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Modern Heritage of the Middle East potentials and values: Documenting a UAE Landmark

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ABSTRACT

Buildings represent the identity of cities and create the memory of the nation. Architecture landmark are the ambassadors of culture and civilization of the country. The UAE modern heritage represented in the 60s, 70s, and 80s architecture signifies the memory of the country and highlights the architecture style and its influences in various periods. The national theatre of Abu Dhabi is a key landmark from the 70s era. This cultural symbol is a landmark that shaped the style of the capital city at this time. This paper is a case study that aims at understanding the architecture of the National Theatre of Abu Dhabi building as a symbol of architecture and the architect's only building remaining in the region. The paper outcomes and findings represent an approach for evaluating and greening modern heritage buildings in the Middle East while protecting both their historical and cultural values. The research aims to provide architects, researchers, and decision makers with a capture of architectural heritage buildings documentation via BIM modelling and traditional methods.

INTRODUCTION

"I don't think all buildings have to be iconic, but the history of the world has shown us that cultures build iconic buildings for their major public buildings". Frank Gehry. Architecture has always been the symbol of nation's civilizations. It gives cultural clues about a city's past, present, and future. While cities are dynamic and can adapt to the changes in technologies, needs, and culture, buildings can take its visitors through time.

"When I concentrate on a specific site or place for which I am going to design a building, I try to plumb its depths, its form, its history and its sensuous qualities." Peter Zumthor.

Heritage Preservation

The process of heritage building preservation is fundamental in sustainable development as it is driven by the goal to preserve an asset so that it can be enjoyed by both present and future generations. According to UNESCO (Rodwell, 2007) "heritage is our legacy from the past, what we live with today, and what we pass on to future generations".

Architecture of the UAE in the 60s and 70s

Consistent changes to the social and economic framework of the United Arab Emirates have led to rapid developments fuelled by the oil industry. The discovery of oil led to several changes to both Emiratis and non-Emiratis living conditions in a region with one of the harshest climates on the planet.

There is a common belief, both among residents and expatriates, that before the discovery of oil, people in the Gulf lived in extreme poverty and had a very little culture worth mentioning (Reus, 2020). For over 5,000 years, there has been evidence of a persistent and advanced society with a rich culture exceptionally suited to the

conditions of the local climate. In the days before oil, the worth of locally sourced goods was high. A supply of fresh water and the abundance of fertile farmland could make a difference between life and death (Haldon, 2020) (Elkaftangui, 2019).

Modern architecture in the U.A.E. was inspired by international developments. There was a transitional period between traditional and modern architecture. It was important for the U.A.E. to catch up with the rest of the world by adapting new materials and slowly adapting new architecture techniques, typologies, and styles (Husnéin, 2017).

The UAE like other nations is trying to keep the memory of its heritage, buildings, and especially key events which took place in these buildings. The UAE was under colonial occupation for an extended period, which made the creation of a national identity requiring a deep search for memory and for its representation, which was identified through architecture to answer the questions on identity, nationalism, control, and influence. The modern heritage, architecture movement in the UAE started in the 60s and 70s. In the recent years, Modern Heritage Initiative was launched to preserve its older buildings from the 60s and 70s. Some of the buildings from this era in Abu Dhabi included, The Cultural Foundation, Qasr Al Hosn, Mina Zayed port and the warehouse, and The National Museum, the subject of this research (Hashim, 2018), (Wakefield, 2020).

Research Objective

The research aims at exploring and documenting the Abu Dhabi National Theatre, an existing Middle Eastern modern heritage building and providing a framework which relies on both digital data and physical measurements and observations for documenting existing buildings.

