Investigating The Socio-Economic Sustainability within The Egyptian Museums over The Last Decade

Mazen Mohamed Nassef , Nadia Ahmed Mohammed , Maha AbouBakr Ibrahim *

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Article

Investigating The Socio-Economic Sustainability within The Egyptian Museums over The Last Decade

Mazen Nassef [1], Nadia Mohammed [2] and Maha Ibrahim [3,*]

[1] Misr University for Science and Technology, Faculty of Engineering, Architectural Engineering; mazen.mohamed@must.edu.eg
[2] The Valley Higher Institute of Engineering and Technology, Architecture and Design Department, Nadya.ahmed@sva.edu.eg
[3] Misr University for Science and Technology, Faculty of Engineering, Architectural Engineering; maha.ibrahim@must.edu.eg
* Correspondence: e-mail@e-mail.com; Tel.: (optional; include country code; if there are multiple corresponding authors, add author initials).

Abstract: Over the last few decades, contemporary museums have undergone a radical change into public places that promote socio-economic sustainability by impeding recreation, commercial, and cultural activities. This shift altered public perception of museums globally and had a profound impact on today's museums, resulting in new prototypes that differed significantly from prior ones. The study tries to answer the following questions: How far have Egyptian museums been evolving over the last decade? To what degree the radical transformation in the museum design can assist in fulfilling Egypt's SDGs? To answer these questions the study attempts to explore how far Egyptian museums have adapted to this fundamental change by tracing the evolution of Egyptian museum design compared with the findings of the author's previous thesis in 2012 and Egypt's SDGs The study used qualitative methods which began with a thorough literature review followed by a comparative analysis of the selected case studies. . The findings revealed that the contemporary design of the recent Egyptian museums by including the social and economic activities, significantly support the national and global agenda in term of SDG. The article provides architects, designers, and policy makers with clear design criteria to enhance the social and economic role of museums towards fulfilling SDGs.

Keywords: Contemporary Museums; Egyptian Museums; Museum Architecture; Museum Design Criteria; Socio-economic Sustainability; SDGs

1. Introduction

Since the first beginning of construction of the Capitoline Museum in 1471 in Italy, professional architects made tremendous developments for the museum as a building type. That provided academics with rich material to put their theories about building museums for decades. However, the study of the science of building and designing museums is still endless. Professional architects still develop their designs, academics still searching, and communities still need such a cultural building type. Over the last decade, many factors took place in developing the museum and its architectural design, such as; a world view that makes special attention to the concept of sustainability, scientific and technological development and the societal need to use the museum recreationally in addition to its cultural use.

The relationship between designing museums and sustainability still a debatable issue. That is because the term sustainability is relatively updated term. Factors of developing museums change according to the need/s required from constructing them in their communities. According to analysts, number of those factors reflects directly or indirectly on the issue of sustainability generally and socio-economic sustainability in particular. Stylianou-Lambert [1], are among the researchers who discussed the issue of designing museums and sustainability. However, their focus was on the policies of designing museums and their impact on sustainable development. They saw that the factors of preserving the sustainable development of museums are; cultural, environmental, social

and economic. They also claim that economic revitalization and micro-interests are considered forces that may urge communities to establish various types of museums.

According to research that have been done about designing museums we cannot find a clear scientific link between the importance of the presence of recreational areas in the design of museums and their role to achieve SDGs, on both levels, locally and internationally. Particularly, in the lack of their presence in the museums of Egypt along decades, and until a decade before [2]. The role of these spaces in achieving the goals of sustainable development and linking them to the needs and requirements of the community and the tourist was absent from this research.

However, practically wise, and standing on new designing principles, we can observe that the recreational zones always have particular considerations in new museums, such as Farsh Film Studio in Iran (2016), Taihang Xinyu Art Museum in China (2022), Anahuacalli Museum at Mexico (2021), and Louvre Abu Dhabi and many others [3]. Considering such activities in new museums globally is an indication for the contemporary social glob need of them, taking into account local aspects.

