Introduction

As we look to the future, the integration of tall buildings into the urban fabric will continue to be a critical topic of discussion.

With rapid urbanization and population growth, the integration of future skyscrapers into the urban landscape will require a multidisciplinary approach that considers social and cultural factors, infrastructural efficiency, environmental factors, renewable energy sources and the incorporation of green spaces and public amenities. Tall buildings will need to be designed with a holistic view of urban sustainability and livability to provide housing, workspaces, and amenities for their residents, while also creating iconic landmarks and contributing to the economic vitality of a city. However, tall buildings also pose challenges such as shading, wind effects, and traffic congestion; poor urban design choices can disrupt the existing social and cultural fabric of the surrounding neighborhood.

This research interprets the lines of development of tall buildings within their urban contexts through different worldwide case studies; through deep historical and cartographical analysis; visits to each of five case study cities, and through numerous expert interviews. Through the researchers’ eyes, and through the eyes and voices of the people in each chosen city, the social, cultural, and environmental factors that influence the integration of tall buildings into the urban fabric were thoroughly explored, unveiling innovative approaches that can be applied in different metropolitan contexts and cultures worldwide. Through analysis of the differences and similarities between approaches to the integration of tall buildings into the urban context, insights into the challenges and opportunities of urban development in the 21st century are gained.

City Comparison

Skyscrapers have been constructed all over the world as symbols of wealth and innovation. Initially, they were predominantly commercial, representing business districts in cities competing in the global economy, later evolving into residential and mixed-use
buildings. Even though the buildings had similar features, the way in which they blend into the city accounts for their primary differences. European cities have grappled with how to manage growth without sacrificing their historic cores. American cities have tended to demolish older buildings in order to construct new tall buildings. Asia has mixed tall and lower buildings, while the Middle Eastern states created cities where skyscrapers are the undisputed protagonists.

**Singapore**

Singapore, or "A City in a Garden," is an island city-state. Almost half of its area consists of parks and greenery. Founded as a British trading post in 1819, it has evolved into one of the world’s most expensive cities. In barely two centuries, Singapore transformed from a swampland to an increasingly modern planned urban environment, studded with tall buildings (see figures 1 and 2).

"Singapore is an intriguing top-down urban laboratory for high-density and high-rise urban environments, providing various typologies; some evolved historically over time, and some emerged as a result of top-down planning of redeveloped areas."

"Singapore has always been in crisis" (L’Heureux 2013). The city is not only a symbol of the virtuous process of change, but also of how cities can reach a highly developed state in just a single generation. Crisis is empowering, driving change and action. With a powerful and stable government, dynamism and modernity, this "architectural laboratory" has attracted worldwide investors, driving massive economic improvement.

Being both an island and a country, Singapore presents urban development challenges, some of which have been addressed by strictly regulating the location and height of tall buildings. Careful planning strategy and optimization of land and airspace are essential to Singapore’s thriving continuity.

**Tel Aviv**

Tel Aviv is a high-density, liberal, and chaotic city, unique in its diversity of inhabitants. The urban structure characterized by its wide boulevards and green spaces invites contemplation and moments of rest, allowing the city to be simultaneously noisy and quiet.

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1 Interview with an Israeli-born architect, resident of Singapore and PhD candidate at National University of Singapore, in Singapore, January 2023.
From the 1990s, the city’s skyline began to change (see Figure 3). The population increment and the city center renewal ran parallel to skyscraper development, mainly along Ayalon Highway. The infrastructure and tall building booms did not occur simultaneously, however, leading to congestion and a chronic shortage of parking lots, decreasing the quality of life for those attempting to reach the city.

“We live in a world of very high-quality service: our computers, our phones and the buildings we live in are at a very high level, and our transportation is at a super-low level.”