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Introduction to the building

The national theatre of Abu Dhabi is the first theatre in the emirate of Abu Dhabi, and the largest in the region. The theatre is a 2,250-seat auditorium. In addition, it houses a lecture and conference hall that can accommodate up to 150 people, and an art gallery. The complex has two exhibition halls that display permanent collections of paintings, sculptures, and other forms of arts. It was built in 1981 to host national and international performances. The building is an architectural icon that represents the Modern Islamic Architecture style that prevailed in the 1970s and 1980s in the Emirate of Abu Dhabi. Moreover, as a cultural building it helped to educate people to develop the society through improving people's sense of the cultural, economic, and social problems of society and prepares them to be able to solve them. It is important to mention that The National Theatre and Cultural Centre were commissioned by the Ministry of Youth, Culture, and Development to create a more culturally aware society in Abu Dhabi (Saeid, 2012). The building was recognized by the UAE ministry of Culture

as a modern heritage building called for conservation in 2019.

Architect Philosophy and Approach

The theatre was designed by the Iraqi architect Rifat Chadirji, who is considered one of the most important architects in the Middle East and the father of modern Iraqi architecture as he designed more than 100 buildings across the nation. His architecture elements including shapes, columns and arches (especially interconnected and modified) became symbol and identifiers for his architecture, the city of Baghdad, and Iraqi architecture. He relied in his designs on abstracting the concepts and elements of traditional buildings and reconstructing them in contemporary forms. The architect designs were inspired by the characteristics of regional Iraqi architecture combined with contemporary features meeting social needs, placing his style in "international regionalism" or an Eclectic Approach. Chadirji's body of work comprehensively influenced the new developments in the Arab region (Harrington, 2014) (Bassim, 2020).

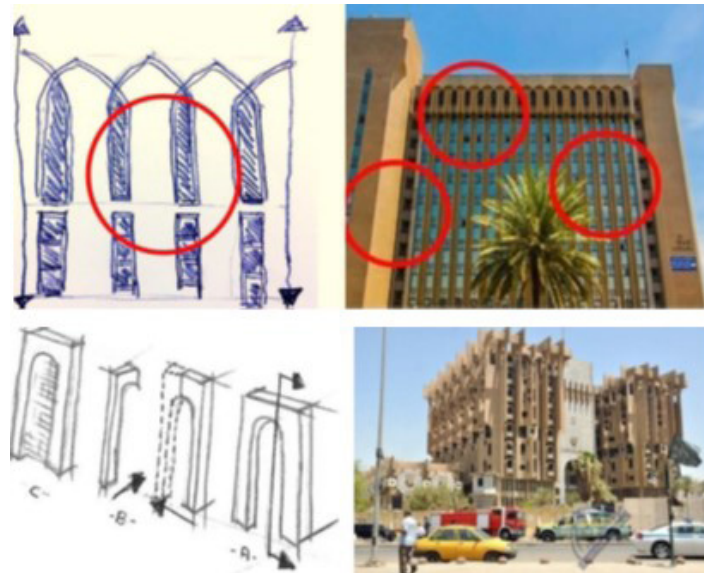


Figure 1: Chadarji's architecture elements (Bassim, 2020)

His designs are conceptual and include abstract forms and arches. He is inspired by second millennium Mesopotamian architecture and by architects such as Le Corbusier, Mies van der Rohe, and Auguste Perret. Many of his buildings incorporate avant-garde concepts and Iraqi traditions. He found himself interacting, influenced by some of the landmarks of ancient Iraqi and Islamic architecture, which he observed in depth in Baghdad's mosques, alleys, markets, khans, and their traditional roles. He also took the pairs of these monuments with some contemporary traditions that he knows from the fountains of the extraordinary in the works of Mondrian, Mies van der Roh and le Corbusier (Library, 2017) (Tamayouz, 2020). The architect was the mind behind the design of many buildings across Iraq, including the Tobacco Monopoly Headquarters, the Central Post Office in Baghdad, and the National Insurance Company

in Mosul. His Monument to the Unknown Soldier (1959), described as a simple, symbolic, modernist structure (ArchINFORM, 2022), (Elsheshtawy, 2004).

