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# Characteristics of Iconic High-rise Buildings

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Abstract: Iconography is a degree given to a building and an objective of its architectural design. The iconic high-rise buildings are important in various fields. Distinctiveness in skyscrapers is not achieved by chance or by exciting stories told about the building. Exaggeration in one of design elements does not achieve the uniqueness and architectural creativity. Iconicity is a product of gathering specific main cores. The iconic tall buildings have distinct characteristics that set them different from other buildings. This paper proposes to combine the distinctive characteristics of the iconic high-rise buildings from different references to form a unified and clear methodology used when designing to achieve the iconicity. The developed methodology can be relied upon in the critical analysis of those skyscrapers to determine the degree of iconicity, and to know the reasons for the failure of some tall buildings in achieving the iconicity with a simple and systematic methodology.

*Keywords:* Iconic buildings, Iconography degree, Unique concept, Metaphoric form, Sustainable.

#### I. INTRODUCTION

The term 'icon' refers to an item or person viewed as being a symbol of something [13]. When the term 'icon' is used to refer to an 'Archaeological Building', such as churches, cathedrals, temples and the tombs of pharaohs, it indicates the beauty of the building, its strength and its steadfastness over the ages, but when it refers to a modern high-rise building, it is not necessary for it to have a touching story that people share to be iconic [8]. The criteria differ when evaluating the iconic high-rise buildings. Architects may think that the unique iconic buildings may be reached by boldness in composition, or by extreme exaggeration in one of the design features such as height or size of the building, or its difference from the architectural character of the surrounding buildings, and some think that the iconic building needs an influential story to be told about it to be related to people's minds that this building is unique from others, but by relying on the principle of extremism in design, the architectural design may reach to be a source of visual pollution and harm to human feelings.

There is a lack of knowledge of the importance of creating these architectural masterpieces for some cities that do not have iconic architectural projects that attract the world's attention to them. These distinctive buildings have the ability to influence in various fields, and there is not enough awareness of the basic factors needed to build these distinctive high-rise buildings [27].

#### A. Importance

The significance of the iconic high-rises is evident in their impact on the public fields. These distinctive buildings have a significant impact on the recovery of the economy and globalization of countries and cities. For example, the construction of 'Burj Khalifa' - the tallest building in the world- has an impact on the economy of 'Dubai' in the 'United Arab Emirates', as it directly affects the global globalization system. The distinctive skyscrapers are a guaranteed source for increasing the income of countries and cities by influencing fields like investment, tourism, marketing, media and cinema.

In addition to the direct impact of these skyscrapers on the policies of countries and their regional and global authorities, so that large cities seek to own iconic skyscrapers to make them significant and clear among the ranks of large cities of global concern, and these buildings are also affected the religious field and the identity of societies by influencing the behavior of individuals [27].

#### B. Iconography's creation main cores

The meeting point between the architect, the constructor, the state and the client is the starting point for the foundation of any iconic project. The architectural creativity necessary to create this distinctive building must be available. Structural capabilities are necessary to implement the creative architectural vision.

State should facilitate the construction process by passing laws that allow this edifice to be created, and provide appropriate infrastructure projects that accommodate this iconic project. The beginning of the construction of the iconic skyscraper requires the presence of the ideal client, who possesses the intellectual flexibility to accept innovative ideas, and has the financial ability to withstand the potential cost increases for that project.

## **II. LITERATURE REVIEW**

Multiple ways in dividing characteristics of iconic high-rise buildings have been suggested in many references, such as:

- Ducks and decorated sheds styles [26]:
  - Ducks: It is a type of building sculpture, and its architectural systems are described as a structure carved to present a symbolic form.

- Decorated sheds: are the buildings in which the space and structure systems are directly at the service of the program and the decoration is applied independently of them.

