RESEARCH ARTICLE

Exploring the "Bigness" in Modern Architectural Design through Urban Cognition

Yuanben Gao

East China Architectural Design & Research Institute, Huangpu District, Shanghai City, 200011, China

Abstract: This paper delves into the concept of "grandness" introduced by Dutch architect Rem Koolhaas, which, in the 20th century, aligned with societal demands and propelled the development of high-rise architectural theory. However, contemporary architectural research has revealed trends of standardization and compartmentalization in large skyscrapers, which to some extent impact the diversity of urban landscapes. This paper initially discusses these constraints and explores potential future directions for "grandness," with a particular emphasis on the transformative impact of cognitive design. Large skyscrapers often lose uniqueness due to their standardization and may compromise functionality through compartmentalization. For instance, the CCTV Headquarters, while architecturally striking, generated controversy due to its lack of functional practicality. Design centered around cognition emphasizes the uniqueness and iconicity of architectural elements, compensating for the shortcomings of "grandness" by creating distinctive architectural memories. This helps large buildings become more identifiable and culturally meaningful in urban environments, integrating better into urban life. This paper aims to argue for the significance of the "grandness" concept in meeting societal needs while also highlighting some inherent limitations. Through case studies and a focus on cognitive design, a better understanding and response to these limitations can be achieved to better cater to the needs of future urban architecture.

Keywords: Grandness; Rem Koolhaas; High-rise architecture; Urban Cognition

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1 Introduction

The concept of "Bigness" was first introduced by Rem Koolhaas in the 1970s, and this theory has had a profound impact on the architectural design approach to skyscrapers. Koolhaas criticized the traditional views that imposed various limitations on architecture in terms of volume and functionality. He introduced the concept of monumental and massive skyscrapers, which occupied an intermediate scale between urban community and individual buildings. He proposed, "At the urban scale, one of the important consequences of 'Bigness' is the disappearance of urban planning logic, replaced by the accumulation process of 'Bigness,' representing the realization of the historical structure collapse predicted in the 'Exodus,' envisioning a growth system that swallows New York." (Rem Koolhaas and Roberto Garagnani, "Delirious New York" (2008), p. 32). Koolhaas considered the most significant characteristic of "Bigness" to be its vast scale and multifunctionality. This includes the capacity to accommodate various functional activities such as dining, leisure, sports, and social interactions, exceeding the capabilities of individual buildings in the 1980s. Furthermore, Koolhaas argued that the volume and architectural form of "Bigness" buildings must be striking enough to inspire blind trust and adoration of architectural capacity, thereby subtly influencing people's subconscious cognition. This fusion led to the emergence of hyper-functional, immersive structures in line with the societal demands of the previous century.

However, the all-encompassing functionality of "Bigness" architecture may inadvertently foster egalitarianism. Koolhaas's vision, detailed in "Delirious New York: A Retroactive Manifesto for Manhattan," depicts "Bigness" architecture as structures capable of meeting a variety of everyday needs, encompassing everything from private residences to public facilities such as cinemas, markets, and gyms. To achieve this goal, these buildings, constrained by their physical size, often need to be intricately subdivided into numerous functional zones – approximately 20% for residential, 20% for office spaces, 10% for public areas, 10% for entertainment areas, and so on. This high level of complexity forces designers to prioritize functions, potentially leading to the isolation of function-specific areas. Furthermore, the high enclosure of these structures constrains architectural form and design strategies, limiting people's ability to comprehend the overall architectural intent or orientation. This could potentially weaken the spiritual resonance between people and the architecture, contradicting the original intent of "Bigness," especially within complex urban contexts. This phenomenon is evident in the homogenization of contemporary skyscrapers in China.

So, how can the challenge of high-rise buildings that lose their "Bigness" be addressed? The key, in the author's view, lies in exploring how people perceive the "Bigness" of architecture. Koolhaas's concept of "Bigness" should not solely be a physical concept; the grandness as a mental attribute should be the focus of our attention. This delves into the realms of environmental psychology and cognitive design, which will be the core topics of discussion in the subsequent sections of this paper.

