skyscrapers are urban symbols that "capture the public's imagination through novelty and sheer size," (Al-Kodmay and Ali, p. 188); and they play a key role in making a city known. Brandon Moor, 2006, p. 123, explained that the pride and enthusiasm felt by Americans for their skyscrapers has transcended time, and place, and has taken hold in the rest of the world. Both Shanghai and Dubai used skyscrapers to improve their imageability. Dubai was an unrecognized city but by constantly building tall, taller, and the tallest, Dubai rose to fame quickly, and came to be perceived as a major global city. Similarly, "Because of its brightly illuminated skyscrapers, Shanghai enjoys international fame as the "Pearl of the Orient" (Hsu, et al., 2009, 1227).

Shanghai views skyscrapers as a means to remake its image and revive its glorious past (Wua and Mab, 2006). In the early 20th century, Shanghai was a global city of majestic economic and industrial power center referred to as the "Paris of the East," "the bright pearl of the Orient," and "the paradise for adventures." The new landscape, replete with skyscrapers, is a manifestation of the renewed commitment to restore Shanghai's glorious past (Wu, 2000, 168).

In a similar vein, Dubai wanted to revive its magnificent history. When Mohamed Ali Alabbar, Chairman of EMAAR Properties, was asked why Dubai is building the "tallest," he

explained that recently the Middle East has been a source of “bad news,” and that Dubai’s exciting projects, including the tallest building, are meant to counter that image by bringing “good news.” In this regard, the developers stated (EMAAR, 2006):

The goal of Burj Dubai [Khalifa] is not simply to be the world’s highest building. It’s to embody the world’s highest aspirations. Burj Dubai [Khalifa] looks different depending on where you’re standing. For those living nearby, it is a shining accomplishment – tangible proof of Dubai’s central role in a growing world. For those standing in other global capitals, it is a shining symbol – an icon of the new Middle East: prosperous, dynamic, and successful. In fact, Burj Dubai [Khalifa] is both. It is a fact – an unprecedented example of international cooperation – and a symbol – a beacon of progress for the entire world.

Tourism

Dubai’s “one-of-a-kind” strategy is to lure tourists and garner international interest by building tall. Indeed, Dubai built many of the “biggest” and “best” projects that the contemporary world has known. It built the world’s largest mall, the Mall of Arabia, covering over 465 million sq m (5 billion sq ft)--it is the most visited tourist destination worldwide (Yeoman, 2008). The city also built the world’s largest manmade islands with hundreds of kilometers of waterfront. Dubai is the first to build a 7-star hotel, Burj Al Arab; and plans to build a 10-star underwater hotel, the Hydropolis. It also built the world’s largest indoor ski resort.

Tallest buildings with key design features make them more attractive. For example, Jin Mao boasts the world’s highest hotel lobby; the Burj Al Arab hotel brags that its atrium is the world’s tallest. Shanghai World Finance Center incorporates the highest enclosed observation deck; meanwhile, Shanghai Tower will incorporate the highest outdoor observation deck. Burj Khalifa hosts the world’s highest restaurant. These places usually provide exceptional and enjoyable panoramic views of the city during day and night times, and consequently make skyscrapers more attractive.

Shanghai aimed to attract tourists by building spectacular urban infrastructure projects, including the new Shanghai Pudong International Airport, the Metro System (one of the world’s largest), the pedestrian tunnel across the Huangpu River, and a 100m (328 ft) wide Millennium Boulevard threading more than 100 skyscrapers in Pudong (Wu, 2000, p. 356). Also, Shanghai attracts tourists by providing quality amenities and hotels, upscale shopping services, and cultural facilities, including the Shanghai Museum, the Shanghai Grand Theatre, and the Shanghai Library. Another example of the importance of tourism in Shanghai is the Lujiazui Finance and Trade Zone. Within a ring of high-rise (50- to 60-story) skyscrapers, 3.7 million sq m (40 million sq ft) of luxury housing and 4.6 million sq m (50 million sq ft) of hotel space have been constructed (Li and Wu, 2006, p. 253). In 2010, Shanghai hosted the 2010 World Expo, which attracted over 74 million visitors, the largest and most popular in Expo history.

Politicians and City Planners

A pro-skyscraper ideology is a response to the global pressures on governments to embrace a “place promotion” strategy (Wu, 2000). Xia, et al., 2010 explain that city officials and planners may find skyscrapers useful vehicles to convey that their cities are changing their status from a “Third World” country to a “First World” country.