Building Analysis Challenges

The building has faced several changes overtime for different reasons varying from accommodating more functions and changes in existing functions. There were a few challenges associated with the research to examine and evaluate these changes; they can be summarized as follows:

A. Missing and/or incomplete documentation: A full set of completed drawings was not accessible which is common for an old building. Missing proper documentation of how the building operates made it difficult to get a holistic idea of how the various machines and systems are working together. To overcome this

challenge direct interaction with the building operation facilities was conducted, observations were recorded, and a building Revit model was generated from the available data, drawings, and blueprints. The key design elements and interior changes are illustrated in Figure 1

B. Overtime changes: The building interfered several changes overtime, which to a certain extent became part of the building. Some of these changes cannot be dated, and reasons behind them cannot be identified. In addition, it was noted that some changes took place during

the construction phase with differences from the building original drawings. All changes had to be evaluated and decisions had to be made on which are needed to stay and others to be removed.

C. Old equipment: It's very difficult to interface with old equipment like fans and AC systems, using modern protocols and technologies. Deciding whether to replace old equipment or somehow integrate with it, was challenging, especially when trying to green the building and minimizing its negative environmental effects.

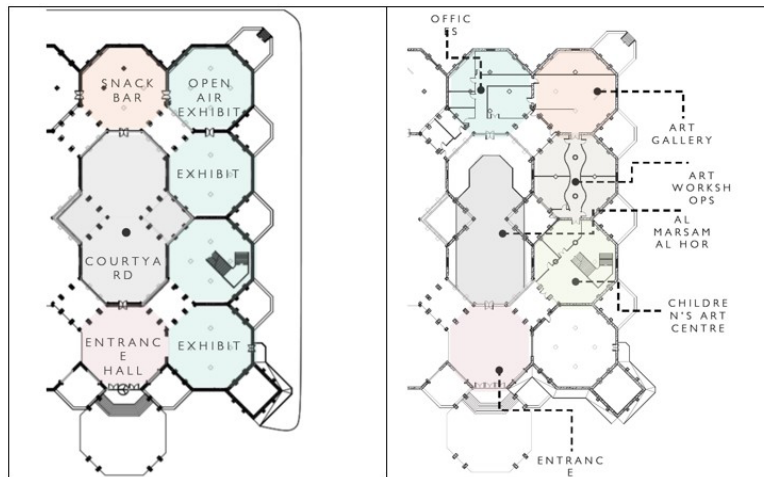


Figure 2: Key design elements and interior changes

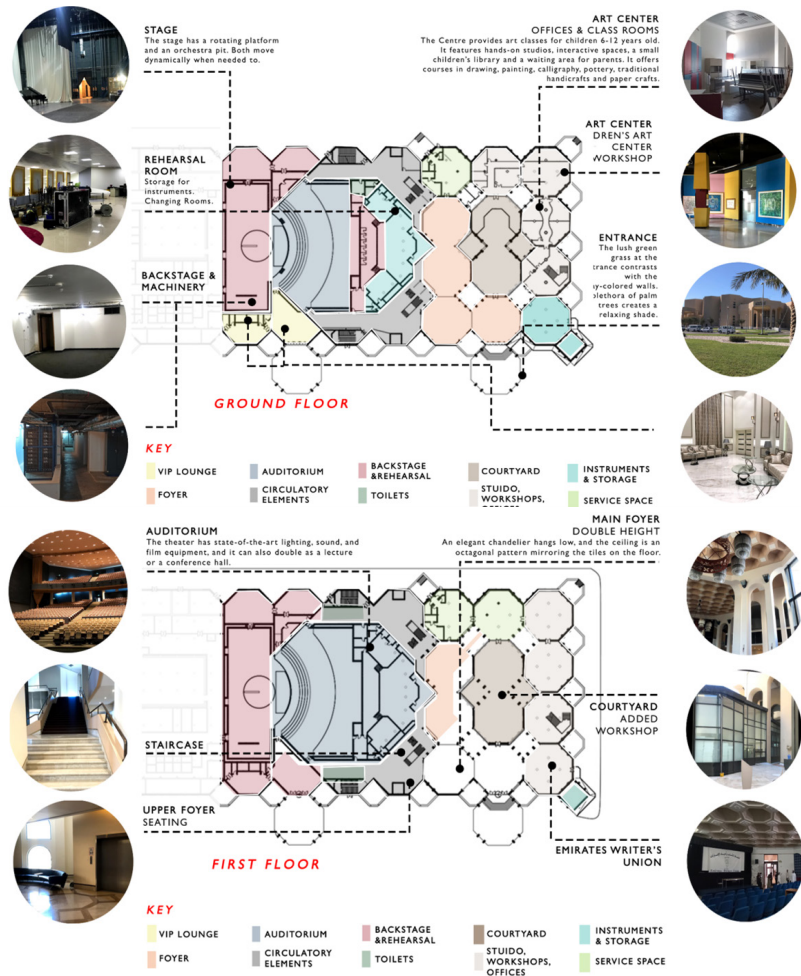


Figure 3: Building Components and visual analysis

METHODOLOGY

The methodology approach aims to celebrating the original identity of the building, highlighting the traditional and cultural values, while focusing on the architect's philosophy both indoor and outdoor. A base case BIM model was created by the researchers from the building survey, existing drawings (hard copies), and observations recordings. From the literature, several documentation methods are used for recording historical buildings including Laser Distance Measuring systems, Aerial Photogrammetry, building surveying, photographic recording, and graphical representation (Ulvi, 2019) (Baik, 2021). The documentation methods used in this research were: Written Documentation (Report), Photographic Documentation, and Graphical

(with drawings) Documentation, as will be explained in the following subsections.

Written Documentation