2 Background Information

2.1 Historical Rationality of "Bigness"

The background of the "Bigness" theory can be traced back to Rem Koolhaas's work in his publication "S, M, L, XL," which explored the challenges and transformations in contemporary urban and architectural contexts. During this period, cities were undergoing significant changes, with continuous urban expansion and the increasing scale of architectural projects. This was driven by several key factors:

(1) Urban Expansion: By the end of the 20th century, global cities were experiencing rapid expansion and urbanization. Cities were growing in size, and their suburban areas were flourishing. This urban expansion created a demand for large-scale buildings and infrastructure, such as massive commercial complexes, transportation hubs, cultural centers, and more.

(2) Technological and Engineering Advancements: Advances in technology and engineering made the design and construction of large-scale architectural projects more feasible. Developments in new materials, structural engineering, and digital technologies provided opportunities for creating larger and more complex structures.

(3) Complexity and Multifunctionality: The diversity and functional needs of cities drove the demand for multifunctional and mixed-use buildings. Large-scale architectural projects often needed to accommodate various functions, including residential, commercial, cultural, and entertainment spaces, presenting challenges in architectural design.

(4) Addressing Urban Issues: Koolhaas's theory reflected a response to contemporary urban problems, including urban congestion, resource efficiency, social diversity, and more. He aimed to propose a new approach to address these issues while emphasizing the uniqueness and vast scale of architecture.

As a result, Koolhaas's introduction of the "Bigness" theory occurred during a period of global urbanization and transformation in the field of architectural design. He sought to provide architects and designers with new ways of thinking to address these changes and challenges. This theory was considered reasonable at the time and stimulated research and innovation in large-scale architectural projects.

2.2 Modern Limitations of "Bigness"

The popularity of "Bigness" from the 1970s to the 1990s can be largely attributed to a sense of alignment between people and society. It was a period of remarkably rapid human development, where, in less than a century, technological achievements far surpassed those of the past two thousand years. People could clearly perceive the rapid evolution of urban social life, the swift transformation of productivity, and the rapid iteration of urban infrastructure. Koolhaas's "Bigness" architecture painted a picture of a utopian-like ideal future life. During that time, people believed that perhaps a hundred years later, humanity would be freely traveling in space, and this perfect grand utopian architecture seemed to represent the pinnacle of human living conditions. This is why many super-sized mega-complex buildings emerged in abundance during that era.

However, the modern limitations of "Bigness" have become apparent as we transitioned into the 21st century. The rapid technological advancements that once seemed to promise a utopian future also brought new challenges and complexities. Some of these limitations include: Sustainability Concerns: Large-scale buildings consume significant resources and energy, posing challenges in terms of sustainability and environmental impact. The focus on "Bigness" did not adequately address these concerns. Urban Congestion: The idea of "Bigness" contributing to the disappearance of urban planning logic, as Koolhaas suggested, can lead to urban congestion and inefficient land use. The unbridled accumulation of "Bigness" can have negative effects on urban environments. Functional Isolation: The high degree of compartmentalization within large-scale buildings can lead to functional isolation. Individual areas may not be well-integrated with the overall architectural intent, leading to less effective utilization of space. Architectural Homogenization: The mass production of large-scale, monumental buildings can result in architectural homogenization and a lack of architectural diversity within cities. Human-Scale Experience: The vast scale of "Bigness" buildings can sometimes alienate individuals, making them feel disconnected from the built environment and less able to relate to these colossal structures. In summary, while the idea of "Bigness" once captivated people's imaginations as a vision of a perfect future, the transition into the 21st century has revealed the inherent limitations and challenges associated with this architectural concept, especially in the context of sustainability, urban planning, and human experience.