In Shanghai, political leaders realized that skyscrapers are great place promoters. In this regard, Kris Olds (1997, p. 116) wrote:

Shanghai Urban Planning and Design Institute (SUPDI) also realized that the CBD needed to act as “an important symbol and image of the results of reform” and the ‘successes’ of the New Open Door Policy. The most appropriate method to express the goals and successes of the reform era, in their minds, was through the emergence of gleaming skyscrapers with striking downtown skylines.

Many second tier Chinese cities have joined the Shanghai-Beijing led skyscraper movement. The Chicago-based firm of Adrian Smith + Gordon Gill Architecture has completed the design of Wuhan Greenland Center, a 119-story, 606-meter tall mixed-use tower in Wuhan at middle China (see Figure 5).

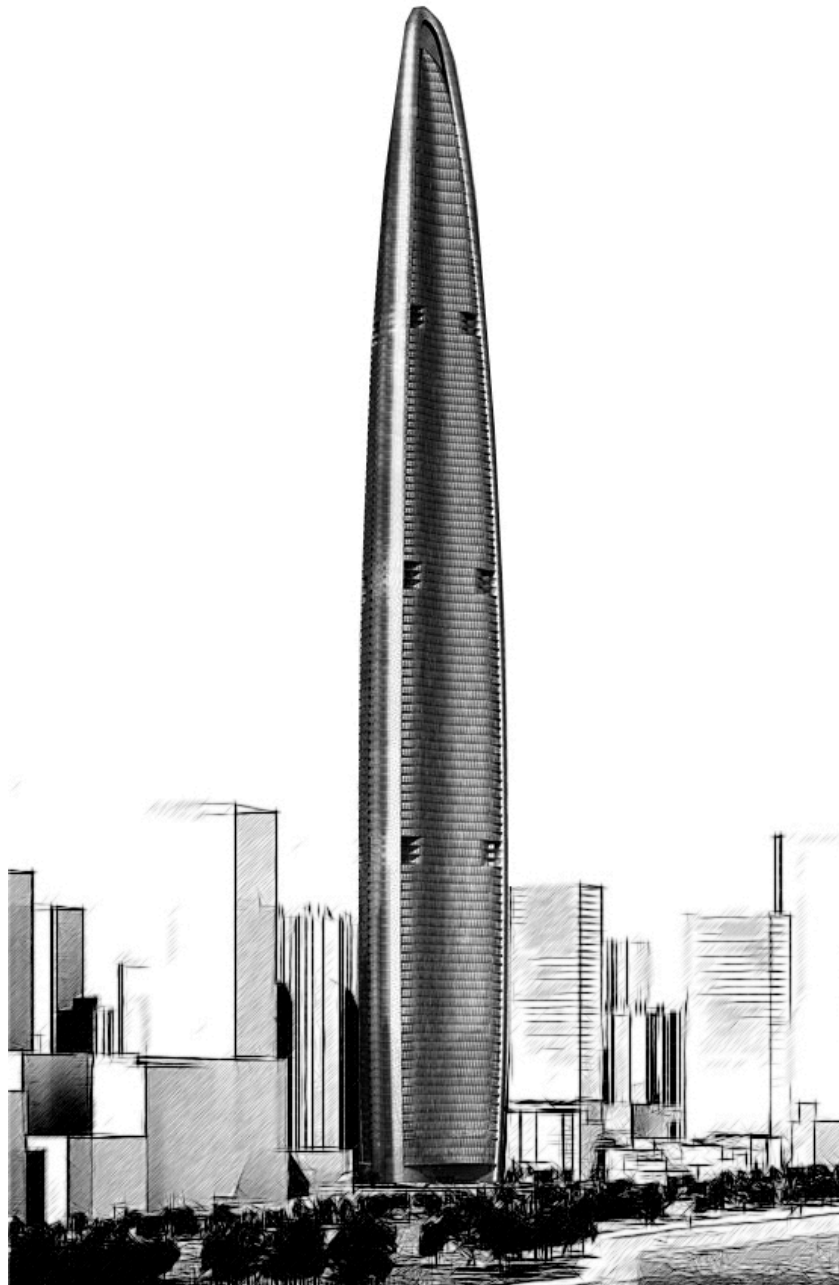


Figure 5: The proposed 119-story Wuhan Greenland Center in Wuhan, China by A. Smith. Its tripod-like base and tapered sides with rounded corners make an extremely efficient, aerodynamic profile that will reduce wind loading, thereby reducing the amount of structural material required for construction. (Sketch by K. Al-Kodmany)