The written documentation was recorded from a range of resources including, 1) the researchers' observations, 2) interviews with the building personnel and facility management, and 3) literature review findings from the architecture of the UAE in this era, the building architect's philosophy, approach, and other projects. The building written documentation summary can be summarized in the above figure 3. Examination and observation of the building shows a few problems affecting the building, which are documented and summarized in the below table

Table 1: Observed problems and proposed enhancement solutions

Site	<ul style="list-style-type: none"> • Large grass area, hard to maintain • Not enough parking spaces • Building access is unclear • Building entrance is not prominent 	<ul style="list-style-type: none"> • Replace grass with local vegetation, easy to maintain • Increase parking spaces • Enhance the ease of access to building, especially the entrance/ drop off • Plan for ease of accessibility
Entrance & foyer	<ul style="list-style-type: none"> • Entrance is not visible from a distance • Reception desk location is not clear 	<ul style="list-style-type: none"> • Provide a grand entrance greeting experience • Reception desk location is a better central location in the lobby
Façade Design	<ul style="list-style-type: none"> • Does not stand out much/reflect the interior aura 	<ul style="list-style-type: none"> • Adding double Skin - Enhancing Islamic Façade Design
Auditorium	<ul style="list-style-type: none"> • Stage viewing angle from seating is asymmetric • ADA-accessibility and accommodation 	<ul style="list-style-type: none"> • Fix blind spot – Viewing Angle may be fixed • Design for ADA provide accessibility and stations
Courtyard	<ul style="list-style-type: none"> • Identity and values are lost due to added workshop space and not allowing for visitors to experience the courtyard aspect 	<ul style="list-style-type: none"> • Restore the courtyard as an open element • Shift the existing workshop area to the interior • Enhance the functionality of the courtyard and value it as a gathering space
Design Extension (Added Art Center)	<ul style="list-style-type: none"> • No major issues – wasted spaces – corridor with obstructing columns 	<ul style="list-style-type: none"> • Alter and plan in a way that goes in harmony with the building - Make the spaces more meaningful
Architectural Building Systems	<ul style="list-style-type: none"> • Water leakage in the backstage due to issues in HVAC system – Left exposed deteriorating building aesthetic 	<ul style="list-style-type: none"> • Fix plumbing & HVAC system accordingly – Hide mechanical systems
Lighting, shading & ventilation	<ul style="list-style-type: none"> • Glazing type; no information was available on the glazing type. From the energy performance it was concluded that it is not an energy friendly system, glare was observed in several areas. • No natural ventilation. 	<ul style="list-style-type: none"> • Energy Friendly, glare minimizing glazing system can be used to enhance to the building energy performance • Natural ventilation can be restored from the courtyard and windows operations.