Also, truly entering the Information Age, computer information technology has had an unprecedented impact on people's lives, significantly diminishing the relevance of "Bigness" in architecture. In the previous century, information retrieval was less efficient, and people relied more on physical experiences for accumulating and making judgments based on their experiences. This limited people's cognitive scope to predominantly within their local communities. Koolhaas's "Bigness" architecture essentially aimed to accommodate all the functions and events of a community within a single megastructure, making such a grand building a central figure in people's cognitive lives, which was an achievable goal at the time.

However, the arrival of the Information Age has revolutionized the efficiency of information access and experience accumulation. People's daily lives no longer have to be confined solely within their communities, and even small towns may no longer suffice to meet people's daily needs. Specifically, efficient information platforms allow people to effortlessly stay informed about events throughout the entire city. People's daily activities are no longer dictated by information barriers but by the efficiency of their transportation options. Coupled with the robust development of urban transit systems, people's life radius has expanded from a few kilometers around their neighborhood to tens of kilometers throughout the city. In this context, individual "Bigness" buildings cannot possibly encapsulate the entire city's functions, and those buildings with "Bigness" as their objective ultimately become mediocre players within the grand stage of the entire "Bigness" city. Perhaps such a

building possesses multiple functions, but unless it integrates all the core city functions (top-notch dining, entertainment, experiences, etc.), it still merely becomes one of the dozens of sites in the daily cognitive lives of people, falling short of being a truly "Bigness" architectural characteristic.

3 Case Study

3.1 The "Bigness" of the CCTV Headquarters

The CCTV Headquarters, located near the Guomao Central Business District in Beijing's Chaoyang District, is a distinctive building designed by Rem Koolhaas and the Dutch architectural firm OMA (Office for Metropolitan Architecture). The main tower of the CCTV Headquarters stands at a height of 234 meters and is renowned for its unique and unconventional appearance and structure. It comprises two high-rise towers connected by a cantilevered bridge, forming a distinctive structure that resembles a "big pair of pants" or "twin towers." The building features a fully glazed curtain wall that emphasizes simplicity and purity in its facade design, reflecting its modern and futuristic architectural style.

At the inception of its design, Koolhaas envisioned the CCTV Headquarters as the perfect embodiment of "Bigness" in architecture:

(1) Monumental Scale: The two high-rise towers and the cantilevered bridge make up the substantial volume of the entire building. The architectural structure was pioneering and, at one point, deemed impossible to achieve due to its cantilevered distance. This contributes to the building's high visual impact when viewed from the exterior.

(2) Function Separation and Integration: Koolhaas's theory acknowledges that large-scale architectural projects often involve the separation and integration of functions. The building houses various functions, including television broadcasting and production, office spaces, conference facilities, and various other uses. These functions are intertwined within the building, each having its own designated areas and private spaces, yet interconnected in terms of circulation, reflecting the complexity and hybrid nature emphasized by Koolhaas.

(3) Innovation and Departure from Tradition: The design of the CCTV Headquarters breaks free from traditional architectural norms and frameworks, embodying a spirit of innovation and departure from convention. The building completely departs from the traditional structural frameworks and standard floor patterns of high-rise buildings. The overall form of the building resembles an enlarged sculpture, aligning with Koolhaas's encouragement of thinking beyond traditional architectural approaches and methods.

The CCTV Headquarters exemplifies the principles of "Bigness" in its bold design and innovative approach, encompassing a monumental scale, intricate function separation and integration, and a departure from architectural conventions. However, as the Information Age has advanced and society's needs have evolved, the building's role in

people's lives and the cityscape has faced challenges, leading to a reconsideration of the concept of "Bigness" in contemporary architecture.

This indeed demonstrates that Koolhaas, in the initial design, made considerable efforts to realize the "Bigness" of the building. However, since the CCTV Headquarters became operational, its "Bigness" has gradually diminished over time:

(1) Overshadowed by the Urban Skyline: The monumental scale of the building has been overshadowed by the emergence of numerous "tallest" and "even taller" skyscrapers in the densely populated CBD. With advancements in architectural technology and materials, people have begun to realize that these so-called "Bigness" skyscrapers may not be as sublime and magnificent as Mount Everest.