- Betsky divides features in the following way [5]:
- (1) The specific 'Wow' factor.
- (2) Ability of making great contact with audience.
- (3) The way the icons appear.
- (4) The framework is as important as the content.
- (5) Combining emotive design and human factor.
- (6) It is not possible to define its separate parts alone.
- (7) Those buildings seem in a smooth shape.
- (8) It is defined as a Monumental Masterpieces.
- (9) They were light and luxurious, emitting translucency.

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(10) It is perfect in symbolism and presentation.

- (11) The enigmatic character and the sense of density.
- Sklair mentioned the importance of the large scale, and the usage of new technologies and architectural glass to achieve the translucency [24].
- Nagy [18] divided features of iconic high-rise buildings as follows:

(1) Unique design.
(2) New techniques in construction.
(3) High efficiency.
(4) New materials used.
(5) Technology.

- Pasquotto mentioned the importance of choosing famous architect as the most important issue in the design process of iconic high-rise buildings, the architects are chosen from among the famous names in the international media. Where the added value of the brand that refers to the project is more important than its spatial, functional and symbolic qualities, therefore, the signature of the famous architect is used as a method of marketing [21].
- Yildiz classify the characteristics that make any building 'Iconic' as follows [27]:

(1) Original design. (2) Large scale. (3) New construction technologies and materials. (4) Spectacular representation. (5) Metaphoric forms.

- Ali pointed out that high-rise buildings are iconic when attention is paid to the design statement, form, historical context, and the role of the skyscraper in the urban context [1].
- Tomlinson stated that the characteristics that make the building iconic are as follows [25]:
  - The building has hundreds of years of history, such as St. Paul's Cathedral in London.
  - Unique design, such as the Guggenheim Museum in Bilbao.
  - That the building breaks some world records, such as Burj Khalifa in Dubai.

#### III. PROPOSED FEATURES OF HIGH-RISE ICONIC BUILDINGS

Studying the distinctive characteristics of iconic skyscrapers from the literature reviews that mentioned this topic, results in arriving at the common characteristics that distinguish these buildings. After deleting the features that were not frequently repeated, not measurable and not unanimously agreed upon by the analysts, the study proposes dividing the common characteristics that are frequently repeated into four main features, which are as follows:

## A. Visual strong effect

The visual impact of buildings is the strongest mean of communication with the human mind, because the human brain thinks first by remembering images not names [27].

This feature is divided into seven points:

• Spectacular representation (landmark): these buildings must have a stunning representation, as it must represent an emotional state, a great event, or a firm belief, or the building itself must be a great event and symbol that the people of the city or country relates to, and be a reference to them to be proud of.

- Unique concept: the original design of those buildings elevates the prestige of the building, and becomes a metaphor for human aspirations. The architectural design is a statement of intentions and hidden messages, so the more unique the design of the building the more iconic the building becomes. Therefore, for a building to be strong in visual impact, it must be visually memorable, and have an interesting form [25].
- Challenging to context (moment of courage): The sense of adventure in the architectural design of highrise buildings promises a more exciting future and attracts people's attention, as adventure and challenge create new ideas in building and a new vision for the future of architecture, not only for the building but also for the city. But some experts in the architectural field warn that modern architecture that contrasts sharply with its surroundings can attract a great deal of critical views, such as the 30 St. Mary Axe building, known as the 'Gherkin' as shown in fig. 1, has drawn many critical opinions and has been scathingly criticized and accused of distorting London's skyline at the beginning of its creation, but eventually won the support of critics [25].



Figure 1: The Gherkin, London, England [17]

- The honest use of materials: Honesty in the use of appropriate materials is one of the reasons for the 'Iconography' of construction, as understanding the possibilities and limitations of materials is an important aspect of architecture, whether it is an understanding of the uses of contemporary or historical materials, or the experience of new ways of using materials. Knowing the method of using materials increases the quality of the building. The materials outside must be related to the building's location and environment, and the materials inside must be linked to the building's function and uses. As these are very different requirements, but the material specifications must match the internal and external requirements of the building [10].
- Unique silhouette: Architectural history teachers assert that the main reason for the formation of iconic architecture throughout history, from the construction of 'Giza Pyramids' to 'Burj Khalifa' in 'Dubai', lies in its unique silhouette. The most iconic buildings could be drawn with a single line on a blank page. Some unique silhouettes begin and

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become simple everywhere on earth because of their effortless style. The classic pencil shape in buildings like the 'Empire State Building' as shown in fig. 2 and 'Chrysler' as shown in fig. 3 is a perfect example of this, as these towers are as iconic as ever [15].