So, the role of the museum has expanded to promote socio-economic sustainability. As a result, the contemporary design of museums has gone through a radical transformation, becoming less traditional institutions, and more public spaces that encourage recreational activities. These contemporary museums have opened their doors to the public, allowing them to engage with their surroundings in contrast with previous experiences. Visitors are no longer limited to admiring the displays and artefacts on display, but can now partake in activities such as interactive exhibits, educational workshops, and recreational activities. the introduction of these initiatives can help to increase public participation in the museum and create opportunities for economic growth through increased tourism and revenue while also providing a platform for the museum to promote its mission and values. As museums continue to promote economic stability and adapt to social progress, they will be able to develop a more sustainable future.

On the other hand, responding to the global commitment to realize the Egyptian plan 2030 to achieve Sustainable Development Goals (SDGs) which was developed by United Nations in 2015, Egypt configured its vision and goals to accomplish these SDGs by 2030. One of Egypt's sustainable development goals that the contemporary design of the museum can support is the social inclusion goal and competitive economy.

From reviewing related literature, investigating contemporary design of museums from the perspective of socio-economic sustainability and linking it with the local vision of Egypt 2030 for achieving SDGs hasn't been reported before. Accordingly, the present work aims trace if the new or recently opened museums in Egypt considered recreational areas in their original designs compared with the recommendations of the dissertation of the first author in 2012 [2]that catalyze the social and economic role of those areas in local museums. Moreover, this study aims to introduce a measurable tool that can assess if those other exhibiting spaces in the museum design in Egypt can support Egypt's vision for sustainability not.

By tracing the evolution of the design of museums in Egypt the research tries to answer the question of: do the new designs of museums in Egypt considered recreational areas or other exhibiting activities through their original designs? Are such areas contributing in achieving the socio-economic sustainability and the 2030 Egyptian plan?

by answering those questions, this study introduces to the architects a clear criteria to design contemporary museums that reflect the needs of their communities, particularly in Egypt, while fostering economic sustainability.

That can be done by deducing architectural design criteria from the sustainable developing goals. Then, nominate from them the items that are suitable to the principle of designing museums. That can be used as a measurable tool to test how sustainable the museum is. The following section explains the research methodology and analytical tools.

2. Materials and Methods

The study adopts an exploratory approach due to the objective which focuses on exploring the change in museums design over the last decade in the term of promoting the social and economic

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sustainability. For gathering and analyzing data, m, the study adopts qualitative methodology which begins with a thorough review of related literature, which relied on a systematic web-based search on the Web of Science and Scopus. The search terms included: contemporary museum design, socio-economic sustainability, Egyptian museums, and Egypt's SDGs. In addition to depending on the Ministry of Tourism and Antiquities' official website and the Ministry of Culture. In the analytical part, the research depends on the pilot study done by the author in his dissertation (Nassef, M., 2012). He surveyed all Egyptian museums and then analyzed their current functions to end with recommendations for enhancing their social and economic role. Based on these recommendations, the design principles of contemporary Museum that derived from literature review, and the Egypt's Sustainable Development Strategy, the current study conducted a descriptive analysis of the most recent museums; The Grand Egyptian Museum, and The National Museum of Egyptian Culture to investigate to what degree their contemporary design support the Egypt's Sustainable Development Strategy in the term of the social and economic sustainability.

Finally, the results showed that the contemporary design of the two museums by including the cultural, educational, and recreational spaces, play a great role in transforming Egyptian museums from focusing only on exhibition to serve as beacons of sustainability. As a result, they significantly support achieving Egypt's SDGs. The results provide architects and designers with clear criteria for creating a socio-economic sustainable museum. (Figure 1).

