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Placemaking in the High-Rise City: Architectural and Urban Design Analyses

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Abstract

The past decade has witnessed an unprecedented boom in tall and supertall building construction worldwide (Wood, 2011). Because of their massive bulk and soaring height, tall buildings often create serious placemaking problems. Employing extensive photographs and sketches, this paper examines architectural and urban design strategies that improve placemaking with tall buildings. The paper embraces a comprehensive approach that considers the relationship of tall buildings to their surroundings at the macro and micro scales. It also considers non-physical factors that tall buildings need to address, such as the social life the building creates. It is hoped that the placemaking factors discussed in this article will provide the required groundwork for future research that explores regulations and codes that foster placemaking with tall buildings.

Keywords: Vertical Architecture, Challenges, Human Scale, Imageability, Perceptual Characteristics

1. Introduction

Improving the qualitative human experience of a city's environment by turning spaces into places is a key concern among urban designers. The term "space" represents the physical container of activities and objects, whereas the term "place" represents a particular portion of space that meets the physiological and psychological needs of people while evoking meaningful and memorable messages of a specific culture, climate, and geography. Urban designers care about turning spaces into places because cities constitute one of the most significant, direct, and constant human experiences of our world. Such an experience profoundly impacts us: indeed, some parts of the urban experience make us feel comfortable and delightful, while other parts frustrate or even depress us (Relph, 2007; Kurtz, 1973; Oldenburg, 2007).

Placemaking is the act of creating an urban landscape that fosters pride and ownership of the physical and social environment. Sense of place is the emotion that one develops from comfort, satisfaction, and attachment with a given area. Lynch asserts that 'place' needs to "speak of the individuals and their complex society, of their aspirations and their historical tradition, of the natural setting and of the complicated functions and movements of the city world," (Lynch, 1960, p. 119). Therefore, placemaking upholds the integrity of place, whether it is on the individual, community, or city scale.

With the advent of globalization, accelerated urban growth, and proliferation of megaprojects, our cities increasingly lack a sense of place. Architects and engineers are busy designing buildings; landscape architects are actively beautifying and greening the city; while urban planners are preoccupied with crafting planning visions for the city's future. However, when their work is assembled, we often find that cities, as a whole, lack the art of placemaking. We may succeed in designing individual buildings but we often fail to make places. In discussing the problem of placelessness, Alan Jacobs and Donald Appleyard wrote:

Cities are becoming meaningless places beyond their citizens' grasp. We no longer know the origins of the world around us…. It is an alien world for most people. It is little surprise that most withdraw from community involvement to enjoy their own private and limited worlds (p. 102).

Indeed, after decades of automobile-oriented and top-down urban planning practices our cities increasingly lack a sense of place. The resulting environments are deprived of places that invite greater interaction among people and foster a healthy economy (Madden, 2011). Consequently, there has been a desperate need for a new urban design direction that considers a multi-faceted approach that improves sense of place. There is a need for creating settings that invite and engage people in a variety of activities. In other words, urban designers today face the challenge of turning many spaces into meaningful places. "Placemaking is both an overarching idea and a hands-on tool for improving a neighborhood, city or region. It has the potential to be one of the most transformative ideas of this century" (PPS Website).

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Further, emerging information technology has also become a hindrance to placemaking. It indirectly supports placelessness rather than fostering a sense of place. In the past, a sense of place often evolved from communal relationships, activities, and small interaction in public spaces. It was not long ago when people went to the street corner to collect the newspaper-this one action forced people to interact with others to receive, share, and pass on information. Such small interactions over time created a neighborhood's character and helped develop a person's sense of place. Jane Jacobs stated, "Sidewalk contacts are the small change from which a city's wealth of public life may grow," (p. 91). Unfortunately, in our current time, online newspapers, newsletters, blogs, and online communities reduce opportunities for place-based interactions to occur. Technology can easily sway one to develop a false perception of place without ever fully being exposed to the physical surroundings and it is possibly that people may only find attachment or sense of place within their virtual world. Oldenburg proclaims, "Neglect of the informal public life can make a jungle of what had been a garden while, at the same time, diminishing the ability to cultivate it," (p. 145). This kind of inattentiveness to the real world belittles the beauty and rigor of developing a realistic sense of place (Al-Kodmany, 2011).

2. The Scope of Work

2.1. The problem

Because of their massive bulk and soaring height, tall buildings have often contributed to the problem of placelessness. In Central Business Districts (CBDs), they frequently evoke the image of a nerve-racking, workaholic business environment, and in residential areas they convey the perception of living in crowded apartments resembling rat cages. In addition, a universal design template of tall buildings has swept the world and has promoted the emergence of a mono-culture of North American design. Architectural critics have lamented that all world cities have begun to look alike and claim that the spread of tall buildings has been one of the factors that fosters homogeneity in the urban landscape.

2.2. Goals

This research tackles the challenges of creating a sense of place with tall buildings. It attempts to identify the physical design features and functional spaces of tall buildings that could enhance and create a sense of place. It discusses how the different parts of a tall building could improve sense of place. For example, a building's top is most visible and if it were designed properly, it could add to the sense of place and help people to orient themselves in the neighborhood or city. The tower's base could be designed so that it caters to human scale. The ground floor could employ socio-economic activities that foster social life. Further, the physical arrangements of tall buildings could enhance imageability by creating a system of landmarks, paths, edges, nodes, and districts.

2.3. Methods

The embraced research method employs extensive visuals that illustrate the discussed physical design features in relation to placemaking. Mostly photographs of existing tall buildings, the visuals attempt to convey how tall buildings can improve imageability, human scale, and cultural association; and how architects and urban designers can mitigate the problem of placemaking. Visuals are necessary to help define and illustrate placemaking and how it is reflected in and related to the physical environment. It is argued that providing visuals of practical examples is an effective and direct way to learn about the examined issues. Visuals also help to illustrate the successes and mistakes of the provided project examples.

3. Literature Review

A literature review reveals that research on the role of tall buildings in placemaking is lacking. We find research that focuses on the structural engineering aspects and technological innovations in tall buildings, such as smart materials and systems (e.g., Nawy and Scanlon, 1992; Schueller, 1996; NEHRP, 2002; Ali and Moon, 2007). Some research focuses on wind impact (e.g., Condit, 1988; Dutton and Isyumov, 1990; Ghosh et al., 2005; Gregory 2003), or fire and safety, and evacuation (e.g., CTBUH, 1992; Hadjisophocleous and Noureddine, 1999; Hlushko, 2004; Isner and Klem, 1993, Meacham and Johann, 2007) and terrorist attacks (e.g., Hadden et al., 2007; FEMA 426, 2003; FEMA 452, 2005; Kurtz et al., 2002). Other research focuses on economics of tall buildings (e.g., Mann, 1992; Ruegg and Marshall, 1990; Steyert, 1973), on sustainability (e.g., Pank et al., 2002), and construction (e.g., Allen, 2004; Chew, 2001; Hadjisophocleous and Noureddine, 1999; Peurifoy, 2002; Warszawski, 2003). Additional studies examine the architecture of tall buildings (e.g., Ali and Armstrong, 1995; Bachman, 2003; Goldberger, 2004; Jencks, 1988). Other research focuses on technical aspects such as facade design (e.g., Behr, 2001; Hart, 2002), and vertical transportation (e.g., NASA, 2000). Other works have been interested in mega structures (e.g., Reina, 2003). Other researchers have been interested in documenting the historical development of tall buildings (e.g., Frampton, 1992; Kostof, 1995; Mumford, 1952; Norberg-Schulz, 1974; Tauranac, 1979). However, research on tall buildings and urban design, particularly on the role of tall buildings in placemaking is scarce.

Further, placemaking literature often focuses on public spaces and plazas-not on tall buildings. Most notably, the work of William Holly Whyte, which forms the foundation of placemaking research, has largely focused on public spaces. Whyte examined the physical characteristics of public spaces that foster a sense of place. Whyte's

work is best represented in his book, *The Social Life of Small Urban Spaces* (1980), which researched the question of why some public spaces are successful while others are not. Also, Whyte started the Street Life Project (SLP) that aimed at researching public spaces by interviewing people and conducting direct observations. SLP continues to follow the footsteps of Whyte's work today.

While there has been a relatively small body of empirical research on placemaking, such as that of Whyte's work, there is a significant volume of theoretical research on placemaking. In a broad sense, this set of research tries to provide a better understanding of the place phenomenon, placelessness, and placemaking. The theoretical research often claims that traditional environments provided a better sense of place and evoked culturally-rooted meaning. Interestingly, both the theoretical and empirical research on placemaking stem from dissatisfaction with the non-place-based design of contemporary urbanism.