G. Lin, 2003, p. 151, explains that municipal Chinese governments have all shown a firm commitment to 'place promotion' and invested heavily in the urban infrastructure to build ring

roads, subway systems, pedestrian shopping streets (*buxingjie*), convention centers, and most importantly, new CBDs with skyscrapers. City-planners also view the skyscraper as the architectural form that ensures that city's succeed in the competition for global attention (Olds, 1997, p. 386).

Skyscrapers promote a place even before construction. F. Wu, 2000, illustrated the practice of place promotion with Internet materials that show Shanghai as a booming international city. The promotional materials were published in multiple languages targeting overseas developers and facilitating the commodification of place (Wu, 2000, p. 349). In addition, the Pudong New Area Administration Committee published *Shanghai Pudong New Area Handbook*, projecting the image of several dozens of iconic skyscrapers. Extensive advertisement and the projected modern image of new Shanghai have proved to attract overseas developers and investors (Croll, 2006; Lee, 1999).

The governments of Shanghai and Dubai provided incentives for global investors to support skyscrapers. These incentives included tax exemptions, one-stop services, shortened approval times, and lower charges on foreign investments. F. Wu, 2000, p. 356, explains that the Shanghai Municipal Government's website shows how speedily the government is dealing with potential investors. The website provides detailed information on how to apply for a visa or for the entry of private/chartered planes, and more. Many of the major projects and the overall urbanization of Dubai are also attributed to the vision and political support of rulers Sheikh Maktoum bin Rashid Al-Maktoum, and Sheikh Mohammed bin Rashid Al-Maktoum (2006 to present). Specifically, Sheikh Mohammad supported building Burj Khalifa in order to put Dubai on the world map (Acuto, 2010). Despite its dwindling oil resources and its lack of demand for increased density, such a vision was actualized because of the strong influence and backing of its ruler.

Openness to Western Culture

Both the cities of Shanghai and Dubai opened their doors widely to the West. Shanghai is one of China's cities most influenced by the Western culture, and similarly Dubai is one of the most westernized cities in the Middle East. Both Shanghai and Dubai exhibit and cater to Western culture through television programs, commodities, restaurants, international schools, malls, nightclubs, museums, recreational facilities, and sports such as golfing and skiing. They also embrace the English language in business, major newspapers, and TV programs. Western influence is present in the logos of multinational products such as Coca-Cola, Pepsi, 7Up, Visa, McDonalds, Subway, KFC, and the like. These Western images and amenities have welcomed international developers and investors to conduct many projects including skyscrapers. Acceptance of Western culture was also manifested in the invitation of elite Western design professionals to counsel on development projects such as Lujiazui (Olds, 1997, p. 118).

Wealth Accumulation

Because they are costly, constructing skyscrapers hinges on the availability of financial resources. Both Shanghai and Dubai have accumulated considerable wealth in the past two decades. Dubai sponsored large-scale developments including skyscrapers through oil wealth, trade and tourism. Similarly, the economic well-being of Shanghai has helped in sponsoring expensive projects including skyscrapers. Shanghai has become among the world's largest exporters, a leading world manufacturer, and a global economic hub. Shanghai's per capita GDP was \$12,075.23 in 2011, but much higher than China's average \$5,563; even back to 2002, its per capita GDP was already 4.1 times higher than China's average (China Statistical Yearbook, 2012). The accumulation of wealth has allowed for expensive skyscraper construction in Shanghai and Dubai.

DISCUSSION

Both Dubai and Shanghai have been building skyscrapers to boost the global image of their cities. They have employed extreme architecture and innovative engineering to make their skyscrapers iconic masterpieces of architecture. In so doing, these cities have attracted global

attention and have had geopolitical influence on other cities to build taller. Burj Khalifa in Dubai, for example, has inspired Kingdom Tower (soon under construction) in Jeddah, a neighboring city to Dubai. Other cities following the lead are Abu Dhabi and Doha.

However, the major issue surrounding skyscrapers is how these buildings fit into the larger urban web. These skyscrapers have good architecture, and some are indeed spectacular; however, they will benefit from better planning for integration into their cities. The following issues are worth considering carefully in the planning process.