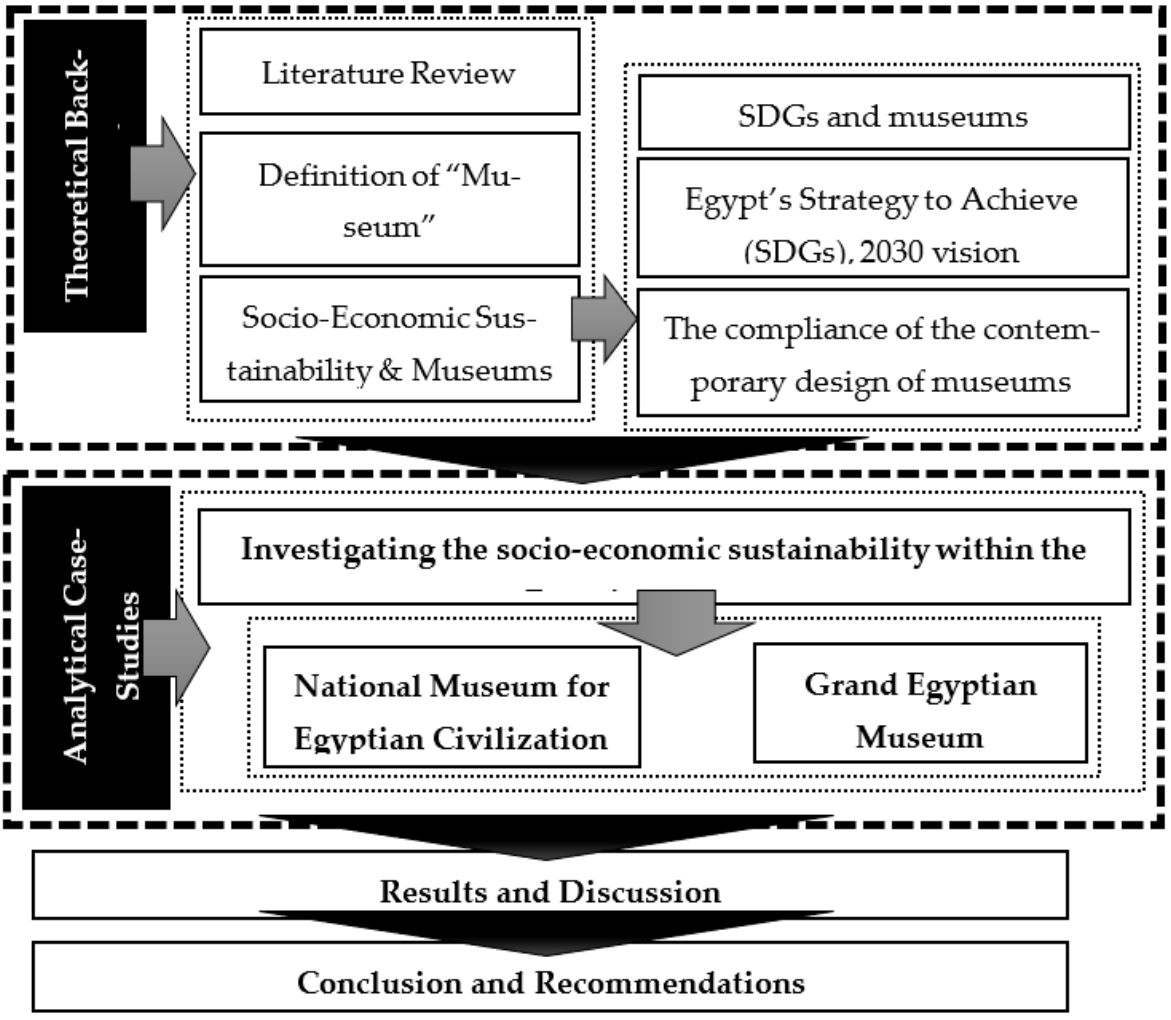

Figure 1. Research Methodology.