Edward Relph's book *Place and Placelessness*, explains the concept of a place as "directly experienced phenomena of the lived-world and hence is full with meanings, with real objects, and with ongoing activities." Relph warns about the prevailing problem of placelessness that is replacing our place-based world. Christian Norberg-Schulz explains the phenomenological understandings of place through human ability to connect with the physical environment, which fosters identity and meanings. In *The Great Good Place* book, Ray Oldenberg introduces the "third place" concept that advocates providing informal public spaces that supplement our home and work lives. Third Places provide a society the opportunity to come together freely and voluntarily, socialize, connect, and enjoy public life.

Other noteworthy theoretical studies within the place-based tradition include Henri Lefebvre's classic text *The Production of Space*, which provides a theory that collates the physical, mental, and social aspects of a space. Similar to the research arguments mentioned above, Lefebvre emphasizes that meaningful places in today's built environment are being replaced by abstract spaces, which are the manifestation of the prevalence of capitalism. Similarly, David Harvey examines sociological, economic, and political aspects of space production, particularly under capitalism. In *Design of Urban Space*, Ali Madanipour examines the physical and social dimensions of urban spaces and offers analysis of their production by concentrating on the intersection between the urban development process and everyday life. Earlier, in *The Poetics of Space*, Gaston Bachelard discusses perspectives on domestic space, spatial psychology and typology. Such large body of theoretical and classic works assists in drawing conceptual frameworks when thinking about placemaking with tall buildings.

4. Theoretical Framework

There are several dimensions of placemaking including the physical and non-physical (psychological and social). It is important to note that despite categorization the physical and non-physical aspects of a place are highly interdependent and rarely, if ever, occur in isolation of one another.

4.1. Physical

The first dimension of placemaking is the physical, which heavily resides in the concrete nature of our environments. These concrete elements can either afford or inhibit orientation, as well as a visual structure of space (Lynch, 1960). In *The Image of the City*, Kevin Lynch suggests five elements to imageability including: paths, edges, districts, nodes, and landmarks (p. 46). Each of these five elements can be intricately knit together to create a sound visual order within the city. In addition to imageability, observing the human scale in urban design is fundamental in supporting a sense of place. Buildings of extraordinary height, for example are likely to hinder placemaking. Cultural references are also important since they can evoke historical meanings and give a place an identity. The physical dimension of placemaking sets the foundation for the psychological and social dimensions.

4.2. Psychological

The second dimension of placemaking is the psychological. It incorporates the perceptions, as well as the unconscious and conscious emotions fostered by experiencing our surroundings through time and space. When we enter a space, our inner self responds to the feelings, senses, and emotions of this experience; it is thereby from these responses that our brain sends forth a perception of that place. Edward Relph elaborates on this dimension in his essay, Prospects for Places, focusing on the feelings transpired through experiencing different levels of place. Relph provides a distinct separation between place and space by ascribing "insideness" and the "experience of being inside" to place. The deeper level of place is seen as the purest form from which one experiences place; it can be characterized by an individual "unselfconscious and perhaps subconscious" relation, disconnected from cultural externalities. The second level of place describes emotions and perceptions that are authentic and unself-conscious, yet connected to cultural and communal externalities. The third level, which is stated to be more of a shallow level of place, encapsulates an experience that is authentic, but self-conscious and involves a deliberate attempt to appreciate that place's significance. The most superficial level of place suggests that the experience emerges from one "being in a place without attending in any sensitive way to its qualities or significances" (Relph, 1976).

4.3. Social

The third sphere of placemaking is the social. This dimension is vested in the emotions, experiences, and

memory contrived through the history and culture of one's environment, as well as the social interactions that take place within (Ellin, 2006). This type of placemaking can occur at multiple scales. Social interactions can be individual or communal; passive or active; indirect or direct, and anywhere in between. Experiencing a variety of these social interactions within a place can stimulate and solidify memory, and consequently produce a greater attraction and attachment to a place. Dolores Hayden contends that developing memory of place helps define an individual's public past, such that each manifested memory with or within the public creates the greater public past. Hayden also explains that developing memory of a place "encapsulates the human ability to connect with both the built and natural environments that are entwined in the cultural landscape" (Hayden, 1995). Cultural and historical landscapes become more apparent as well with the help of the physical and psychological dimensions of placemaking. Physical objects can symbolize and reflect cultural and historical associations that are unique to that place, thereby triggering pride or attachment to place.

4.4. The proposed model

This research emphasizes the role of physical aspects that foster positive social and psychological experiences of urban spaces. It proposes four architectural and urban design factors that could improve placemaking with tall buildings: 1) imageability, 2) human scale, 3) the social life, and 4) cultural design references. First, the paper focuses on the role of tall buildings in improving the imageability of cities. If designed and located well, tall buildings will support a sense of place and improve the imageability of cities by producing legible and memorable environments. They will also help pedestrians and motorists create vivid mental maps that foster effective city navigation. Second, the paper emphasizes human scale design as a basic ingredient for successful places. With respect to tall buildings, it examines human scale issues at the city-wide level, the towers' base, and the overall architectural and site planning design. Third, the paper discusses the socio-economic factors that enhance the social life and economic viability of our cities. It argues that encouraging accessible socio-economic activity in tall buildings is fundamental to their ability to contribute to placemaking. Finally, the paper examines incorporating cultural references into the design of tall buildings in order to support placemaking. Culturally sensitive design aims at creating buildings that relate to a specific culture and way of life. It is hoped that the examined dimensions in the proposed model will enhance placemaking with tall buildings (Figure 1).

5. Imageability

The macro-scale analysis considers the overall visual impact of tall buildings on the environment. Viewers see tall buildings as elements integrated with the city. In this context, imageability is an important urban design concept that helps in studying the visual integration of tall buildings in the city. Kevin Lynch defined imageability as "the quality in a physical object which gives it a high

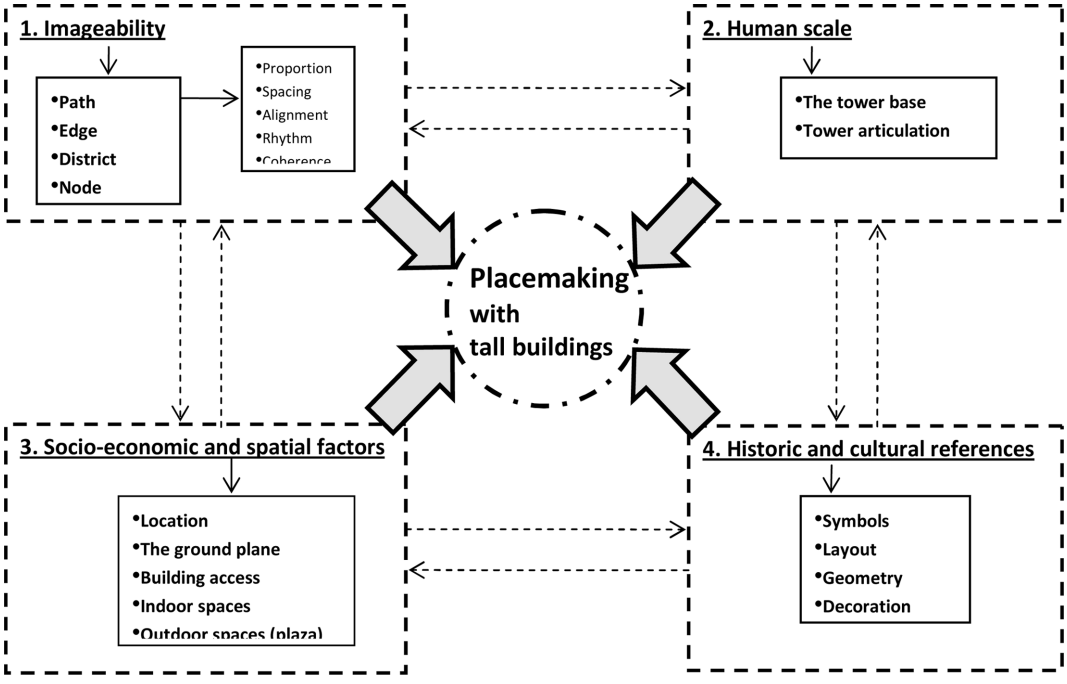


Figure 1. Graphical representation of the proposed model for placemaking with tall buildings. Consideration of the four factors shown in this illustration is necessary during the urban design process to improve placemaking with tall buildings. *(Diagram by author)*

probability of evoking a strong image in any given observer. It is that shape, color, or arrangement which facilitates the making of vividly identified, powerfully structured, highly useful mental images of the environment. It might also be called legibility,. (Lynch, 1960, p. 9). Studying the relationships of tall buildings to the cityscape is critical for ensuring an imageable environment that fosters placemaking. If properly integrated, tall buildings will help to achieve an imageable or legible city that reinforces civic life, fosters citizen's pride, and assists residents and visitors to spatially orient themselves in the city and to navigate through it efficiently (Nasar, 1998). Kevin Lynch suggested that imageability consists of five elements: landmarks, paths, edges, districts, and nodes. In the following sections the paper applies Lynch's elements of imageability to tall buildings.