(2) Decline in Comprehensive Functions and Monotony: During the design phase, Koolhaas envisioned the CCTV Headquarters as a place with a variety of functions, including dining, entertainment, communal spaces, and sports, to cater to the daily needs of the working population. However, in the competitive Information Age, mere existence is not enough to attract popularity in the dining and entertainment sector. After work, office-goers prefer to take a short subway ride to places like Sanlitun for leisure and entertainment. Attempting to compete with Sanlitun for dining and entertainment influence as an office building seems like a far-fetched dream. As a result, over time, the building's functional identity has largely reverted to that of an office building.

(3) Metabolism of Innovation and Transcendence: Two decades ago, the architectural design of the CCTV Headquarters was genuinely groundbreaking. However, with the rise of numerous architects known for their innovative architectural designs, such as Zaha Hadid, Snøhetta, and others, the building's once "innovative design" now seems to reflect the passage of time and the evolution of eras. The "Bigness" created through distinctive design innovation can only exist for a while.

The evolving urban landscape and the changing societal demands of the Information Age have led to the diminishing impact of the CCTV Headquarters' "Bigness." As the definition of "Bigness" continues to transform, it raises questions about the sustainability of this architectural concept in the contemporary world.

The gradual disappearance of the "Bigness" of the CCTV Headquarters is fundamentally rooted in the fact that Koolhaas, in his pursuit of grandeur, primarily approached the design process from the perspective of an architect, focused on creating a building that appeared grand to the eyes of architects. He overlooked the fact that the personal convictions and aspirations of architects may not necessarily align with the core perceptions of ordinary users. In other words, to truly create "Bigness," we need to shift our focus to the perspective of the end-users and study the characteristics that, in their perception, define a building as having "Bigness" in the context of urban life. Understanding the "Bigness" of a building from the user's perspective involves considering elements like accessibility, functionality, and how the building integrates with the daily life of the city's inhabitants. It goes beyond the architect's aesthetic vision and delves into how the building serves the community, how it impacts the urban environment, and how it contributes to the daily lives of people.

3.2 Urban Cognition and "Bigness"

As previously discussed, Rem Koolhaas failed to shift the perspective of "bigness" to that of the users in his design, leading to a brief period of "bigness" for the CCTV Headquarters, which later began to wane. To find the true characteristics of "bigness" from the users' perspective, we can explore grand architecture in the history of urban development.

Louis Mumford once pointed out in "The City in History" that the origin of cities was closely tied to people's fear of death and nature. They regarded burial sites as the

most sacred places and started building their camps around these sacred grounds. This marked the inception of cities, transitioning from primitive linear nomadic societies into expanding tribal civilizations, forming the earliest urban forms. As cities evolved, activities in the city were placed in the safest and most important locations based on the core ideology.

For instance, iconic structures such as the Acropolis in Athens, the ancient Egyptian pyramids, and ancient Chinese palaces and imperial tombs are emblematic urban buildings. They have withstood the test of history and hold a significant place in contemporary urban consciousness. Their "bigness" is not primarily based on physical features or size, but rather on their close connection to collective memories of their respective eras. These structures are intertwined with themes like burial, faith, power, leaving profound impressions in people's minds.

It is evident that if a building can be closely associated with important memories in people's cognition, it has the potential to possess "bigness." This emphasizes the cultural, historical, and symbolic significance of buildings, beyond just their appearance or scale. In urban planning and architectural design, considering the cultural background and social significance of a building and how it integrates into urban life and collective urban memory can help create buildings with more enduring "bigness" that will profoundly affect people's cognition and emotions.