3. Theoretical background

This section introduces a thorough review of the previous literature on museums including; the definition of a museum, the socio-economic sustainability within the design of a museum as a

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contemporary approach, reviewing the national strategy that Egypt adopts for achieving sustainable development goals (SDGs), and finally demonstrating theoretically how the contemporary design of museum can support the national SDG.

3.1. Literature Review

The introduction of this research introduces the study work concerning the relationship between sustainability and designing museums. However, there are a number of researches that consider the evolution of designing museums from other perspectives that deserve to be mentioned.

There are a considerable number of researches dealt with the role of the scientific and technological development in the evolution of designing museums. Most of the recent conventions deal with the scientific and technological developments in designing museums, focusing on developing the exhibiting methods, such as [4] who were dealing with using virtual reality to help participants to visit the museums from distances via websites. Also, [5]. This essay intends to describe the design and implementation of an exhibitor that interacts with visitors by "telling stories about their lives" anytime it is picked up. The exhibitor will transmit authentic museum samples to blind and visually impaired visitors without the need for duplication. In the same context, [6]and [7] where investigate the kinds of material that conversational voice-based AI systems in museums could offer to fulfil visitor expectations. Zhao J. [8], claims that the functionality of a virtual museum is comparatively excellent, with chat rooms available for users to interact with both vast virtual exhibitions and virtual objects. Furthermore, S. N. Mohammed and his colleagues [9] address the usefulness of using information and communication technologies (ICTs) in setting a trend in the growth of museum displays in the Emirate of Sharjah examined by specialists and museum researchers. Additionally, they go through the ICT tools that museums can employ to enhance visitor technology offerings. However, they did spot some negatives, in which, ICTs reduce the enjoyment of visitors to a museum presentation and instead of serving as a tool for information, it functions as a distraction, shortening attention spans. As well as [10], where Fenu explains the importance of Augmented Reality (AR) as a method of exhibiting in museums, particularly the literary museum. Such techniques foster the visitors' sense of surprise, which integrates the user with the museum context [11]. Using new technologies in museums also helps with educational concerns as well [12].

On another level for studying the relationship between designing museums and the social and cultural needs, there are respectable number of authors are dealing with the process of co-designing in building museums, including; Vanessa Cesário [13], who focused on the participatory factor of teenagers in the process of using technology in museums. In another dissertation by Arnold P. O. S. Vermeeren [14], the experiences in, around, or involving museums that are part of networks of people and organizations, numerous ideas have been developed. They highlighted that extending the viewpoint that informs the design brief may open up new design possibilities. Nevertheless, by using some strategies that suggest that museums might not always be at the core of the design concept and that the central part of the museum may be located inside or even outside the museum itself. Also, Dominik Porczyński [15] works on the process of creating representations of local culture to be shown in a museum setting. They were curious about the role that artwork plays in this procedure and how it differs from the use of non-artistic objects. They concluded that delivering a sense of local culture does not depend only on the exhibited pieces, but that other dimensions go beyond the exhibits only. In the same context, and contradiction to the first aspect, we find that there is a trend that contradicts the use of modern technology in designing museums, and argues that we must not lose sight of how to create a richer user experience when curators and cultural caretakers do not have access to modern digital practices pushing towards Co-design methods [16].

On a deeper level, some researchers dealt with two elements of what they have mentioned regarding the design of museums, such as Christopher M. [17] who combined in his research the content that creates meaning at the cultural level and the Human-Comuting Interaction (HCI), which highlighted "meaning"g as a crucial but misunderstood notion in contexts of interaction design. They also argue that museums – as a cultural building type- acquire high importance for sustainable development as much as any social economic or environmental building type.

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Such background is a base to build up a scientific strategy to provide the architectural community with a measurable policy that can assess the sustainable performance in designing museum. Here, for that research, this strategy provides the Egyptian community of architecture with an assessment tool for that performance.

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

3.2. Definition of "Museum"

Scholars and researchers defined the term "museum" differently since each group approaches it from a unique viewpoint. According to the International Council of Museums (ICOM):

> "A museum is a not-for-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing."[18] Figure 2.