5.1. Landmarks

Landmarks are point-references, defined physical objects, such as buildings or mountains that are easily distinguishable. Because of their distinctive height and clear visibility over distances, tall buildings are space markers in a city's skyline and some approach landmark status. Tall buildings of unique shape and contrast can be considered major landmarks. While major landmarks are usually visible from many distances and angles, minor landmarks are seen from limited localities and certain approaches. One of the most important elements in making a tall building a landmark is its top. The architectural crowns of skyscrapers have a special role in reinforcing the imageability of tall buildings because they are readily visible from a distance. One vivid example is the 41-story Smurfit-Stone Building in Chicago whose tapered top makes it distinguishable (Figure 2).



Figure 2. Smurfit-Stone Building in Chicago. Distinctive rooftop contributes to the tower being a space marker. It also contributes to placemaking by associating a place with a distinct built form. Despite the fact that the building is not very tall-shorter than its adjacent buildings-its sloped and unique diamond-shaped rooftop makes it stand out. *(Photograph by author)*

5.2. Paths

Paths are "the channels along which the observer customarily, occasionally, or potentially moves (Lynch, 1960, p. 47). The city is full of linear elements along which people commute and conduct daily activities. Lynch suggests that tall buildings are essential components of major streets and boulevards in modern cities and play an important role in strengthening a path's imageability. One recent example where tall buildings shape the image of a path is Sheikh Zayed Road in Dubai (Figure 3).

Six spatial qualities (proportion, spacing, alignment, rhythm, coherence, and terminus) that critically impact a path's imageability can be detailed as follows.

5.2.1. Proportion

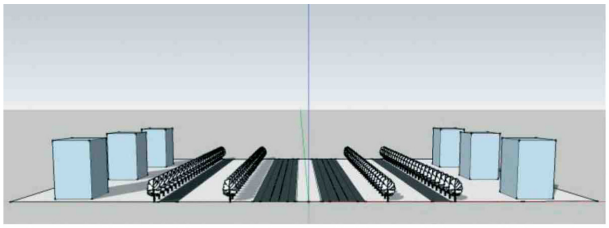
Proportion refers to the relationship between the vertical scale formed by tall buildings and the horizontal plane, such as an adjacent land, street, and body of water. A due proportion, such as the ratio of the building's height to street width, is needed for imageability (Figure 4a). When this ratio is too low, the street will feel too wide and imageability of the street is lost. If the ratio is too high, the street will be perceived as too narrow and the path is going to feel claustrophobic and canyon-like. For example, some streets in Manhattan and the Chicago Loop have poor imageability because the street's width is too narrow when compared to the excessive height of skyscrapers on both sides.

5.2.2. Spacing

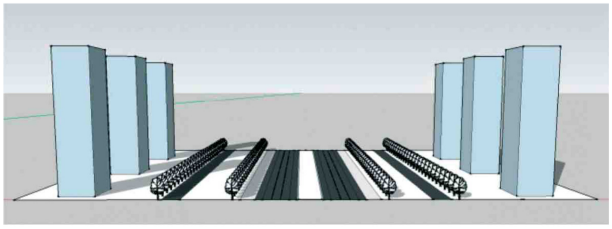
Tall buildings along a path should be arranged in a structured and balanced manner. A dispersed arrangement of tall buildings along a path will likely weaken imageability and may convey chaos and disorder (Figure 4b).



Figure 3. Sheikh Zayed Road in Dubai. Tall buildings spatially define the path and are essential components of major streets and boulevards in modern cities. They also play an important role in strengthening a path's imageability. *(Source: Wikipedia)*

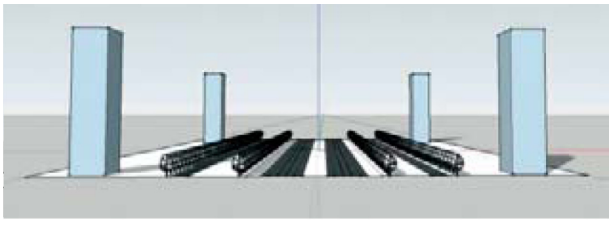


Buildings' height to street's width ratio is too small; no sense of enclosure.

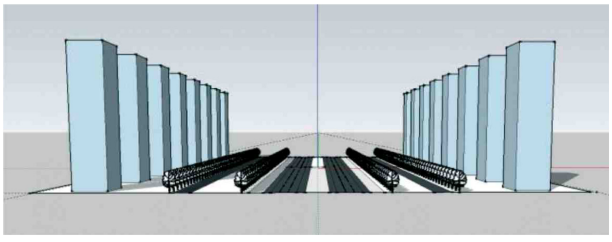


Buildings' height to street's width ratio is more appropriate; a sense of enclosure is developed.

Figure 4a. Proportion. *(Sketch by author)*

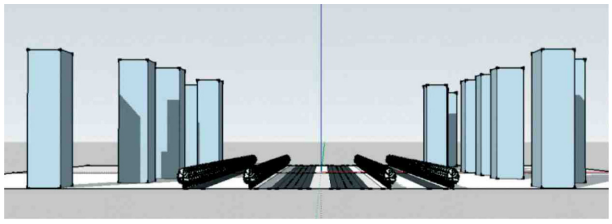


When buildings are not aligned with the street edge, they convey a sense of disorder.

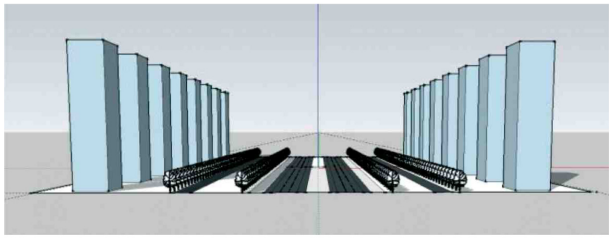


Spacing along the path is more reasonable.

Figure 4b. Spacing. *(Sketch by author)*

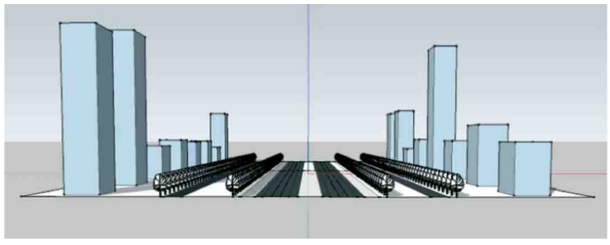


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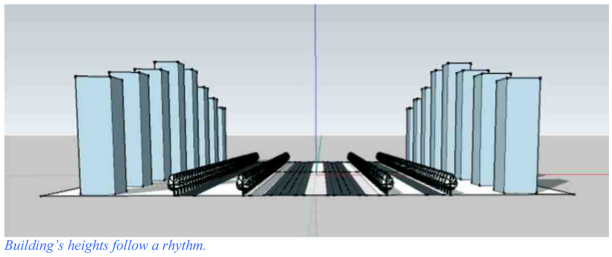


When buildings are aligned with the street edge, they provide a better sense of order.

Figure 4c. Alignment. *(Sketch by author)*



Buildings' heights do not follow a rhythm.



Building's heights follow a rhythm.

Figure 4d. Rhythm. *(Sketch by author)*

5.2.3. Alignment

Recessing buildings in a disorganized manner will break the imageability of a path. The relationship between visual exposure and enclosure of the street should be balanced and aligned to ensure the visual continuity of the path (Figure 4c).

5.2.4. Rhythm

Changes in the heights of buildings along a path should be carefully studied. Abrupt height changes may convey a sense of out-of-rhythm disorder while smooth transitions are likely to reinforce consistency (Figure 4d).

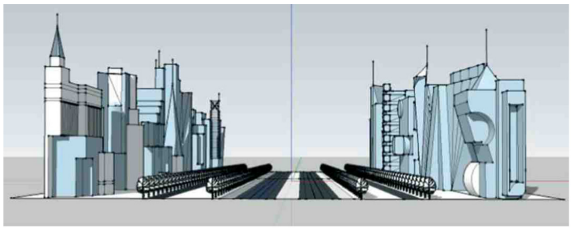
5.2.5. Coherence

Architectural design, style, and facade treatment should be studied so that they all fit together harmoniously. While design diversity should be encouraged, the collective imageries of the path should communicate a coherent, legible, and memorable image. Adjacent tall buildings in a group should blend with one another to reinforce visual conformity and continuity. This also holds true when new buildings are inserted into a district or neighborhood near existing buildings (Figure 4e).