Economics

Skyscrapers are costly projects. Their construction requires a premium because of their need for sophisticated foundations, complex structural systems to carry high wind loads, and high-tech mechanical, electrical, elevator, and fire-resistant systems. While about 70% of a skyscraper's gross floor area is usable space, more than 80% is generally usable for low-rise buildings. Skyscrapers also suffer from higher costs for elevator maintenance and emergency response preparedness. For supertall buildings, architectural and engineering firms usually need to carry out special studies and employ a cutting-edge technology, which adds to the total cost. For example, Burj Khalifa required the latest design, materials and construction technology in order to be able to reach to heights never achieved before. Walls were formed by using an automatic self-climbing formwork system and concrete was pumped via specially developed pumps that were able to pump to heights of 600 m (1,970 ft) in a single stage. These unique systems increase the total cost of the tower (Baker, et al., 2007).

Because skyscrapers are costly structures, the reasons for constructing them should incorporate economics. Escalating land values, property taxes and demands to be in close proximity to downtown business districts resulted in the vertical growth of city centers (Starrett, 1928). In difficult economic times, however, towers may not generate enough sales or rental value to make up for the high construction costs. At this writing, due to an unexpected global economic downturn, Burj Khalifa faces significant vacancy rates. Earlier, the Empire State building in New York faced a similar problem. "The most colossal miscalculation of the 1920s was the Empire State Building which remained three quarters empty for a decade after its opening in 1931 and did not turn an annual profit until 1950" (Willis, 1995, p. 90).

Today, however, the drivers for building skyscrapers tilts away from economic demand and toward delivering prestige, attracting tourists and businesses, and attaining global status, as exemplified by Dubai and Shanghai. Interestingly, enhancing imageability may turn into positive economics. For example, building Burj Khalifa to such height does not necessarily make economic sense. But Burj Khalifa, as an icon and tourist attraction for Dubai, helped raised the value of land around the project, a phenomenon often referred to as the "Burj Khalifa Effect." Developers are using similar calculations for Kingdom Tower, which will be the centerpiece of a new location in Jeddah, Saudi Arabia.

It is a simple idea: build taller to increase revenues in order to offset land and development costs. However, there is a balance between building tall to recoup expenses versus the design, engineering, construction, and long-term operational costs of physically challenging buildings. That balance is termed the "economic height" of the skyscraper. The true economic height of a structure is that height which will secure the maximum ultimate return on total investment within the life of the structure under appropriate conditions (Al-Kodmany and Ali, 2013).

It is hard to explain skyscraper mushrooming in Dubai by using conventional local land-use economics. Nothing but such pride-driven international competition could nurture a glorious aberration like the Burj Khalifa. For Dubai: "it was always the height that was the one thing they were trying to do" (Smith, 2007). However, EMAAR, the developer of Burj Khalifa explains that Burj Khalifa is meant to do something impossible: to function as a catalyst for new downtown development to Dubai. In late 2009, Dubai was in a crisis as it failed to repay its debts, faced a threat of its economic downturn, and was bailed out by Abu Dhabi. In three short years, surprisingly, it has bounced back with a boost in its GDP by 4.1% in the first half of 2012 as

estimated by the International Monetary Fund (IMF). Dubai is a resilient city and is prepared to venture into speculative projects by taking risk (Zhang, 2007a).

Socio-cultural Issues

Western firms that may not be attuned to the local culture designed most of the skyscrapers in Shanghai and Dubai (Al-Kodmany and Ali, 2013; Kong, 2007; Pacione, 2005). Indeed, among the consequences of a wholesale “importation” of the “urban giants” has been the loss of local architectural tradition. Opinion surveys in Dubai and Shanghai indicate that local people and architects are not necessarily pleased with new “Western” environments, including high-rise developments (Bagaeen, 2007; Wu, 2000). There is a need to adopt policies that make skyscrapers respect local tradition, culture, and heritage. To attract foreigners to the city, Dubai seems to have severed its strong cultural roots and opted for a cosmopolitan city with an open door policy to outside cultures. The city’s glistening and lax nightly environment reminds one of Las Vegas more than any other regional city.

Design approaches that respect local cultures have been mostly superficial. In the case of Burj Khalifa, the design inspiration, as has been proclaimed, was local and native plants. However, the form of Burj Khalifa does not really reflect that. Despite the propagated claims, the tower’s design does not explicitly relate to Islamic and local culture.