- Pure simplicity: Simplicity is a common feature found in many of the most iconic buildings around the world, so that it can be a unique, eye-catching gesture that culminates in a structure that is never forgotten. Given the relentless verticality of the 'Twin Towers' of Minoru Yamasaki as shown in fig. 4, or the smooth shape of Foster's St Mary Axe, and of course there are exceptions to every rule, as simplicity can be dispensed with if the building to be an icon is primarily of medium height rather than tall height [15].
- Perfect symmetry: Symmetry is present and widespread in iconic high-rise buildings, as it is a common characteristic of icons such as the 'Empire State Building', 'Burj Al Arab', 'The Gherkin', 'The Pyramids of Giza' and 'Eiffel Tower' in Paris, and that strong symmetry leaves an impression in people's minds, as it is difficult to reach iconography in high-rise buildings without resorting to perfect symmetry [15].



Figure 2: The Empire state building, New York, USA [28].



Figure 3: The Chrysler, New York, USA [3].



Figure 4: The Twin towers, New York, USA [2].

#### B. A meaningful message

Architectural styles in iconic buildings derive their uniqueness by showing off building techniques, creative movements, and social changes that shape the zeitgeist somewhere at a particular moment in time, whether it's a rebirth of art and culture with renaissance architecture, or steel skyscrapers. In the post-war movement, each change of style tells us something different about the shifts in architectural history, as it shows that iconic architecture has always had meaningful messages to people. This feature is divided into three points:

- Brilliant backstory: it must be taken into consideration, having a story told about the building is one of the reasons for its iconicity, because it gives a sense of mystery, raises people's passion to talk about that iconic building, visit it and take memorial photos next to it. The more stories and legends that are told about the history of the building, the more people become attached to that building and that building became classified as an icon in people's perspective [25].
- Metaphoric forms (poetic metaphor): Adding enigmatic signifiers and a metaphoric form to the building like 'The Gherkin' as shown in fig. 5, that can be used to enhance the building's deeper meaning to be successful allows the viewer to draw his personal symbols and his own interpretations on it, where people try to stand in front of these architectural masterpieces over and over again to reach their moral and symbolic connotations [16].

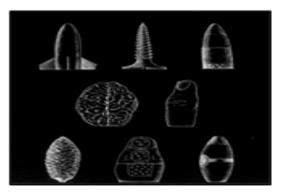


Figure 5: Metaphoric form of Gherkin tower [14].

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- Relation to country identity: Iconic building must represent the culture of the environment to which it belongs, in order to form a bridge and a relationship between the icon and people. The cultural and social aspect is important in defining the iconic buildings. In fact, iconic architecture is a distinctive way to represent the identity of the community, its culture, history and beliefs. Iconic building must represent the symbolic value of its city. Nowadays, iconic high-rise building represents technology, modernization and the advanced future of the place in which it is located [6].

#### C. Technical modernity

New buildings have the upper hand, because advances in technology means that structural engineers and architects can now do what was previously unimaginable. New designs that were impossible to imagine decades ago are now being built. The promise of a better future and a sense of adventure are important things that attract people's attention [25]. This feature is divided into two points:

-High efficiency: Those buildings must consume less energy in cooling, heating, lighting and ventilation, which reduces electricity bills and increases the price of housing units. Provides thermal comfort and natural lighting and reduces pollution and carbon dioxide emissions. It has high technologies of insulation to reduce noise inside the building. - New construction techniques: With the rapid development of modern construction technology, more and more complex buildings are being built which would not have been possible without the use of advanced modeling techniques. As structural engineers have to deal with the increasing difficulties of designing the most complex projects. This is impossible without the use of modern computer technology and modern building techniques, which became one of the iconic features [11].