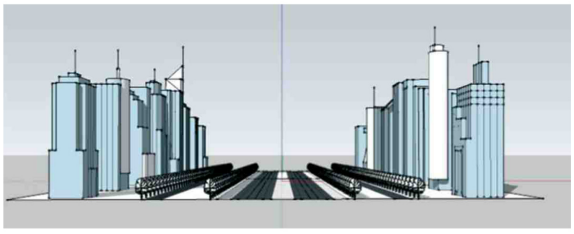
5.2.6. Terminus

Terminating a path with a vivid object may strengthen the path's imageability. This concept has been used often in ancient cities where a street terminates with a church tower or a mosque minaret, for example. Usually, these architectural elements receive special design treatment, for they are the most visible along the path (Figure 4f).

When the various spatial qualities of a path are all taken into consideration, they can combine to create highly imageable cityscapes.

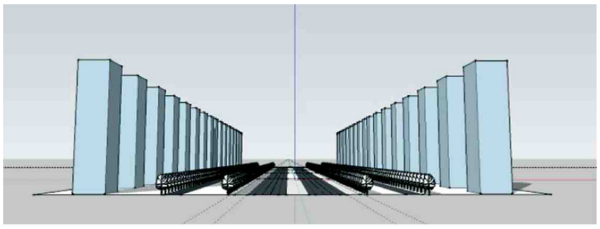


Each building could be architecturally interesting; however, when placed together they lack coherence.

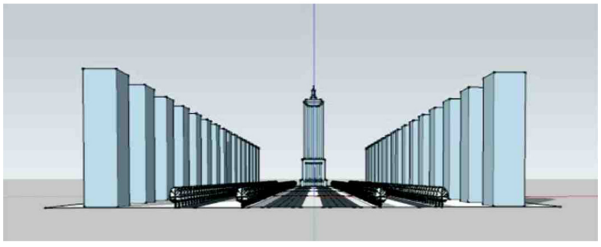


Buildings' designs are in less conflict.

Figure 4e. Coherence. *(Sketch by author)*



The path does not have a terminus; it seems endless.



The terminus provides a "visual destination."

Figure 4f. Terminus. *(Sketch by author)*

5.3. Edges

Edges are boundaries between two phases and can be perceived as linear breaks in continuity. They could be natural elements such as shores, forests, and mountains, or man-made, such as railroads. A particular arrangement of tall buildings could create an edge or reinforce an existing one. For example, tall buildings along New York City's Central Park make clear edges. Similarly, tall buildings along the shoreline of Lake Michigan in Chicago create a vivid edge (Figure 5).

5.4. Districts

Districts are medium-to-large sections of the city, conceived as having an area that the observer enters into, and which are recognizable as having some common or identifying characteristics. Tall buildings could reinforce the imageability of a district in multiple ways. For example, a group of tall buildings can form an entire district, as is the case in many Central Business Districts (CBDs). A cluster of tall buildings in the La Défense District located 6 km (3.8 mi) to the northwest of Paris creates a distinct district. Among the newest towers are the Tour Signal (Signal Tower), 301 m (988 ft) and Tour Phare (Phare Tower), 296 m (971 ft) tall.

One factor that enhances the imageability of a district of tall buildings is creating a focal point through distinctive heights. Promoted by a 1990 redevelopment plan, Pudong in Shanghai contains a cluster of spectacular tall and supertall buildings. Among these buildings are Oriental Pearl Tower, 468 m (1,535 ft); Shanghai World Financial Center, 492 m (1,614 ft); Jin Mao, 421 m (1,381 ft); and Shanghai Tower (under construction), 632 m (2,073 ft) tall. Similarly, London's Canary Wharf's cluster of tall buildings has created a distinct district. The cluster contains some of the United Kingdom's tallest buildings: One Canada Square at 235 m (771 ft) and Citigroup Center at 200 m (655 ft) tall.

5.5. Nodes

Nodes are "points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is travelling (Lynch, 1960, p. 47). A group of tall buildings around a space may create a vivid node (Figure 6).

Lynch explains that a node's imageability is reinforced by creating a sense of enclosure. The vertical planes of tall buildings and placing them around a space help in creating a sense of enclosure. One recent example that illustrates creating a sense of enclosure with tall buildings is provided by the Lakeshore East Development in Chicago. Another example is provided by tall buildings around



Figure 5. Tall buildings create a vivid edge along the shoreline of Lake Michigan in Chicago. This scene was captured at dusk which reinforces how tall buildings enhance the imageability of the Lake's edge and improve sense of place. *(Photograph by author)*



Figure 6. A group of tall buildings around a space may create nodes. Tall buildings at the intersection of Michigan Avenue and Wacker Drive create a clear node and a grand welcoming gateway to the Magnificent Mile in Chicago. *(Photograph by author)*

Century Park in Lujiazui, Pudong, Shanghai. These tall buildings reinforce the imageability of the nodes they create.

Another important factor that strengthens the imageability of a node is providing an anchoring point within the node. It could be a central element such as a fountain or sculpture. In the case of a node with tall buildings, a major tall building with distinctive height and design could "celebrate the node. ICC complex in Hong Kong is a good example where ICC building 482 m (1581 ft) provides an anchoring point that ties together the buildings of the complex.

The aforementioned five elements of imageability are key parts of establishing and reinforcing a place and they help to elicit an emotional sentiment towards the city. Within Lynch's framework described above, one can view a city as a web of paths and nodes that are surrounded by edges and contains districts and landmarks. These five elements are likely to be woven together and are rarely separated, even mentally from their context. They could also be fused together - part of a path could mentally form a district. Likewise, a large node could form a district while a district could be collectively considered a landmark. A recent example that illustrates the relationship among the elements of imageability is provided by the proposed urban design scheme of a major development in the Gujarat International Finance Tec-City (GIFT) district of Gujarat in India. The clustering of tall buildings forms a district. The supertall Diamond Tower is located strategically along a prime axis and creates a major landmark. A series of tall buildings arranged along an arc opposite this tower forms a clear edge.

6. Human Scale

The micro-scale analysis considers human scale issues in relation to tall buildings. Humankind is the measure of all things, as Protagoras, a pre-Socratic Greek philosopher, suggested (Ali et al., 1995; Riley et al., 2003). Observing human scale in the design of the built environment is essential for providing comfort to users and evoking a sense of place. Since tall buildings are of a grand scale, they by default, violate human scale (Beedle et al., 2007). Large cities with a conglomeration of soaring buildings face the challenge of providing a sense of place. They are likely to exhibit what Jacobs and Appleyard call "giantism" (Jacobs and Appleyard, 2007). Developments of massive tall buildings cause pedestrians to feel small, dwarfed, and irrelevant. However, by employing proper perceptual characteristics-through design elements of the tower base, shaft, landscaping, atriums, plazas, and sculptures-there are opportunities to mitigate the overwhelming vertical scale.

6.1. The tower base

The architectural design, layout, and decoration of the base of tall buildings must respond to the human scale (Alexander et al., 1987; Rapoport, 1977). Toward this end, architects have provided several design approaches. For example, Paul Rudolph suggested that the architectural design and perceptual characteristics of the first 30 m (98 ft) of any tall building should respond to the human scale and contain intricate architectural treatments that can be appreciated by viewers at the street level (Alba, 2003). Rudolph's design approach is exemplified in the design of many of his buildings, including the Lippo Center in Hong Kong (Figure 7).

Ludwig Mies van der Rohe suggested employing a simpler visual treatment by providing transparency, which invites the viewer to look through the base. This is achieved by recessing the exterior walls of the ground floors and fronting the ground level with floor to ceiling windows, which can be seen in the design of the Daley Plaza, and Kluczynski and Dirksen Federal Buildings in Chicago. Because the ground floor is transparent, it allows



Figure 7. Paul Rudolph's design of the Bond Centre (now Lippo Center) in Hong Kong. Articulating the twin towers' base is intended to respect the human scale through visual complexity and richness. *(Photograph by author)*

passersby to see through it and evokes an inviting and permeable entryway. The design of the 200 S. Wacker Dr. building employs a similar technique, but in a creative way. It incorporates a three-story, glass-enclosed lobby set back from the perimeter, creating a pedestrian arcade. The exterior columns are set on an angle to optimize indoor/outdoor views. Helmut Jahn provides a different design approach. For example, in the James R. Thompson Center (JRTC) in Chicago, known also as the State of Illinois Center, he makes the tower taper back and then cave in toward the base in order to minimize the problem of "tallness" (Figure 8). Contemporary architects have been providing creative solutions for making towers respect human scale through sensible design of the base.