Photographic Documentation

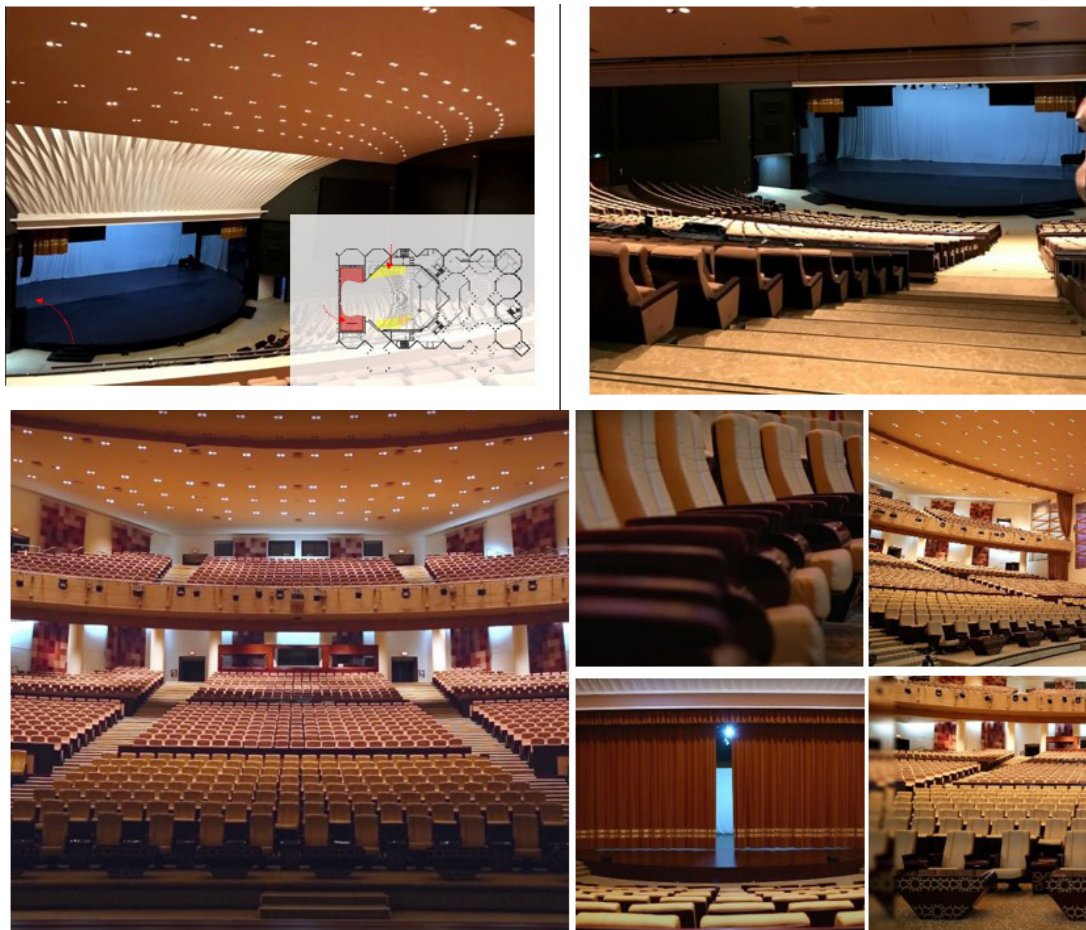
In the photographic building documentation, the key investigated building elements are the building façade and entrance, the auditorium hall, the courtyard, and interior spaces. In addition, geometric analysis is implemented

from these main elements to understand the architecture influences from the architect's previous works and link it with the architect's key symbols and elements already discussed, as shown below in Figure 4 and Figure 5.