#### D. Permanent building

Continuity and resilience through time is one of the most important features of iconic high-rise buildings. In fact, no structure is permanent forever. Buildings' structures will degrade over time and eventually fall into disrepair, unusable or demolished. However, they can the structural systems of the building is considered permanent if it is designed for long-term use, rather than short-term or temporary use. The duration that can be considered long-term varies depending on the life span of the structure design. This feature is divided into two points:

- Durable: The continuity of the iconic building and its steadfastness through different times is always one of the most important reasons for the iconography of that building. The durability is the resistance of the building materials, buildings and structural system to deterioration. It may be difficult to measure this characteristic of new high-rise structures because this requires many years, and also requires those buildings to pass real tests such as earthquakes and natural disasters [14].

-Sustainable technologies: A characteristic of iconic highrise buildings is its advancement in the use of sustainable architecture methods, which seek to reduce the negative environmental impact of buildings through moderation and maximum efficiency in the use of energies, resources and ecosystems in general. When modern iconic architecture uses a conscious approach to energy and conservation in the design of the built environment, the idea of sustainable design is to ensure that the use of currently available resources does not lead to adverse effects on individuals and society.

#### IV. ANALYSIS OF ICONOGRAPHY DEGREE

Five of the iconic high-rises were analyzed, for their iconic grade according to the distinctive features extracted from this study. Those buildings were selected according to specific criteria, which are as follows:

- The building broke global or local records.
- The reputation of the building at the global or local level.
- The presence of the opinions of architectural critics about the building.
- The strong influence of the building on the city in which it is located in various fields.

#### A. Analysis methodology

The method of analyzing the selected buildings depends on knowing the way they were built and their history and knowing the concept of designing those buildings and the architectural message that the building presents to know the degree of their success as icons. The characteristics of those buildings are compared with the distinctive features reached by this paper, to know the extent of the validity of the distinctive characteristics and to reach the degree of iconography present in each building.

#### B. Examples of iconic high-rise buildings

In this analysis, iconic tall buildings are reviewed, the degree of whose iconography has been agreed upon by renowned architectural analysts and the general public both globally and locally.

#### 1) Burj Khalifa – Dubai, UAE

Burj Khalifa shown in Fig. 6, which is currently the tallest building in the world which replaced the previous owner 'Taipei 101', it was designed to be the cornerstone of largescale development in Dubai based on the government's decision to diversify the oil-based economy. The construction of this skyscraper was a very important turning point in the history of architecture, as this building has established itself as one of the most famous high-rise buildings in the whole world and in the history of mankind. Just a year after its completion, the tower made a dramatic appearance in the fourth episode of 'Mission Impossible'. Where the building hosted the most important scenes of action, which can be seen from a very far distance [9].

• Design concept:

It was designed in the 'neo-futurism' style of reinforced concrete, metal and aluminum and the triple floors were designed in the shape of 'Y' to increase the efficiency of spaces. It consists of a heart and wings that support that high

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rise, that tower consist of more than 4,000 tons of structural steel. It consists of a few columns placed on the borders of the building.

Those columns are connected to each other by struts, which increases the rigidity of the whole structure [11]. The design is derived from Islamic architecture, there are 27 setbacks in a spiral pattern with the height of the tower from the flat desert base, as this reduces the cross-sectional area of the tower during its height and creates comfortable external terraces. The tower only swings with a total of 1.5 meters. The exterior cladding consists of 142,000 square meters of more than 26,000 reflective glass panels, aluminum panels and stainless steel with vertical tubular fins. This architectural glass acts as a shield against glare, desert sunlight and strong wind [7].