6.2. Tower articulation

Design articulation of a tower may assist in lessening its impact on human scale. For example, the AMRO Building in Chicago employs multiple techniques to mitigate the impact. AMRO is a 140 m (458 ft), 29-story commercial skyscraper designed by DeStefano & Partners that can be viewed from 360 degrees, making the height more tangible at the pedestrian level. The tower grows from a base along a well-designed plaza. The building design applies horizontal white stripes every several floors in order to evoke the illusion that there are fewer floors. Also, a focal horizontal band with vertical lines toward the tower's base, forming a wide belt, is utilized in order to break up the massiveness of the façade. The tower's edges are articulated with perforated steel frames that allow light to pass through and enrich the visual effect, which lessens the building's massiveness. Furthermore, the employed light color scheme (white and whitish "snowy" blue) of the glass façade makes the tower smoothly blend with the sky, reducing the tower's perceived verticality and massiveness. One of the interesting human elements within the structure is the placement of the building's street address number. The tall steel pole that extends to the top of the building houses the "540 W Madison" address at the very bottom of the structure. This helps to bring the scale down to human eye level (Figure 9).



Figure 8. Helmut Jahn's design of the James R. Thompson Center (known also as the State of Illinois Center) in Chicago. The building tapers back upward and caves in toward the base. These design "tricks" improve the relationship of tall building with the street level. The light and shadow create a musical play into the façade of the building enriching the urban space experience. The pedestrian path at the base of the building defines the human scale. *(Photograph by author)*



Figure 9. AMRO Building in Chicago. The 29-story office tower employs a number of design elements such as defined base, plaza, roof garden, horizontal strips and "belts," and façade framing (top right), building address sign (bottom) that mitigate human scale problem created by "tallness." *(Photograph by author)*

6.3. Streetscape

Careful landscaping may help to restore human scale environments (Ali et al., 1995). In downtown Chicago, dominated by skyscrapers, landscaping and streetscape design have been helping to mitigate the human scale problem. Small street signs are placed at a height for pedestrians to view, while larger signs intentionally attract pedestrians' attention. Streetlight posts are placed amongst the trees, while banners on the light poles, approximately halfway up, convey messages to passersby. The flags and flagpoles that fly outside the office buildings are located at about the first and second stories of buildings, again taking away from the feeling of the massively large building that pedestrians are walking through. Figure 10 illustrates how simple landscaping elements, like tree canopies and streetscape elements-such as awnings-effectively mitigate the human-scale problem of tall buildings by creating a micro-environment for pedestrians.

7. The Social Life

The social life of tall buildings is critical to placemaking. People's presence and participation are essential elements in making successful places, because a place without people is lifeless. The economic viability of a space is directly tied to the social life of a space; people are attracted to the services as well as the crowds that can be produced by such services. With an increase in the



Figure 10. Tree canopies, landscaping, and awnings in conjunction with sidewalks are among the humanizing elements in a street with predominantly tall buildings as can be seen at North Michigan Avenue in Chicago. *(Photograph by author)*

number of people, the socio-economic synergy increases dynamically and exponentially.

7.1. Location

Choosing a location for tall buildings is critical and should be based on the potential for the location to foster a healthy socio-economic relationship with the city. Tall buildings and their nearby spaces can serve as socio-economic nodes that augment placemaking. Clustering of tall buildings is likely to generate socio-economic synergy that would foster social activities and increase the presence of pedestrian environments. In contrast, if tall buildings are located in isolation, for example, scattered in the midst of a low-rise suburb, then it is more likely that they will become "destination" buildings, whether they are residential or commercial office buildings. Tall buildings, if spread out, create "lonely" environments that inhibit healthy socio-economic activities. Dispersed spatial arrangements are usually car-dependent and lead to reduced foot traffic. The reduced flow of people coming in and out of these buildings makes these places feel deserted. At night they may even become eerie pockets.

7.2. The ground plane

Research emphasizes (e.g., Whyte, 1980) that the design of successful tall buildings has clearly been correlated with access to street-level activities; such as strolling and sitting. Unfortunately, some tall buildings have turned their backs to the street by employing high, blank, windowless walls. In these cases, socio-economic activities are not only forced inside the building, but are also afforded less access. Today, many tall buildings' retail and social activities are totally internalized and segregated from the city's social life; and their indoor spaces are disconnected from outdoor spaces. They become isolated, rather than integrated elements in the city. Earlier, Le Corbusier's vertical neighborhood model brought socio-economic activities from the ground level into the building's upper floors. Depriving the ground level of a connected socio-economic space decreases the vigor of the building's social life and diminishes its sense of place. In response to these problems, some city officials have recognized the importance of socio-economic activities and have used incentives to encourage developers to design pedestrian facilities into the ground floor of their buildings (Gehl, 2007).

7.3. Building access

Access to tall buildings should stress ground floor connectivity, and the entryway should be clearly visible. Focusing mainly on providing automobile access for tall buildings, as opposed to pedestrian access, is undesirable because it diminishes the need for people to use the street level and therefore diminishes the social use of the building. Tenants could drive into the building, work, shop, eat, sleep, and then leave again without walking in the city. Consequently, tenants are deprived of engaging in the city's public life and the city is also deprived of the tenant's participation. "Drive-through" tall buildings provide convenience for automobile users at the expense of a healthy social life and rich human interaction.

In the recently proposed "zero-foot" tall building model, access is limited to the upper and underground floors only-one can only enter the building from lower or upper levels (Beedle et al., 2007). This model aims to free the ground floor for greeneries, but in doing so it disconnects the ground floor from street life. Removing spaces such as retail from the ground level severs the connection between the street level and the building. Walkways, escalators, and ramps leading directly to upper floors bypass the social life at the street level. Lively elements of the ground floor, like shops, restaurants, cafés, coffee shops, food vendors, barber poles, and cigar and newspaper stands, are moved to the lower or upper levels (Dobbins, 2009).

7.4. Indoor spaces

A major challenge in connecting tall buildings with the city is that most of the activities in tall buildings happen in internalized environments that are frequently disconnected from city life. Recently, architects and designers have further emphasized the indoor spaces of tall buildings. Loukaitou-Sideris and Banerjee (1998) explain that due to perceived terrorism and real crime, as well as "the rat cage" analogy for residential tall buildings, developers are increasingly emphasizing the life of private indoor spaces. New spatial and architectural forms have been invented to enrich the life of indoor spaces. Some examples are atriums, galleries, arcades, indoor parks, courtyards, skycourts, and skygardens. These indoor spaces have serve as destinations and they are connected through vertical circulation. They are increasingly attractive, massive in scale, and splendid in design and decoration.

Architects and interior designers have been keenly collaborating to produce magnificent indoor spaces within tall buildings by artistically combining artificial and natural lighting systems. Landscape architects also provide exotic, lush landscaping schemes. In addition to beauty, these indoor spaces are enriched with an abundance of amenities, socio-economic activities, and attractions, such as restaurants and food courts, shopping, ample seating, food vendors, and restrooms.

However, indoor spaces, such as atriums, function as exclusive privatized indoor plazas that cater to a smaller segment of the population with a particular socio-economic status. These spaces differ from the conventional urban space, which are inclusive to all segments of the society. As such, these "indoor plazas" cease to be "true" public places. The atrium might be regarded as anti-urban because it turns the street outside-in and converts the street's edge into an enclosed, privatized space. The design challenge for the architect, therefore, is to move an atrium off the street without total denial of the street itself and establish a connection between the outdoor plaza and the atrium. The two spaces should reinforce each other and help pedestrians smoothly transition from one place into the other.

The 311 S. Wacker building in Chicago, designed by Kohn Pederson Fox Associates and constructed in 1990, serves as an interesting example of incorporating a well-designed atrium into a thriving plaza life at ground level. Its grass-lined plaza includes large planters, movable Adirondack chairs, and outdoor dining patios to further service the food court located just on the other side of its atrium. It welcomes people off the street while simultaneously inviting its tenants to enjoy both spaces (Figure 11).

7.5. Public spaces



Figure 11. 311 S. Wacker Drive Building in Chicago provides a seamless visual connection between its atrium and outdoor plaza. Its grass-lined plaza includes large planters, movable chairs, and outdoor dining patios to further service the food court located just on the other side of its atrium. It welcomes people from the street while simultaneously inviting its tenants to enjoy both spaces. *(Photograph by author)*

Large public spaces improve environmental conditions and enliven the city's social and civic life by giving people access to natural light and allowing them to congregate and entertain. Ray Oldenburg explains that public spaces "are essential ingredients to a well-functioning democracy for developing social cohesion, endowing a sense of identity, and providing psychological support" (Oldenburg, 207, p. 138). People often identify cities by their most prominent public spaces.

A tall building's public spaces are crucial for supporting city social life and placemaking. It is particularly important to provide for placemaking in tall buildings where socially interactive spaces or "urban rooms" can be created. By responding to prevailing urban conditions, the architect can give tall buildings some sense of civic use. Through bonuses and incentives, cities' zoning regulations have encouraged developers to provide setbacks, outdoor spaces, and public plazas for tall buildings (Konvitz, 2001).