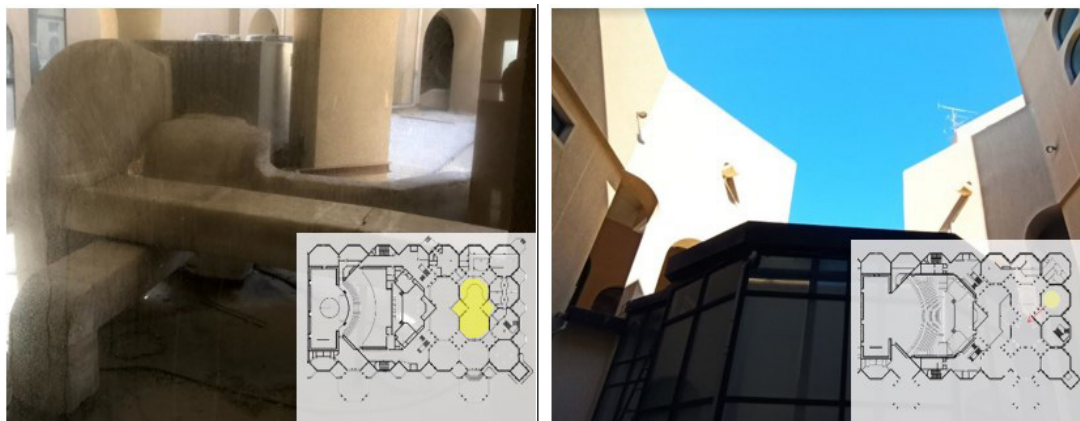
A Setting Entrance and façade



B. Auditorium



C. Courtyard



D. Interior spaces



Figure 4: Photographic Documentation



Figure 5: Internal and external main views

Architecture elements and inspiration from previous work

The building includes some architecture elements that represent motifs from the architect's previous works which includes procured entrance, arches, volts, arched windows as shown in Figure 4

Graphical (with drawing) Documentation

Building Information Modeling (BIM) can play an important role for better understanding the building architecture, structure, and energy performance. It facilitates data transfer and communication between the building decision makers and facilitators. However,