• Iconic features achieved:

It has a distinctive visual effect and can be seen from long distances, has a unique silhouette, and has a symmetrical shape. The materials used in its construction are suitable for design, and the building is considered out of context with buildings around it because of its high height. It presents a strong message as it announces the power and hegemony of the state. The design reflects metaphorical forms. Very modern building techniques were used in its construction, and it is considered strong to withstand natural conditions. The building received 27 awards in 2010 and 2011, and it destroyed many record numbers [19].

#### 2) The Gherkin – London, U.K

The Gherkin shown in fig. 7, in reference to the unconventional layout and exquisite appearance is considered as the most famous building in the city with its distinctive architectural style. The building appeared in recent films such as 'Harry Potter', 'Half Blood Prince', 'A Good Year', 'Basic Instinct 2', and 'Match Point'. Since 2010, 'Sky News' has been broadcasting its popular show 'Jeff Randall Live' from a studio in the building [9].

#### • Design concept:

It is designed in 'Neo-futuristic/Structural expressionism', and has a panoramic upper dome, dubbed the lens. The diameter of the building measures 49 meters at the base and increases to 56.5 in the widest part and decreases to 26.5 on the highest floor, giving the appearance of a rocket or cucumber as London residents believe. This design improves the flow of wind around the facades because every floor rotates 5 degrees to previous one, which reduces pressure on the structure and prevents it from being directed to ground level. Most rooms overlook the outside [17]. It has a form of a radial plan. Walls and ceilings were covered with a continuous triangular skin of glass, allowing the entry of natural light. The building uses energy-saving methods that make it consume half the energy of a similar tower. The voids on each floor create 6 shafts which provide a natural ventilation system for the whole building [17]. Shafts draw warm air from the building in the summer and heat the building in the winter using passive solar heating.



Figure 6: Taken by the researcher of Burj Khalifa, Dubai, UAE.



Figure 7: The Gherkin, London, England [20].

#### • Iconic features achieved:

It has a wonderful design and an interest in sustainability, energy savings, natural lighting, and has an ability to increase tourism. It applies modern systems. It has a unique design out of the prevailing context of the buildings around it, and it has a large scale. It possesses distinctive poetic inspirations and signs of ambiguity that stimulate the public to think and feel a new identity evoked by the innovatively designed building. Since its completion, the building has received several awards in the field of architecture.

#### 3) 432 Park Avenue – New York, USA

At the time of construction, the building was the third tallest building in the United States and the tallest residential building in the world shown in fig. 8. In 2021 it was the sixth tallest building in USA and the third tallest residential building in the world. It is characterized by its delicacy and its symbolism as a residence for the wealthy [22].

• Design concept:

It is designed in a contemporary design, the outer surface of the tower consists of a grid of cast-in-place concrete, consisting of white cement. The building is divided into 12storey blocks separated by two open floors mechanical spaces to allow air to pass through the building to reduce the wind load on it. By measuring the height-to-width ratio in it, it's found that it is one of the thinnest buildings, so it has been described as a pencil tower in New York city [22]. Many problems occurred for the residents, including two elevators were stopped for weeks in 2018 due to a leak in the

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mechanical floor, water damages were reported in many flats, the complaints included that high winds held one of the residents inside the elevator and caused 'creaking, banging and clicking noises', and residents have complained about the increase in the high annual costs of servicing a private restaurant. In addition to a 300 percent increase in insurance costs during a period of two years. It found that 73 percent of the building's mechanical, plumbing, or electrical infrastructure was not built according to the plans [22].



Figure 8: 432 Park Avenue, New York, USA [4].



Figure 9: Shanghai Tower, Shanghai, China [23].

• Iconic features achieved:

It does not have a strong visual impact. The design is not unique, but the designer has adopted a very simple and repeated design in concrete buildings. It does not have a unique silhouette and cannot be considered as a landmark. The moral message from behind the building is very negative as it appears in the comments of critics and residents of the city that the building symbolizes the difference of social classes and the discrimination of the rich with wealth. There is no great use of technology in the building. It can be considered that the building is permanent due to the use of a wonderful method of distributing the loads, but modern sustainability techniques were not used in the construction.