Some of the earliest and most exemplary research on public spaces and placemaking is that of William H. Whyte (1980). His work continues to influence and inspire research on the topic. Whyte's findings indicated that the relationship of a plaza to the street is the most important and integral design factor for public spaces. A useful plaza starts at a street corner where there is considerable pedestrian traffic and activity, as well as sitting spaces, particularly with a view of the street. Retail stores as part of the street front invite foot traffic and create a lively atmosphere on the street. Whyte recommended that developers should be required to dedicate a minimum of 50% of the ground floor area to retail use, where appropriate, and the transition between the street and the plaza should be seamless.

Unless there are compelling reasons, Whyte does not recommend sunken plazas. Not only do they require a little extra effort to enter, they give the impression of being disconnected from the main social life at ground level. However, exceptions can always be made depending on the special character of the location, urban grain, and their design, particularly if they are able to function as an amphitheatre. An example of one of these exceptions is the sunken plaza of the Chase Tower in Chicago. The plaza is oriented to the south and is set just a short distance below street level, yet it is accessible to pedestrians. It has been designed with permanent seating and plantings that provide shade and places to relax (Figure 12).

Another recent example of a successful sunken plaza is the renovated plaza of the John Hancock Center in Chicago. The new design invites the public into the plaza through radiating and transitional two-stage stairways. The attractive landscaping, elaborate decoration, and extravagant lighting systems have fostered a vibrant social life.

Public plazas are also occasionally used for seasonal and cultural activities and serve as temporary public exhibitions for artwork. These exhibitions and activities contri-



Figure 12. The Chase Tower's sunken plaza in Chicago. Its proper location, spacious design, availability of sitting places, lush landscaping, vibrant fountain, shade, amenities and services are among the many elements that enliven the environment and contribute to its success. *(Photograph by author)*



Figure 13. Cloud Gate (nicknamed "Bean") is a centerpiece public sculpture in the Millennium Park in Chicago. The sculpture humanizes the vertical space evoked by the surrounding tall buildings. Made up of stainless steel plates welded together, it creates a highly polished exterior that reflects its surroundings including the city's skyline. *(Photograph by author)*

bute to placemaking, as they give passersby and tenants something new to look at, breaking the monotony of seeing the same thing every day. They usually come with special visual qualities and aesthetics, since they are likely to present new products, fashions, and the like. Further, the design may cater to seasonal activities such as sitting, relaxing, or playing with water in the summer time.

7.6. Public art as placemaker

As placemakers, sculptures near tall buildings have the ability to humanize space and complement landscaping schemes (Ali et al., 1995). They create visual dialogues with their surrounding environment and capture public attention. Engaging sculptures stimulate "triangulation"- an external sensory stimulus that attracts people's attention and makes them interact with it, and engages viewers into casual conversations. Sculptures frequently evoke special aesthetic qualities and may represent the latest and greatest artistic statements, likely to further draw people's attention. As such, engaging sculptures draw people towards them; people enjoy touching them, walking under and around them, taking photographs, sitting, and chatting next to them.

Therefore, plazas and sculptures near tall buildings have a role in mitigating the "tallness" effect. For example, sculptures in the newly developed Millennium Park in Chicago are scaled up to form a transition between tall buildings nearby and people in the park. The sculptures are also designed to be engaging so that the public is drawn to them and tall buildings become a background for the public space (Figure 13).

8. Cultural Design Reference

One vitally important factor of placemaking with tall buildings is that their design must respect the local culture (Rapoport, 2005; Al-Kodmany, 1999). Inhabitants of different parts of the world have historically developed their own cultural traditions and civilizations based on their climate, food habits, religion, and the teachings of their sages. Scholars have critiqued the International Style and modernist skyscrapers for being placeless. Rapoport and Norberg-Schulz have repeatedly critiqued "Universal Design" and "International Style" for falling short in making designs respond to cultural issues, and regarded their products as "rootless" architecture (Norberg-Schulz, 2007). Design characterized by a plain, steel and glass box, the International Style has been transplanted to many cities independent of local cultures (Duncan et al., 1993); these buildings hinder rather than support placemaking because they do not adequately respond to their varied settings. However, a countertrend of tall building design attempts to embrace architectural forms inspired by local culture and vernacular architecture. The new trend is significant because vernacular vertical architecture is rare and skyscraper design is inherently more challenging than low-rise architecture. A few building examples representative of the new trend are presented below.

8.1. The Petronas Towers

The 452 m (1482 ft) high Petronas Twin Towers in Kuala Lumpur, Malaysia, were the tallest in the world from 1996 to 2004. The Malaysian government required Cesar Pelli, the architect of the project, to infuse certain cultural elements of the region into the towers' design. Consequently, the architecture of the Twin Towers emphasized the Islamic and oriental use of symmetrical geometry both in the outer view of the towers and within the interior, where the plan consists of interlocking circle and square geometrical elements. The typical floor plan is articulated in an eight-pointed star, and hence by extru-



Figure 14. Jin Mao Tower in Shanghai, China reverts to the Chinese traditional pagoda form consisting of a series of steps along building height. Its image clearly evokes local cultural association. *(Photograph by author)*

ding the geometry, each tower resembles a tall minaret. The towers evoke the imagery of ancient architecture, such as the Islamic Qutub Minar (Minaret) in Delhi. The employed lighting system of the tower is also designed so that it reinforces the minaret's image at night.

8.2. Jin Mao Tower

Adrian Smith's design of the Jin Mao Tower was inspired by the ancient pagoda, giving an identity to the skyline of Shanghai, China. Rising to 421 m (1,380 ft), the building's setbacks throughout the facade create the traditional form of stepped pagodas (Figure 14). Jin Mao is located in the new Pudong area and marks China's modernization and emergence into the global financial market.

The presented project examples show new skyscraper designs that have departed from the typical steel-and-glass tower prototype, in favor of forms that support local identity and placemaking. These examples are important because skyscrapers have become a force of American cultural hegemony all over the world, resulting in the loss of many global cities' identity. Some of the examples are more successful than others in terms of providing direct visual references to a particular context. For example, the design of Jin Mao embraces the pagoda form and relates directly to the Chinese culture. Similarly, the design of Petronas Towers in Kuala Lumpur was based on Islamic architecture and regional character manifested in the employed geometric pattern, architectural ornaments, and decorative arts. The exterior design of these towers could be considered place-based. Simply speaking, the Petronas Towers would be inappropriate in a Chinese city such as Shanghai and Jin Mao would be inappropriate in Kuala Lumpur.

However, a common problem with these skyscrapers is that many of them are out of scale, out of context, and out of place. Because of their extreme height, they tend to dwarf the neighboring buildings and largely violate human scale. In these cases, skyscrapers' visual exposure is immense and they do constitute a problem to placemaking. A better arrangement of skyscrapers is achieved through an urban design scheme that provides height transition in which nearby buildings rise gradually to create an iconic skyline rather than generating an abrupt and radical change in the city's silhouette.

9. Placemaking Regulations

While there is a lack of regulation on placemaking (Lang, 2005; Alexiou, 2006; Rapoport, 2005; Whyte, 1980), the proposed model in this article may work as a foundation for future research that aims at exploring regulations and codes for placemaking with tall buildings. Such studies will require considerable work that deserves a continuing and additional research; which is beyond this article's scope. The studies will need to embrace empirical work; they should be context specific and be derived out of synthesis of cases of diverse cultures, behaviors, and places

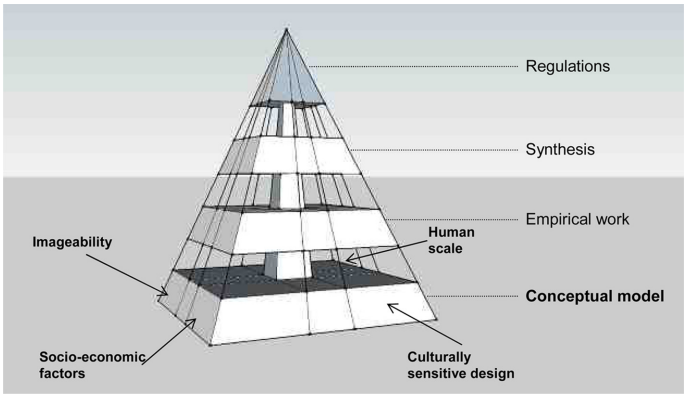


Figure 15. Toward establishing placemaking regulations. *(Sketch by author)*

(Lang, 2005; Rapoport, 2005) (Figure 15).