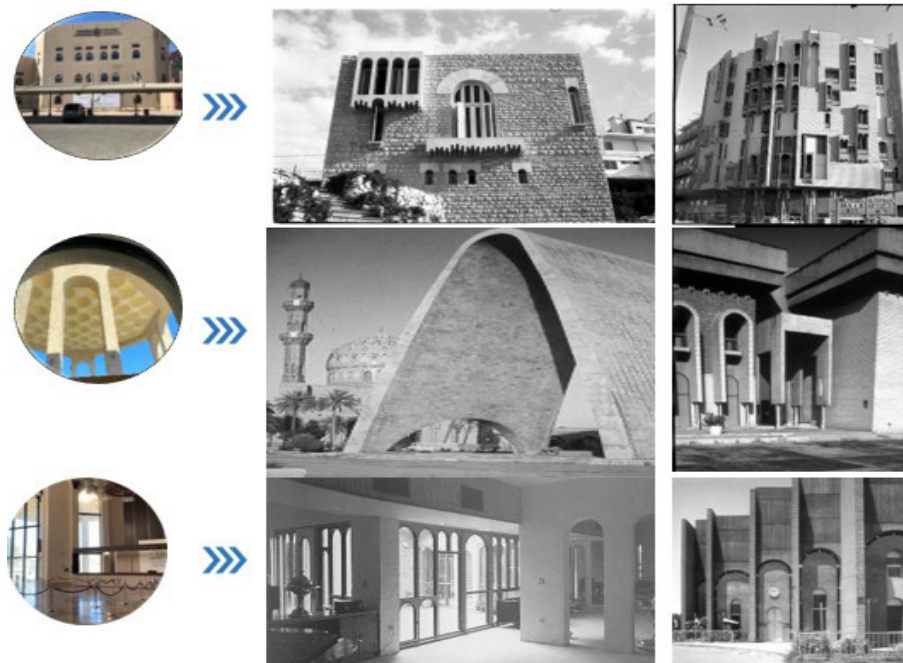


Figure 6: linkage of the theatre elements with the architect's previous works

Generating BIM for an existing building is both complex and time consuming. Different techniques were used in capturing the building data such including imaging; physical measurements using laser measuring tools, image analysis, and 2D scanned plans analysis. The BIM generation process concluded the following:
Many differences were detected between the proposed initial plans and existing conditions.

- No structure plans were found for the building;

consequently, the research team based a construction element and generated the structure system based on the measurements, observations. In addition, some columns and structure elements placement are adjusted in the BIM model.

- No information was available for the HVAC system and some materials, consequently some observations were recorded from the visits, in addition to assumptions.

The generated BIM model is shown below in Figure 3:

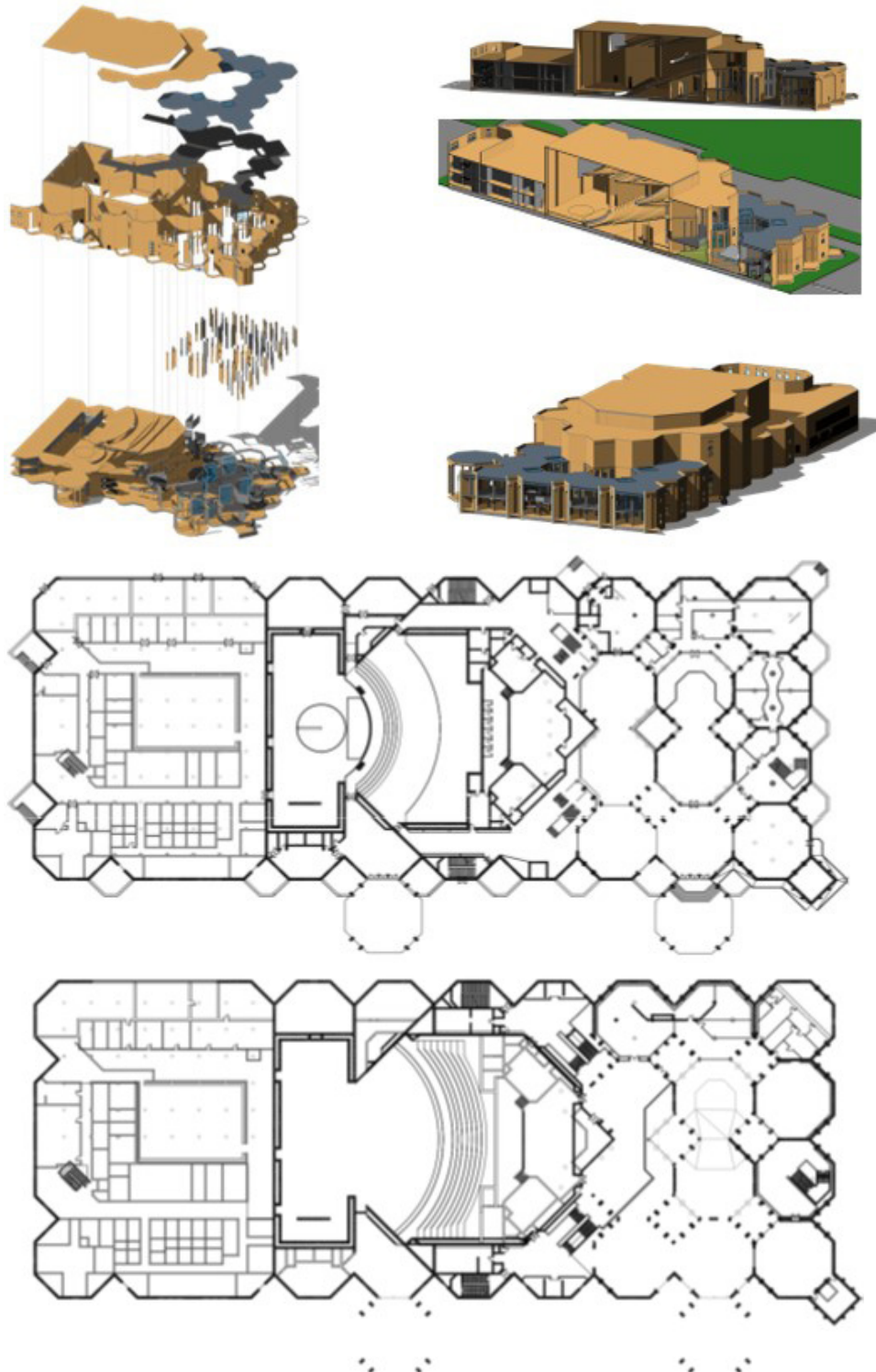


Figure 7: The generated museum BIM model

CONCLUSION

Dealing with older/existing buildings is one of the greatest challenges. New technologies, visual simulations, and energy simulation tools can generate a large amount of data, visualize it, and analyze it, which does not only save time, also allows for exploring details and generates relationships that were hard to understand before.

FUTURE RESEARCH

The proposed research aimed at exploring the values of the existing building while investigating potentials

for re-adaptation of the building while maintaining its historical and heritage values. The research proposed few re-adaptation approaches. Each of these alternatives was highly affected by the initial approach and design concept taken by the designer, which aims at maintaining both the recognized visual appearance of the building and preserving its historical value. Future research needs to examine these aspects and evaluate interior materials and possibility for alterations to more adequate, reliable, and sustainable ones. A summary of the future potentials of the building are presented in Figure 8 below:

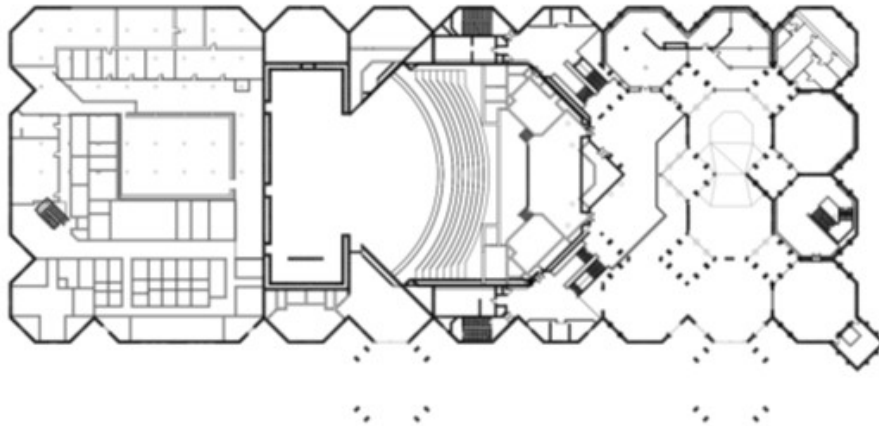


Figure 8: Building future potentials

The Takeaway

Cultural heritage preservation and documentation has a strong role linking the past, present, and future of a society and a nation. Conserving, documenting heritage and transferring such documentation to the following generations are vital, 3D documentation, photographic, and written methods have great advantages. A combination of the three methods was used to generate a BIM model for the examined National Theatre building. The research framework can be used for documentation for existing heritage buildings, especially in the Gulf and the Middle East. However, little information on several aspects including HVAC system and electrical performance, structure decisions made a full accurate documentation more challenging. In addition, information on the dates and reasons behind some design and interior spaces changes of materials and space planning were missing. At the end, recognizing and understanding the values of existing building, especially modern heritage ones is one of the matters that Architects and Designers, and sustainability leaders need to realize and work in partnership to achieve.

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