#### 4) Shanghai Tower – Shanghai, China

Shanghai Tower shown in fig. 9, is the third tallest building in the world, and the tallest building in Pudong in Shanghai, it has the highest observation deck in the world at a height of 562 meters, and it has the second fastest elevator in the world at a speed of 20.5 meters per second [12].

#### Design concept:

It takes the form of nine cylindrical buildings stacked on top of each other, all surrounded by the inner layer of the glass facade. It is designed to capture rainwater for internal use, and part of the sewage is recycled. The building is twisted at an angle of 120 degrees to reduce the wind load on the building by 24 percent, and this was the reason for reducing the quantities of building and reinforcement materials by 25 percent for a building of the same height, thus saving 58 million dollars in construction cost. The building has 270 vertical wind turbines capable of generating up to 350,000 kWh of electricity annually, which provides 10 percent of the building's electrical needs. The use of two layers of glass on the facade has reduced the electricity required for air conditioning the building. As a result of the torsion in the design of the building, there is a large unused area of up to 50 percent, which led to an increase in the cost of rent to compensate for the abandoned spaces [12].

• Iconic features achieved:

It has a good visual effect, the design is somewhat unique but not exceptional, the building is not considered out of context, the silhouette is considered weak, and it is asymmetric. It has no poetic metaphor or a clear allegorical form, but it may have little to do with the identity of the state. There is a high level of technology used in it and modern building techniques have been used in the construction. The building is keen on modern sustainability techniques.

#### 5) San Stefano Grand Plaza – Alexandria, Egypt

The building shown in fig. 10 is the second tallest building in the city of Alexandria; the building can be seen from very far areas. It overlooks four streets. It is only 5 km from the airport and 10 kilometers from the entrance of the city, and the commercial complex in the building is a place for picnics for the residents of Alexandria.

#### • Design concept:

It was built based on a system of columns and beams using cast concrete. The building's facades are made of bricks coated with paints that are resistant to erosion factors caused by the influence of the sea. Blue glass covers a small part of the façade. The rest of the facade is a grid of balconies overlooking the sea shore. The design of the building is symmetrical on all sides in the form of two inverted 'U' letters opposite from the back and connected. It may represent some class differences in the Egyptian society, as the housing units in it are very expensive for most of the city's residents.

• Iconic features achieved:

It is a landmark of Alexandria because of its high altitude from the surrounding buildings in the city, the visual effect is attractive, but it is not exceptional. It defies the general fabric surrounding it because of its height. It does not have a strong silhouette, the building is a symmetric and the appropriate materials were used in its construction where its condition is still excellent since its construction until now,

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and it has not been affected by the erosion factors caused by its proximity to the sea.



Figure 10: Taken by the researcher of San Stefano Grand Plaza, Alexandria, Egypt.

## C. Results

- Looking at the results from the following table (table I):
- The degree of iconicity of the building is evaluated by researching the presence of each iconic feature in the building, to know the number of distinctive characteristics in each building.
- By collecting the common iconic characteristics of the iconic high-rise buildings that were analyzed, it was found that there are iconic qualities that cannot be dispensed with even in the case of a weak degree of iconography for the building, such as:
  - 1. The impressive representation of the building.
  - 2. The challenging to the context of the buildings around it.
  - 3. The great relevance with the identity of the state or the city.
  - 4. It is a durable building.
  - 5. The pure simplicity of the design.

6. The perfect symmetry in the design of the building.

It found that there is an iconic characteristic that has not been repeated much, such as the brilliant backstory that is told about the building and its history, which means that it is no longer a feature of great importance in the iconic modern high-rise buildings.