In the endeavor of embarking on research that aims at charting out regulations, the following points need to be considered:

9.1. Qualitative nature of placemaking

As has been demonstrated in this article, placemaking is a qualitative phenomenon; however, regulations and codes are often quantitative since they deal with dimensions, distances, areas, volumes, velocities and the like. Christian Norberg-Schulz (2007, pp. 126~127) explained:

A place is therefore a qualitative, "total" phenomenon, which we cannot reduce to any of its properties, such as spatial relationships, without losing its concrete nature out of sight… Being qualitative totalities of a complex nature places cannot be described by means of analytic "scientific" concepts. As a matter of principle, science "abstracts" from the given to arrive to neutral "objective" knowledge. What is lost, however, is the everyday life-world, which ought to be the real concern of man in general and planners and architects in particular.

Literature reviews suggest that there are a fewer quantitative measures of placemaking (Brown et al., 2009; Fleming, 2007). For example, Whyte suggested that developers should be required to dedicate a minimum of 50 per cent of the ground floor area to retail use. Paul Rudolph suggested that the design and architecture of the first 100 feet of any tower should be tailored to pedestrian's scale. Literature review also indicates that there are fewer regulations than needed. For example, in the 1980s, the City of San Francisco gave incentives for providing public plazas for tall buildings. It proposed giving for each square unit of plaza area an additional six or eight square units of building space - depending on the zoning district. Later, the City adopted more aggressive regulations and required developers of tall buildings to provide useable indoor and outdoor open space that is accessible to the public and "must pay into the city's park fund two dollars for each square foot of office space" (Loukaitou-Sideris and Banerjee, 1998, p. 106). The codes specified minimum required areas, location, access, seating arrangements, landscaping, retail services, food, sunlight, and hours of operation. The regulations also incorporated Proposition K, known as the 'no new shadows' law that mandates new tall buildings not to cast a shadow on existing public open spaces in the downtown (Loukaitou-Sideris and Banerjee, 1998). These regulations address important aspects of the physical development but do not dive into the issue of placemaking (Cravens, 2006; Cresswell, 2004).

9.2. Empirical research

In reviewing Whyte's work, we find that he stresses the importance of empirical work as a necessary step for devising codes and regulations. In order to produce meaningful and mature regulations, sound empirical research is needed. Findings of the empirical research should help in formulating the rationale of proposed regulations. Authorities, planning departments and local government may conduct specific empirical research on placemaking and should explain how it relates to the development of tall buildings in the context of their cities (Whyte, 1980). Current work by the Project for Public Spaces (PPS) follows Whyte's footsteps in conducting empirical research on placemaking (Castello, 2006; Cravens, 2006; Feld and Basso, 1996).

9.3. Contextual specificity

Each city has its own particularities, and therefore, regulations should be context sensitive. Generic regulations may not work. The idea that 'what works for one place may not work for other' applies in the case of placemaking (Kamin, 2010). The tall building should always be seen in relation to its context, whether it is an infill building within the block, a corner building defining intersecting streets, or a free-standing tower. When they are applied without contextual considerations, codes become abstracts, and they may result in placeless spaces (Gray, 2007). Further, regulations need to provide some flexibility for context adaptability. While planners may attempt to make regulations as clear as possible, they should recognize that placemaking regulations should not be rigid. Rather, regulations should be modifiable depending on circumstances and context. Experiences on placemaking projects stress that the process is often adapted to fit into different community circumstances. Local knowledge and experience are essential for suggesting reasonable changes to regulations in order to fit a particular context. In any event, this challenge should never diffuse or weaken the placemaking endeavor (Cowan, 1974). When looking for examples of design that incorporates respect for the cultural context, we find the Petronas Towers. It embraced Malaysian and Islamic architectural elements into its architectural design. In a similar manner, the Shanghai's Jin Mao Tower incorporated Chinese cultural references into its design. Therefore, regulations may encourage incorporating cultural references in the design. It may specify certain critical cultural symbols, geometry, architecture, and so on, so that architects and urban designers have clear options and choices for real-world applications (Rapoport, 2005).

9.4. Over-regulations

Finally, over-regulations should be avoided. Too many regulations may work against the core purpose of placemaking, which is creating places that are distinct, meaningful and imageable (Lanham, 2007). To this effect, Michael Hough (1990, p. 180) writes:

The over-regulation of what can be done to private property has an inherent potential to generate tedium. Compare the planned shopping arcades of many new develop-

ments, where regulations and design dictate the style and positioning of signs and setbacks, with the shopping streets that have grown up in response to the needs of individual store owners. The former somehow lack the vitality, life, and interest of the latter. Similarly, the formal landscaped avenues, parks, and gardens that grace the institutional centers of many cities and speak to their sense of civic pride lose their special identity as places when they become universal expressions of the city's landscape.

With over-regulations we may risk creating similar and sterile environments and unintentionally stifle creativity in the art of placemaking. Therefore, over-regulations, niggling regimentation, and excessive control are counterproductive to creating diverse and palatable environments (Hough, 1990; Norberg-Schulz, 2000).

10. Conclusion

Tall buildings play a pivotal role in placemaking within the context of the city. Careful attention should be paid to how new buildings fit into the existing urban fabric; how they can add to the sense of place for the city; and that they should reflect the culture, climate, and environment of their location. The base of a successful skyscraper should mitigate, as much as possible, its overwhelming size at the pedestrian level and integrate its services and amenities with the surrounding community. By considering the four factors of placemaking with tall buildings - imageability, human scale, socioeconomic activities, and cultural associations - architects and urban designers will be able to design tall buildings that positively contribute to the existing urban fabric of a city. Once it is determined how a tall building can add to a city's sense of place, these principles can be carried out in the building's architecture and design quality. Future research could examine the necessary elements of achieving architectural quality and a sense of place in tall buildings (Al-Kodmany and Ali, 2013).

References

Alba, J. (2003). *Paul Rudolph: The Late Work*, Princeton Architectural Press: New York.

Alexander, C., Neis, H., Anninou, A. and King, I. (1987). *A New Theory of Urban Design*, Oxford University Press: New York.

Ali, M. M. and Armstrong, P. J. (1995). *The Architecture of Tall Buildings*, Council on Tall Buildings and Urban Habitat (CTBUH) Monograph, McGraw-Hill: New York.

Ali, M. M. and Moon, K. S. (2007). Structural developments in tall buildings: Current trends and future prospects. *Architectural Science Review*, 50(3), pp. 205~223.

Allen, E. (2004). *Fundamentals of Building Construction: Materials and Methods*. Hoboken, NJ: John Wiley & Sons.

Al-Kodmany, K. (1999). Residential visual privacy: Traditional and modern architecture and urban design. *The Journal of Urban Design*, 4(3), pp. 283~311.

Al-Kodmany, K. (2011). Tall buildings, design, and technology: Visions for the twenty-first century city. *J. Urban Technol.*, 18, pp. 113~138.

Al-Kodmany, K. and Ali, M. M. (2013). *The Future of the City: Tall Buildings and Urban Design*. WIT Press: Southampton, UK.

Alexiou, A. S. (2006). *Jane Jacobs: Urban Visionary*. New Brunswick, NJ: Rutgers.

Bachelard, G. (1969). *The Poetics of Space*, Grossman Publishers, Inc.: New York.

Bachman, L. R. (2003). *Integrated Building Systems: The Systems Basis of Architecture*. New York, NY: John Wiley & Sons.

Beedle, L., Ali, M. M. and Armstrong, P. J. (2007). *The Skyscraper and the City: Design, Technology, and Innovation*, Edwin Mellen Press: Lewiston, NY.

Behr, U. (2001) *Double facades for high buildings. Tall Buildings Beyond* 2000, Vol. a, Urban Habitat and Highrise, TBMa. 1994~1999. Malaysia: Institute Sultan Iskandar.

Brown, L. J., Dixon, D. and Gillham, O. (2009). *Urban Design for an Urban Century: Placemaking for People*. New Jersey: John Wiley and Sons.

Castello, L. (2006) City & time and places bridging the concept of place to urban conservation planning. *City & Time*, 2(1): pp. 5.

Chew, M. (2001). *Construction Technology for Tall Buildings*. Singapore: Singapore University Press.

Condit, C. W. (1988). The two centuries of technical evolution underlying the Skyscraper. In: L.S. Beedle, editor-in-chief, *Second Century of the Skyscraper*. New York, NY: Van Nostrand Reinhold, pp. 11~24.

Cravens, A. (2006). Storytelling, histories, and place-making: Te Wahipounamu South-West New Zealand World Heritage Area. A thesis submitted in partial fulfillment of the requirements for the Degree of Master of Arts in Geography at the University of Canterbury.

Cresswell, T. (2004). *Place: A Short Introduction*. Carlton, Victoria, Australia: Blackwell Publishing.

CTBUH. (1992). *Fire Safety in Tall Buildings*. New York, NY: McGraw-Hill.

Dobbins, M. (2009). *Urban Design and People*, John Wiley and Sons: Hoboken, NJ.