In the same manner, Jin Mao’s design is said to be based on the Chinese lucky number “8.” Most viewers will, however, not be able to tell that the design of this building was based on this lucky number. Additionally, does reference to eastern numerology actually signify serious cultural accommodation and improve sense of place? Nevertheless, Jin Mao’s design deserves credit in terms of drawing its shape from the traditional Chinese Pagoda.

In the case of Shanghai Tower, Gensler applied the notion of traditional lane houses found in Shanghai’s vernacular *shikumen* house, where rooms are arranged around a communal open space, and a cluster of *shikumen* houses forms a *lilong* or a neighborhood. However, when Gensler translated this concept on the vertical plane, the benefits of the traditional concept were lost and the intended sense of community was abated (Xia, et al., 2010).

Local governments and residents have raised concerns about losing local and cultural identity. After seeking global status, these governments have come to the realization that preserving local identity through the built environment is important; it is not enough to be global at the expense of losing their local identity.

This loss of identity and the need to preserve the built heritage is increasingly taking significance in the design and planning discourse. Most new developments in Dubai are now announced in terms of what they bring to the city and how they contribute to its cultural identity. The government leadership believes that the traditional urban fabric should not only be preserved but should inspire future development as well. The late UAE Emir (president), Sheikh Zayed (1971-2004), was famously quoted: “Who has no past, has no present, and no future,” (Pacione, 2005, p. 229) Tremendous efforts have been initiated to restore historic city landmarks and to rebuild ‘portions’ of the old fabric now destroyed.

Skyscrapers designed by foreign architects have been a controversial issue among Chinese architects and planners for years. However, many government officials and the young middle class often support the projects because they view these “super modern” buildings as an indication of China’s rising power. Foreign designers’ efforts to reflect Chinese vernacular style have been well received, such as the case of Jin Mao Tower in Shanghai (Zhang, T. 2007a).

Environmental Impacts

The article titled: “Soaring to Sinking: How Building Up Is Bringing Shanghai Down” by Kate Springer, 2012, warns that skyscrapers are a major contributor to Shanghai’s subsidence. She explains that while this problem has been going on for several decades (the city has reportedly subsided 406 mm (16 in) in the last 50 years), the large concentration of skyscrapers built in soft soil has accelerated the sinking of land. Shanghai has inherently soft soil because of its geographical position at the mouth of the Yangtze River basin and groundwater accounts for

nearly 70% of land subsidence; however, a report by the Shanghai Geological Research Institute claims that the physical weight of skyscrapers accounts for 30% of Shanghai's surface subsidence. Shanghai is sinking by an average of 10mm (0.39 in) per year. The government has limited building heights and begun pumping water back underground in an effort to stop the trend. Unfortunately, the implications will only grow graver with the pace of development and rising sea levels due to global warming (Springer, 2012).

New regulations are needed in order to create preventive measures for environmental problems resulting from massive skyscraper construction. Reducing groundwater pumping, decreasing the density of buildings and skyscrapers will help to mitigate the problem.

Furthermore, large concentrations of skyscrapers may create strong wind through the tunnel effect, as has been experienced in business districts in Shanghai's downtown areas including the Lujiazui financial zone (Simeng, 2006). Wind speeds increase between high buildings, as wind currents often form mini whirlwinds and turbulence around densely built skyscrapers, which negatively impact pedestrians. New regulations are needed to regulate heights and spaces between skyscrapers and to require proper landscaping in order to mitigate wind effect.

Similar to Shanghai, Dubai faces the problem of wind turbulence around its supertall buildings. To minimize wind turbulence around tall buildings, Dubai Municipality has drawn up a new wind code requiring developers to take account of how tall towers are changing wind patterns. Skyscrapers also need to address the problem of sandstorms in Dubai's desert environment (Pacione, 2005).

In excessive heat, skyscraper's windows, if not well designed and constructed, may crack and crash into to the ground. Recently, there have been incidences of this in both Dubai and Shanghai. This problem requires regulations that review high-rise glass design, construction, and maintenance. As more skyscrapers are built, many with all-glass-clad walls, these concerns become more pertinent (Al-Kodmany and Ali, 2013).