In Tel Aviv, the crane has become part of the landscape and construction site noise is constant (see Figure 4). The city has started a strong process of urban renewal intended to address its lack of infrastructure and aging building stock, to continue to maintain stability as Israel’s cultural and commercial capital. Tel Aviv can be defined as an “Undisciplined Magnetic City,” a chaotic, vibrant place addicted to constant change.

Dubai

“During the late 20th century, Dubai was, suddenly, a postmodern urban spectacle rising from the desert: precisely the glittering global consumer utopia imagined by Dubai’s rulers and merchant elite” (Kanna 2011).
Dubai is one of the seven United Arab Emirates bordering the Persian Gulf in the southeastern Arabian Peninsula. The site where Dubai stands today was a vast mangrove swamp, which by 3000 B.C. had dried up and become habitable.

Dubai had very rapid growth starting in 1955, when it covered an area of only 3.2 square kilometers, growing to 976.6 square kilometers by 2015 and continuing to grow today. The urban evolution of Dubai started in the second half of the 1950s, when its growth reached a point where there was a need for a formal organizational structure. In the following years, the city started to grow even more rapidly, supported by the introduction of master plans from 1957 and the discovery of oil in 1966.

The city’s profound vertical growth started in the late 1970s, with complexes such as the World Trade Center, and proliferated an incredible number of new, very tall towers (see figures 5 and 6): from the Burj al-Arab to the Burj Khalifa, which, at 828 meters, currently holds the title of the world’s tallest building.

London

The first opportunity to conduct town planning at a large scale in the City of London was presented by the Great Fire of 1666, which burnt two-thirds of the city to ashes. The rapid urbanization of the city happened between 1800 and the 1940s. Just after 1800, its population exceeded one million people, making London not only the world’s largest city and first metropolis, but also the prime model for urban development worldwide. Nineteenth-century London became the first “urban laboratory,” where studies of everyday life by academics and reformers helped to shape the city.

Few skyscrapers were built before the late 20th century, owing to restrictions on building heights imposed by the London Building Act of 1894, which set a height limit of 30 meters. After the height restrictions were lifted, several skyscrapers were built in the 1960s and 1970s, mostly in the western part of central London and in the City of London (see Figure 7).

The first building exceeding 150 meters to be constructed in London was the NatWest Tower (Tower 42), completed in 1980. The
Shard, completed in 2013, at 306 meters, remains London’s tallest building (see Figure 8). Strict regulations remain to preserve protected views, especially those of St Paul’s Cathedral, the Tower of London, and the Palace of Westminster.

Milan
At the time of the unification of Italy in 1865, Milan was a city of 170,000 inhabitants. Its growth was stimulated by different factors, including the construction of the railway network that connected the city with Turin to the west, Monza to the north, and Venice in the east. Beginning in 1884 with the Beruto Plan and continuing with successive master plans, the city of Milan started to expand its boundaries.

After the end of World War II, Italy and Milan found themselves in a dramatic situation that also represented a valuable opportunity to start reconstruction and stimulate the economy. It was a delicate phase of transition marked by two crucial moments: the approval of a new urban plan and the awareness of a changed aesthetic climate, providing the fundamental prerequisites for the rise of new skyscrapers.

In the 1970s, the leading industrial sector became a tertiary sector, abandoning the center city and stimulating the creation of a business district in Porta Nuova, where, since
2005, most of the city’s contemporary skyscrapers are gathered, particularly around the CityLife development (see figures 9 and 10).

**Dimensions of Analysis**

**Greenery and Nature**

The integration of green spaces into architecture has a significant impact, with such spaces constituting “an essential resource to provide healthy and sustainable living environments” (Robbel 2016). They have multiple benefits for citizens, such as mental, physical and social well-being; and for the planet, reducing, for example, the urban heat island effect and improving air quality.

One of the greenest cities worldwide is Singapore, a nation-state that values green spaces as integral to its high-rise development. The city’s Concept Plans emphasize the crucial role of green spaces in providing a high-quality living environment for all residents, often said to have “more trees than people.”