## D. Overview of findings

The results in the previous table reflect reality very clearly, as follows:

- 1. Burj Khalifa has 11 iconic features, thus surpassing more than half of the distinctive features, indicating the building's strength from an iconic point of view, which is very much in line with its global status as an icon of Dubai.
- 2. The Gherkin received the highest score among the buildings studied. This score shows in people's association with the building as an icon in London, confirming the views of architectural critics that this building is exceptional, and takes into account many of the iconic characteristics.
- 3.432 Park Avenue has achieved 4 iconic features only, which indicates that the building is weak in iconographic terms. This is clearly reflected in the negative opinions of critics about this building.
- 4. Shanghai tower has slightly exceeded half the number of features to achieve only 8 characteristics, thus it is an iconic building, but not significantly. This score is clearly evident in the negative criticism directed at that tower, and that its global fame is not at the level required.
- 5. San Stefano grand plaza achieved only half the number of features, and this corresponds to the truth, as this building is only famous at the local level in the city of Alexandria, and its reputation did not exceed that.

		Burj Khalifa	The Gherkin	432 Park Avenue	Shanghai tower	San Stefano
Iconic features Buildings						
Visual strong effect	Spectacular representation (Landmark)	√	✓	-	-	✓
	Unique concept	-	~	-	✓	✓
	Challenging to context (Moment of courage)	√	✓	-	-	✓
	The honest use of materials	~	~	-	$\checkmark$	~
	Unique silhouette	✓	✓	-	-	-
	Pure simplicity	✓	~	~	✓	-
	Perfect symmetry	~	~	✓	-	✓
Meaningful Message	Brilliant backstory	-	-	-	-	-
	Metaphoric forms (Poetic metaphor)	✓	<b>√</b>	-	-	-
	Relation to country identity	✓	-	~	✓	✓
Tech nical mod ernit	High efficiency	✓	~	-	$\checkmark$	-
	New construction techniques	$\checkmark$	~	-	$\checkmark$	-
Perm anen t build	Durable	✓	✓	~	$\checkmark$	✓
	Sustainable technologies	-	✓	-	$\checkmark$	-

Table 1: Rating 5 buildings for the iconic features of high-rise buildings.

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#### V. CONCLUSION

This paper discussed the characteristics of iconic high-rise buildings. The study presented the importance of iconic buildings and the basic principles necessary for their construction. Hence, the features that distinguish these buildings were searched for. Based on the theoretical literature, it is possible to identify the characteristics necessary to make the building iconic, such as visual impact, meaningful message, technical modernity, and building continuity through time. The research proposes a framework as a tool for assessing the degree of iconicity of any tall building. Moreover, it can be applied during design to achieve iconography. The research focused on the iconography of high-rise buildings. After determining the methodology, five famous high-rise buildings were selected, and the methodology was applied to them to evaluate and determine the degree of their iconography, and to find out the extent to which the evaluation result matches the degree of success of those buildings as icons in reality. The research concluded that the evaluation methodology is completely logical and impartial and can be relied upon in measuring the degree of iconography and design of high-rise buildings.