Furthermore, skyscrapers should be built with considerations of their impact on water, sewer and electrical infrastructure. Dubai's biggest challenge is water, which is undrinkable without desalination. Dubai continues to rely on oil to desalinate water used for multiple purposes, including air-conditioning its massive skyscrapers' interior spaces. Practices such as this have made Dubai and the other emirates to have one of the world's largest carbon footprints. They also generate enormous amounts of heated sludge, which is pumped back into the sea. In the face of global warming, skyscrapers in Dubai need to perpetuate sustainable practices (Reuters, 2010).

The location of skyscrapers in relation to transportation systems should be carefully studied. It is desirable to cluster skyscrapers close to mass transit so that the environmental impact of transportation is minimized. Transportation considerations are largely lacking in Dubai. Shanghai is a better example where the city enjoys an effective metro system. However, while Dubai's population has grown at an average annual rate of 6.4%, the number of cars on the road has increased by 10% each year from 2004–2006. Average daily trips in Dubai are anticipated to grow from 3.1 million per day to 13.1 million by 2020 (Ahmed, 2005). Dubai is building a driverless metro that is meant to partially solve transportation problems.

Finally, glittering new skyscrapers and residential towers may be dangerously susceptible to natural disasters like typhoons, hurricanes, strong winds, tornadoes, rainstorms and floods. With too few shelters for the population, too little public education and training on flood mitigation, and relatively ineffective institutional systems for crisis management, Shanghai and Dubai could be under considerable threat in the future.

Green Skyscrapers

The significance of embracing green or sustainable design principles for skyscrapers can hardly be overemphasized and has been extensively covered in the literature (Al-Kodmany and Ali, 2013; Ali and Armstrong, 2008; Dalton and John, 2008). Shanghai Tower's green design process employing sustainable technologies may provide a good model. The tower's swiveling,

asymmetrical glass façade reduces wind loads on the building. The building's spiraling parapet collects rainwater to be used for the tower's heating and air conditioning systems, and wind turbines situated below the parapet generate on-site power. Further, the gardens nestled within the building's façade create a thermal buffer zone while improving indoor air quality. Power for the building will also be partially generated by wind turbines (Xia, et al., 2010).

Given their tremendous scale, the materials that go into the construction of skyscrapers should be carefully selected. Preferably, materials should come from recycled sources from areas closer to the skyscraper's location so that the CO₂ emission generated by transporting materials is reduced. Constructing skyscrapers requires steel and aluminum smelting, raising environmental questions due to their use of electricity. Similarly, cement production for concrete releases large amounts of CO₂ into the atmosphere (Al-Kodmany, 2012b; Aboulnaga, 2006).

Skyscrapers are often cited as one of the largest energy consumers in a city, but the new generation of skyscrapers is addressing these issues in innovative ways. Skyscrapers in Dubai could consider integrating photovoltaic technology to harness solar energy. Skyscrapers in Shanghai could help in collecting rainwater to reduce flooding events. The treatment of waste has become a serious environmental issue in Dubai; green skyscrapers may provide self-treatment for waste. These tall buildings can also employ air filters to improve air quality as the case of Bank of America Tower in New York City.

SUMMARY AND CONCLUSIONS

This paper has investigated the forces that led to the construction of skyscrapers in Shanghai and Dubai. It has argued that with the advent of globalization, skyscraper developments were energized by a synergistic relationship between global and local forces embedded within cultural, political, and geographic contexts. The two cities are significantly different, however, from a broader perspective, they possess similarities in regards to the factors that caused skyscraper development discussed in this paper, including: openness to the "outside world," particularly to the West, accumulation of economic wealth, using skyscrapers as urban symbols of prosperity; global tourism and political support and governance that considers skyscrapers as a means for place promotion.

Both Shanghai and Dubai have strived to become a hub of global commerce, a top tourist destination and a shopping Mecca. These cities have used skyscrapers to reinforce their respective ambitions to become major global cities. They have spent billions of dollars to build skyscrapers of astonishing heights all within the past two decades. Pudong, a district in Shanghai has become known as the Manhattan of the Far East while Dubai became known as the Manhattan of the Middle East. They both rose to modernism swiftly and opened channels of communication and trade with the West. Combining the involvement of global businesses and innovative strategies of urban marketing with headline-catching projects, they transformed their urban landscape.