Singapore’s “jungle building” architecture stands out for its incorporation of sky gardens and abundant greenery, establishing a strong connection between nature and the built environment. This can be observed in the vertical green façade of Oasia Hotel Downtown (see Figure 11), with vegetated façades and planted open-air carve-outs creating inspiring spaces with a dynamic interplay of light and shadow, providing a refreshing sanctuary amidst the bustling urban surroundings. Singapore’s green spaces shape the sustainable and livable built environment, connecting the city with the “magic of the place.”

In Milan, the Bosco Verticale (Vertical Forest) (see Figure 12) by Stefano Boeri is one of the more dramatic vegetated tall buildings inside a historical center, nesting its occupants in a green respite, absorbing CO₂, minimizing heat-island impacts, reducing energy consumption, and hosting a wide variety of plant and animal species. Its success has inspired numerous similar projects.

Tel Aviv, too, is sensitive to the integration of greenery in the urban environment, via its aforementioned boulevard system, constituting a continuous linear route of human activity that crosses the urban fabric and connects centers of activity. Even in the busiest areas of the city, there are green corners that offer space for relaxation and recreation. For now, however, there is not a significant integration of vegetation on high-rise buildings.

Not all the cities analyzed featured vegetated skyscrapers. Dubai has an arid climate condition that would make vegetated façades challenging. In London, Chicago and New York, vegetation can mainly be found in urban parks.

**Integration**

Tall buildings need to be integrated into the urban fabrics of the cities in which they rise. Their integration must respect both urbanistic and cultural/social aspects. The latter influences skyscraper design in

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3 Interview with Moshe Safdie, January 2023.
global hub cities, reflecting values, aesthetics, and symbolism.

Tel Aviv today is a metropolis bustling with life, characterized by a mixed ethnic population. The city’s architecture reflects a blend of different styles and influences. The integration of old and new, as well as the diversity of its inhabitants, has led to the development of a unique urban fabric characterized by a mix of residential, commercial, and cultural spaces. The city has experienced rapid development in recent decades, leading to an increase in tall buildings and high-density developments in some areas, while trying to balance this development with preserving the cultural and historical significance of the older built environment.

Singapore mandates a stable proportion of each of its main ethnic communities across the island, leading to well-integrated developments. The high population density in Singapore has driven the development of innovative solutions to meet residents’ needs. The Pinnacle@Duxton, for example, is an architectural laboratory for super-dense high-rise public housing, optimizing land use and creating vertical public green areas for the citizens. Meanwhile, Kampung Admiralty integrates a range of public facilities and services under one roof, catering to the needs of its elderly population and enhancing their quality of life (see Figure 13).

European cities like Milan and London must contend with historical centers, making the integration of tall buildings into the urban fabric more challenging. London’s tall buildings mainly grow in the City of London, where they integrate well with the historical buildings, respecting protected views of the main landmarks (see Figure 14); or in Canary Wharf, in former docklands east of the city center. Milan created two main clusters outside the city center, CityLife and Porta Nuova, which nevertheless perpetuated some features of the historical core, such as the enduring Italian piazza.

Dubai, on the other hand, built nearly from scratch, a coastal/desert super high-rise city that does not integrate with the old city Deira, from which it is completely independent.

Landmarks

‘Landmarks are physical objects that are easily distinguishable from one another, which serve as a well-known reference point. They enrich the urban fabric, creating spatial legibility and enhancing the visual experience of a city’ (Al-Kodmany 2017).

The collective idea of skyscrapers often centers on the concept of “landmark,” due to their majestic dimensions and the role that they play in making the cities recognizable from far away.

The attributes that contribute to making tall buildings “landmarks” include their significant height, a major factor for visibility; their form, when distinct, bold and clear; and their location, which can further elevate the perception of the buildings when they are grouped in clusters.

These aspects are not enough to make a tall building a “landmark,” however. A building becomes a landmark “in the moment in which the citizens identify themselves in it, and when it works efficiently without creating problems.”