#### REFERENCES

- [1] Ali, M. (2005). CTUBH 2005 7th World Congress. In the skyscraper: epitome of human aspirations (pp. 1–9). New York, USA.
- [2] Anderson, B. C. (2001). The Twin Towers Project: A Cautionary Tale. City Journal.
- [3] Augustyn, A. (2010, July 15). Chrysler Building. Britannica. Retrieved from https://www.britannica.com/topic/Chrysler-Building.
- [4] Bekiempis, V. (2021). High anxiety: super-rich find supertall skyscraper an uncomfortable perch. The Guardian, 1–1.
- [5] Betsky, A. (1997). Icons, magnets of meaning: San francisco. Chronicle Books.
- [6] Davarpanah, S. (2012). A Query on the Impact of Place on the Formation of Iconic Buildings in Architecture (thesis). Gazimağusa.
- [7] Ding, F., & Kareem, A. (2020). Tall buildings with dynamic facade under winds. ELSEVIER, 6(12), 1443–1453. https://doi.org/10.1016/j.eng.2020.07.020.
- [8] Elhagla, K., Nassar, D. M., & Ragheb, M. A. (2020). Iconic buildings' contribution toward urbanism. Alexandria Engineering Journal, 59(2), 803–813. https://doi.org/10.1016/j.aej.2020.01.020.
- [9] Erbay, M. (2013). Modern architecture and cinema: an assessment through iconic buildings (thesis). academia.edu, Trabzon.
- [10] Farrelly, L. (2012). Contemporary Ideas. In The Fundamentals of Architecture (2nd ed., pp. 136–160). essay, AVA Publishing.
- [11] Fu, F. (2015). Tall buildings. In Advanced modelling techniques in structural design (1st ed., pp. 26–26). essay, Wiley Blackwell.
- [12] Hu, G., Zhu, S., Gao, R., & Xiao, L. (2021). Modeling and analysis of Shanghai Tower based on Ansys Workbench. 2021 4th International Symposium. https://doi.org/10.1109/isttca53489.2021.9654785.
- [13] Icon. Oxford Learners' Dictionaries. (2021). Retrieved August 7, 2021.
- [14] Jencks, C. (2005). The Iconic Building. Rizzoli.
- [15] Jones, P. (2011). Iconic Architecture and Regeneration: The Form is the Function. Liverpool University Press, 115–140. https://doi.org/10.5949/upo9781846315930.

- [16] Mahdi, H. (2019). Iconic architecture and sustainability as a tool to attract the global attention (thesis). ResearchGate.
- [17] Mckenna, K. (2015, October 21). The gherkin. Academia.edu. Retrieved January 6, 2022, from https://www.academia.edu/17089030/The\_Gherkin.
- [18] Nagy, S. (2016, January 30). Iconic Buildings Classification. Academia.edu. Retrieved May 2, 2021, from https://www.academia.edu/21222671/Iconic\_Buildings\_Classification.
   [19] Narayanan, S. (2010). BURJ KHALIFA, WORLD'S TALLEST
- STRUCTURE The Burj Khalifa project. ResearchGate, 15.
- [20] Nkandu, M. I., & Alibaba, H. Z. (2018). Biomimicry as an Alternative Approach to Sustainability. Bulletin of the Polytechnic Institute of Jassy, CONSTRUCTIONS. ARCHITECTURE Section., 4–4. https://doi.org/10.5923/j.arch.20180801.01.
- [21] Pasquotto, G. (2019, January 10). Iconic buildings and city marketing the central area of São Paulo. BITÁCORA. Retrieved June 19, 2021, from https://www.academia.edu/38126360/Iconic\_Buildings\_and\_City\_Ma
- rketing\_The\_Central\_Area\_of\_S%C3%A3o\_Paulo. [22] Post, N. M. (2015). Team building 1.397-ft 432 park avenue tower
- went to extremes to make it white. Research Gate. [23] Roxburgh, H. (2016, August 23). Inside Shanghai Tower: China's
- tallest skyscraper claims to be world's Greenest. The Guardian.
- [24] Sklair, L. (2006, April). Iconic architecture and capitalist globalization. Retrieved May 10, 2021, from https://www.researchgate.net/publication/41097874\_Iconic\_architectu re\_and\_capitalist\_globalization.
- [25] Tomlinson, A. (2014). Constructing great reputations: What makes a building iconic? The National News.
- [26] Venturi, R., Brown, D. S., & Izenour, S. (1977). II. In Learning from Las Vegas: The forgotten symbolism of architectural form. essay, MIT Press.
- [27] Yıldız, E. (2018). The importance of iconic buildings for city image: Konya science center example. Iconarp International J. of Architecture and Planning, 6(2), 461–481. https://doi.org/10.15320/iconarp.2018.63.
- [28] Yousuf, I. (2020, September 8). Empire State Building. Encyclopædia Britannica.