Opportunities and Threats

From the previous review of key skyscrapers we summarize some lessons and see how global and local forces can interact, either to mediate or eradicate the architectural forms that express cultural identities. In the case of Jin Mao, one can see the positive potentials for global and local forces to interact. In this project the designers attempted to employ advanced technology to integrate contemporary design language with architectural forms that express local cultural identities and historical roots. The globalization of the skyscraper also presents an opportunity to promote green technologies as presented in the example of Shanghai Tower.

Threats represent the negative influences that should be taken into consideration while acting globally and locally. Architects and developers distinguish themselves with new, impressive forms, disregarding local considerations. Local cultures, identities and practices are largely ignored in the process of designing eye-catching skyscrapers. In the case of the Shanghai World Financial Center Tower, the negative potentials and threats of globalization are clearly apparent in how the tower is cut off from the past and ignores the place identity and architectural

heritage. The project defies Shanghai's older fabric and vernacular architecture. It tries to "shock and awe" rather than empathize. Further, skyscrapers are causing environmental problems. In Dubai, skyscrapers are contributing to significant increase in energy consumption and increase in greenhouse gas emission. Lastly, skyscrapers can be a massive and speculative misallocation of capital.

Recommendations

Skyscraper development should take into consideration their impact on city life, environment, transportation, public communal spaces and pedestrian life, sidewalks, and safety. In constructing futuristic skyscrapers and intensifying land use, public spaces have become less common and smaller. Concern about quality of public space is increasingly important since new skyscrapers are owned by private developers. Most importantly, Shanghai and Dubai need to reexamine the need for skyscrapers, since they have been constructing skyscrapers without sufficient underlying demand (Al-Kodmany and Ali, 2013).

The development of skyscrapers should be carried out by a multi-disciplinary team that possesses diverse qualifications and combines skills from several professions, encompassing both the modern technologies of the age and the richness of local heritage. This can be implemented by respecting the dominant styles in the locality in order to achieve a degree of consensus among local people. When considering globalization, architects and planners should perceive the opportunities that globalization provides from place-identity considerations. They must anticipate the threats that affect our local heritage in order to link global technologies (including green technology and modernization) with local values and cultures. This will require great sensitivity and substantial talent to successfully weave together appropriately chosen, traditional characteristics with technologically modern elements. It demands a regionally derived, form-making language, with its own compositional grammar and vocabulary for materials and details that makes a skyscraper in Dubai different from one in Shanghai.

Architects, planners, and urban designers need to analyze and select aspects of local tradition and vernacular architecture—functional relationships determined by social customs and behavior, formal geometries, materials, colors, ornament—to be incorporated cleverly in what would be a "modern" building. The hope is to make architecture look both contemporary and reflect local identity whether Chinese or Middle Eastern. In a nutshell, the design team should think "glocally," a composite term that refers to an inclusive design approach that combines considerations of local needs and global forces. The aim is to promote "glocalization"; that is to unite the local and global outlooks and to find balance between them, reinforcing a distinct urban identity while at the same time remaining open to positive foreign influences.

Ending Notes

As the skyscraper goes global, more and more competition is likely to come from different parts of the world. Using skyscrapers as symbols of prosperity is being embraced by many emerging cities at the global stage. For example Korean cities, such as Seoul and Busan, are increasingly building skyscrapers as icons that elevate their cities' image to world-class cities. The same applies to other cities such as Panama City and Abu Dhabi and many others in Central and South America, and Asia. Skyscrapers are not only appearing in many cities but also becoming taller. Recently Azerbaijan proposed to build a 1050 meter (3444 ft) tall tower later this decade. Other, even loftier projects will likely emerge as well; for example Adrian Smith + Gordon Gill, the firm responsible for the design of the Kingdom Tower in Jeddah, Saudi Arabia, has already begun modeling a prospective mile-high tower. Within a few years, the Empire State Building will no longer appear on the CTBUH's list of the 20 tallest buildings in the world. As such, careful and comprehensive studies about skyscraper development will be increasingly important.

The analysis provided in this paper forms a starting point to piece together a clear picture of the multi-faceted aspects of skyscraper development in emerging global cities. The stories of Dubai and Shanghai as modern leaders in building skyscrapers are important to other cities that are aspiring to grow. It is hoped that this paper has laid the foundation for rigorous research on

this topic and provided some meaningful lessons. Future researchers may carry out comparative studies, or may dwell on other subtle and important issues such as users' experiences and perspectives on the development of skyscrapers in their cities from a socio-psychological viewpoint.

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