Certainly, contemporary society no longer holds reverence for death or adoration for monarchy. Our lives have become more individual-centric, with less attachment to other individuals or totems. However, this doesn't mean that fragments of our daily lives cannot give birth to "bigness." The Eiffel Tower in the hearts of the Parisian people is seen as a structure imbued with "bigness" because, from its inception, the Eiffel Tower aimed to become a part of the lives of the people of Paris. Every Parisian could see the Eiffel Tower from their own windows. This, of course, was an ideal vision, but it reflects that "bigness" can also emerge from everyday life. Recently, the construction of the colossal sphere in Las Vegas exhibits the potential for "bigness" because it actively engages with people's daily lives. Over time, it can leave a vivid mark in the collective cognitive memory of people. This kind of "bigness" that evolves through the passage of time is not easily affected by urban redevelopment or the information age. It is deeply etched in people's cognitive memory and remains enduring.

4 Conclusion and Suggestion

Rem Koolhaas's concept of architectural "bigness" proposed in the 1970s was a crystallization of the utopian ideals prevalent at that time. High-rise buildings, with the CCTV Headquarters at the forefront, briefly achieved the goal of "bigness." However, as time passed and the impact of the information age unfolded, urban lifestyles and people's priorities underwent significant changes. Individual buildings could no longer rely on comprehensive functions and sheer volume to embody "bigness." Attempting to do so

would lead to resource waste and a misalignment of building purposes.

To correctly shape buildings with "bigness," we should adopt a perspective closer to people's daily lives. Instead of focusing solely on the form and function of the building itself, we should design buildings as integral parts of people's daily life based on their perception of the city. Over time, these buildings can become important elements of people's daily lives. Buildings shaped in this manner possess greater longevity and are less susceptible to being replaced by short-term changes in the zeitgeist.

Also, to achieve "Bigness" that resonates with users, it's important to consider the following aspects during real architectural design:

(1)Functionality: Understanding how a building's functions cater to the daily needs of the community. Does it offer convenience, a range of amenities, and a space that enhances the quality of life for its users?

(2)Accessibility: Assessing how accessible the building is for a diverse group of users. Can people of different backgrounds and abilities easily access and navigate the building?

(3)Integration: Examining how the building harmoniously integrates with the surrounding urban environment. Does it contribute positively to the city's identity and offer a sense of place?

(4)Impact on Community: Evaluating the building's impact on the community, both in terms of its physical presence and its cultural significance. Does it foster a sense of pride and identity among the local population?

(5)Longevity: Considering how the building's design and function are adaptable to changing societal needs over time. Can it remain relevant and continue to serve its users effectively as the city evolves?

By shifting the focus to the user's perspective and emphasizing these aspects, architects and designers can create buildings that embody "Bigness" not just in terms of scale and form but in how they enhance the daily lives and experiences of the people they serve. This approach can help ensure that "Bigness" remains a relevant and enduring concept in contemporary architecture.

References:

[1] Otero-Pailos, J., 2000. The grandeur behind: Some retro tendencies in Rem Koolhaas's urban theory. City, 4(3), 379-389.

[2] Garagnani, R., 2008. Rem Koolhaas/OMA: Building Merveilles. École Polytechnique Fédérale de Lausanne Press.

[3] Koolhaas, R., 2014. Delirious New York: A Retroactive Manifesto for Manhattan. The Monacelli Press, LLC.

[4] Koolhaas, R., & Mau, B., 1997. S, M, L, XL. The Monacelli Press, LLC.

[5] Lewis, M., Mangford, S., Song, J., & Song, Y., 2019. Urban Development History - Origin, Evolution, and Prospects. Shu Cheng, 2(68), 68-68.

[6] Kapagavalli, S., & Chandra, E., 2016. A review of architecture and methods for automatic speech recognition. International Journal of Signal, Image, and Pattern Recognition, 9(4), 393-404.

[7] Guggenheim, M., 2009. Constructing Memory: Architecture, Networks, and Users. Memory Studies, 2(1), 39-53.

[8] Mitchell, W.J., 1990. The Logic of Architecture: Design, Computation, and Cognition (p. 292). Cambridge, Massachusetts: MIT Press.