Duncan, J. and Ley, D. (1993). *Place/Culture/Representation*, Routledge: London.

Dutton, R. and Isyumov, N. (1990). Reduction of tall building motion by aerodynamic treatments. *Journal of Wind Engineering and Industrial Aerodynamics*, 36(2), pp. 739~747.

Ellin, N. (1996). *Postmodern Urbanism*, Princeton Architectural Press: New York.

EM, Emporis Standards: Data Standards: Structures - skyscraper. Emporis Standards, standards.emporis.com/?nav=realestate&lng=3&esn=18727, retrieved June 15, 2011.

Feld, S. and Basso, K. (eds.) (1996). *Senses of Place*. Seattle, WA: University of Washington Press.

FEMA 426. (2003). Mitigatring Potential Terrorist Attacks Against Buildings.Washington DC: Federal Emergency Management Agency, December.

FEMA 452. (2005). A How-To Guide to Mitigate Potential Terrorist Attacks Against Buildings. Washington DC: Federal Emergency Management Agency, January.

Fleming, R. (2007). *The Art of Placemaking: Interpreting Community Through Public Art and Urban Design,* Merrell Publishers: Cambridge, MA.

Frampton, K. (1992). *Modern Architecture: A Critical History*. London, UK: Thames and Hudson.

Gehl, J. (2007). Three types of outdoor activities and life between buildings. *The Urban Design Reader*, eds. M. Larice & E. Macdonald, Routledge: London and New York, pp. 364~375.

Ghosh, S. K., Fanella, D. A. and Liang, X. (2005). Seismic and Wind Design of Concrete Buildings. Country Club Hills, IL: International Code Council.

Goldberger, P. (2004). *Up From Zero: Politics, Architecture, and the Rebuilding of New York*. New York, NY: Random House.

Gregory, R. (2003). Wind sock. *Architectural Review*, 214(3), pp. 69~73.

Hadden, J. D., Johann, M. A. and Meacham, B. J. (2007). Blast events: Building design for extreme events. *Structure*, 14(1), pp. 38~41.

Hadjisophocleous, G. V. and Noureddine, B. (1999). Performance criteria used in fire safety design. *Automation in Construction*, 8(2), pp. 489~501.

Hart, S. (2002). Facade engineering emerges as a highly specialized science and striking art form. *Architectural Record*, 190(August), pp. 163~170.

Hayden, D. (1995). *The Power of Place: Urban Landscapes as Public History*, The MIT Press: Cambridge.

Hlushko, A. (2004). Mechanical, Electrical, and Fire Protection Design, *Building Security: Handbook for Architectural Planning and Design*. New York, NY: McGraw-Hill, pp. 23.1~23.15.

Hough, M. (1990). 'Principles for regional design,' from out of place: Restoring identity to the regional landscape. In: M. Larice and E. Macdonald (eds.) *The Urban Design Reader*, Edited Volume, 2007. London and New York: Routledge, Taylor and Francis Group, pp. 174~182.

Isner, M. S. and Klem, T. J. (1993). Fire Investigation: Report on the World Trade Center Explosion and Fire. *Quincy, MA: National Fire Protection Association*, 26 February.

Jacobs, A. & Appleyard, D. (2007). Toward an urban design manifesto. *The Urban Design Reader*, eds. M. Larice & E. Macdonald, Routledge: London and New York, pp. 98~108.

Jencks, C. (1988) *Architecture Today*. New York, NY: Harry N. Abrams.

Kamin, B. (2010). Suburban sprawl, meet suburban tall; new high-rises offer chance for compact, walkable communities. Chicago Tribune, 12 February. http:// featuresblogs. chicagotribune.com/theskyline/2010/02/suburban-towers. html

Konvitz, J. (2001). Cities in the Third Millennium. *Tall Buildings and Urban Habitat: Proc. of 6th CTBUH World Cong. on Cities in the Third Millennium*, ed. L. Beedle, Spon Press: London, pp. 159~178.

Kostof, S. (1995) *A History of Architecture: Settings and Rituals*. New York, NY and Oxford, UK: Oxford University Press.

Kurtz, N. D., Hlushko, A. and Nail, D. (2002). Engineering Systems and an Incremental Response to Terrorist Threat. Building Standards, July/August. http://irc.nrc-cnrc.ge.ca/ practice/fir_3.html.

Kurtz, S. (1973). *Wasteland: Building the American Dream,* Praeger: New York.

Lang, J. (2005), *Urban Design: A Typology of Procedures and Products*. New York: Elsevier.

Lanham, K. F. (2007). Planning as placemaking: Tensions of scale, culture and identity. Master's project in urban and regional planning. Virginia Polytechnic Institute and State University.

Lefebvre, H. (1991). *The Production of Space,* Oxford: Basil Blackwell.

Loukaitou-Sideris, A. & Banerjee, T. (1998). *Urban Design Downtown: Poetics and Politics of Form*, University of California Press: Berkeley and Los Angeles.

Lynch, K. (1960, 1969). *The Image of the City*, MIT Press: Cambridge, MA.

Madanipour, A. (1999). *Design of Urban Space: An Inquiry into a Socio-spatial Process,* John Wiley & Sons.

Madden, K. (2011). Placemaking in Urban Design, in *Companion to Urban Design*, Eds. Banerjee, T. and Loukaitou-Sideris, Routledge Companions.

Mann, T. (1992). *Building Economics for Architects*. New York, NY: John Wiley & Sons.

Meacham, B. J. and Johann, M. A. (2007). Extreme Event Mitigation in Buildings - Analysis and Design. Quincy, MA: National Fire Protection Association.

Mumford, L. (1952). Roots of Contemporary American Architecture: A Series of Thirty Seven Essays Dating From the Mid-Nineteenth Century to the Present. New York, NY: Reinholt.

NASA. (2000). Space Elevators - An Advanced Earth-Space Infrastructure for the New Millennium. NASA Marshall Space Flight Center, August.

Nasar, J. (1998). *The Evaluative Image of the City*, Sage Publications: London.

Nawy, E. G. and Scanlon, A. (eds.) (1992). Designing Concrete Structures for Serviceability and Safety, SP-133. Detroit, MI: American Concrete Institute.

NEHRP. (2002). Recommended Provisions for Seismic Regulation for New Buildings and Other Structures. Washington DC: Building Seismic Safety Council.

Norberg-Schulz, C. (2007). The Phenomenon of Place. *The Urban Design Reader*, eds. M. Larice & E. Macdonald, Routledge: London and New York, pp. 125~137.

Oldenburg, R. (2007). The problem of place in America. *The Urban Design Reader*, eds. M. Larice & E. Macdonald, Routledge: London and New York, pp. 138~148.

Pank, W., Girardet, H. and Cox, G. (2002). *Tall Buildings and Sustainability*. London, UK: Report to Corporation of London, March.

Peurifoy, R. L. (2002). Construction Planning, Equipment, and Methods, 6th edn. Boston, MA: McGraw-Hill. Project for Public Spaces. (PPS), http://www.pps.org, accessed September 30, 2012.

Rapoport, A. (1977). *Human Aspects of Urban Forms,* Pergamon Press: Oxford.

Rapoport, A. (2005). *Culture, Architecture, and Design,* Locke Science Publishing Company: Chicago.

Reina, P. (2003). Megastructure supports Taipei's 508-Meter Megatower. *Engineering News-Record*, 24 November.

Relph, E. (2007). Prospects for places. *The Urban Design Reader*, eds. M. Larice & E. Macdonald, Routledge: London and New York, pp. 119-124.

Riley, T. and Nordenson, G. (2003). *Tall Buildings.* The Museum of Modern Art: New York

Ruegg, R. and Marshall, H. (1990). *Building Economics: Theory and Practice*. New York: Van Nostrand Reinhold.

Schueller, W. (1996). The Design of Building Structures. Englewood Cliffs, NJ: Prentice-Hall.

Steyert, R. D. (1973). The economics of high-rise apartment buildings. Planning and Design of Tall Buildings: Proceedings of the First World Congress 1972, Vol. 1a. New York, NY: ASCE (Lehigh University).

Tauranac, J. (1979). Essential New York: A Guide to the History and Architecture of Manhattan's Important Buildings. New York, NY: Holt, Reinhart and Winston.

Urban Habitat (CTBUH) Monograph. New York, NY: McGraw-Hill.

Warszawski, A. (2003). Analysis of costs and benefits of tall buildings. *Journal of Construction and Management*, 129 (4), pp. 421~430.

Whyte, W. H. (1980). *The Social Life of Small Urban Spaces*, Edwards Brothers, Inc.: Baltimore, MD.

Wood, A. (2011). *Best Tall Buildings 2010*, *CTBUH International Award Winning Projects*, Council on Tall Buildings and Urban Habitat (CTBUH), Routledge: New York.