In addition, “the adoption of an icon does not necessarily follow shortly after its construction, and is probably intertwined with the people’s need of it. It is the case of the 30 St. Mary Axe (Gherkin) that it happened in a moment in which people maybe felt a bit depressed and they needed a symbol that represented the regeneration of London.”

New York long identified itself with the Empire State Building as a representation of the technological prowess and economic strength of the United States. Chicago’s Willis Tower laid the foundation for the supertall buildings being built today. One of Milan’s landmarks is the Pirelli Building, symbol of the economic recovery of Italy after World War II. The Burj Khalifa is the symbol of Dubai; having the tallest building in the world represents power. Singapore identifies itself in Marina Bay Sands, a hotel/casino whose form is inspired by a house of cards. Tel Aviv has the Azrieli Center (see Figure 15), a complex of three towers of different shapes, presented as a symbol of renewal for Israel.

Other important factors in a skyscraper’s landmark status are primarily globalization, which exported the idea that the construction of tall buildings is reflective of the fierce economic competition among existing and emerging global cities; and the ambitions of the architectural community to attract national and international acclaim (Al-Kodmany 2017).

Business/Investment

‘As Cass Gilbert in 1900 said, ‘A skyscraper is a machine that makes the land pay,’ so the economy plays a crucial role in the matter of tall buildings. Fundamentally, tall buildings are a response to the demand to be living and working in central urban locations. Without the demand, there would be no tall buildings.”

Figure 13. Kampung Admiralty, Singapore, is less remarkable for its height than for its integration with the community and support for local seniors. Shown here, a hawker center and retail services on a porous, open-air ground level. © Daniel Safarik
At first, skyscrapers were mainly office buildings, both because they offered space to host all the workers at a given company; but they were also majestic, representing a significant “business card” for that company. These buildings were, and are still used, as signs of power and affirmation; they are usually home to headquarters of important companies.

Subsequently, luxury residential buildings began to represent a growing share of the market, driving higher profits per unit of area, thanks to the rising tide of international investors willing to purchase a luxury apartment with a great view of the city as a store of wealth in nations with established property rights and rule of law.

“Critics complain that tall buildings are ugly, are incompatible with the ‘human scale’ or are drivers of income inequality and gentrification. It is safe to say that the vast majority of tall buildings—even if they appear out of scale given contemporary perceptions—have a solid economic case.”

Conclusions

With the advent of globalization, tall buildings have become, in the collective imagination, the symbol of technological innovation, the physical manifestation of the wealth and power of cities actively competing in the global economy.

Mediating the presence of tall buildings entails delicate urban planning and architectural choices so that these, as William Pedersen defined them, “big actors,” work well in the cities.

“[Skyscrapers] work well when they fit into the urban fabric, when they have the possibility of being accessible by public transport in an appropriate way, when they manage to connect with the surrounding streets, and when they manage to solve the gap between the pedestrian zone and their whole body in a uniform and elegant way, without creating a sharp detachment with the context.”

Even though sometimes, at first glance, these buildings can look very similar to each other, as if copied and pasted in different locations regardless of context, it is in the differences that they find their dialogue with the city in which they rise.

Milan maintains its culture of piazzas, in the modern formulation shaped by tall buildings. London designs its tall buildings to the views of the main landmarks of the city and builds them close to the historical core and pubs, where a high degree of social and business activity is concentrated.

Dubai uses skyscrapers as symbols of its power and influence. Tel Aviv’s powerful urban development addresses infrastructure challenges through a large-scale urban renewal efforts, concentrating skyscraper construction along major highways, while preserving the historic core of the White City. Singapore integrates technology and nature into its high-rise environment, driven by the genuine necessity to create a unified and improved living environment for its diverse population.

The common connection between successful tall buildings across the cities of the world is in the different characteristics that they have, allowing them to effectively communicate with the surroundings and the citizens of the places in which they rise.

References