This definition is divided into four sections. Firstly, it describes museums as a place which serve "society". The definition didn't identify which society it should serve; local, regional or international society. It left the choice to the initiator or the responsible institutions of erecting the museum. Identifying the target community that the museum serves would make a huge difference and must be considered.

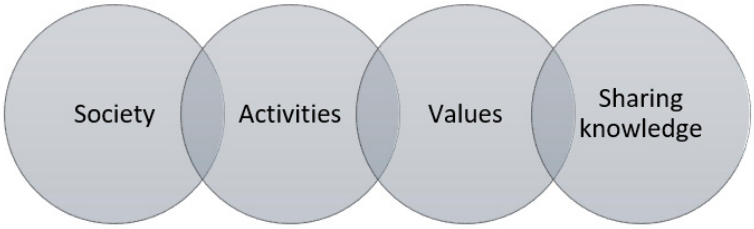

Figure 2. The main pillars of ICOM definition to the Museum.

Also, the definition emphasizes that museums do not seek financial benefits. However, they have to maintain an economical source that keeps their quality and helps them to be developed. Secondly, the definition identifies the activities that must take place in any museum, in which museums should collect valuable items and preserve them. Also, such activities must include within "value". The definition did not mention whether this "value" is quantitative such as; the oldest, smallest, and biggest.. etc., or qualitative that may reflect any quality of morals, cultures and other knowledge. This paper adopts this definition which aims to keep or develop their sustainable state.

3.3. Socio-economic Sustainability and Museums

Socioeconomic sustainability is a term that refers to both the social and economic dimensions of sustainability. It can be implemented in architecture by taking into account many aspects such as community space, housing affordability, job development, profitability, and accurate accounting of environmental services. It is significant because it contributes to the development of livable and sustainable communities that benefit both people and the environment. According to [19, 20] social sustainability concerns not only the ongoing satisfaction of individuals' basic human needs, but It's also a measure of human well-being and having the best lifestyle.

Dizdaroglu, Z. Shafiq and Vallance [21–23] advocated that social sustainability has multiple dimensions including; (a) social capital, justice, equity, and so on; (b) changing behaviour to achieve bio-physical environmental goals; and (c) the conservation of socio-cultural characteristics as well as how individuals actively embrace or oppose the change. On the other hand, economic sustainability

focuses on profitability and appropriate accounting of ecosystem services for optimizing the cost-benefit assessment according to [20], while [24] argued that economic sustainability involves more than just GDP, exchange rates, and profit; it also includes the creating, distributing, and consuming commodities and services.

The International Council of Museums (ICOM)states that sustainability is the dynamic process of museums, based on the acknowledgment and protection of tangible and intangible heritage with the museums reacting to the needs of the community. By contributing to the value of heritage and social memory, museums must fulfil their responsibility to be a vibrant and appealing part of the community [25].

As a part of the community, museums can improve their social sustainability by strengthening their ties to society as a whole, returning to being learning hubs rather than destination attractions, and developing into more socially conscious businesses that have significant effects on the lives of those who use their services. Through engaging, community-led events that advance society, museums may aspire to restore depleted reserves of human and social capital [25]. This is accomplished, for instance, through the museum's function to educate its visitors. This function states that the goal of museums is to make access to lifelong learning possible. Due to the special resources a museum has available for both formal and informal education through traditional activities, like providing tours or informational materials, utilizing historical artefacts in participatory and interactive programs, or planning workshops and implementing trans-disciplinary educational initiatives [26], [27]. The regeneration of local economies and leisure and entertainment function are two additional functions that might be added to the educational function. These roles have a direct bearing on the viability of the economic sustainability of museums [28]. Numerous academics have shown how museums contribute to economic growth. In addition to being a key component of many regions' tourism development plans, museums also help to raise locals' incomes and provide employment [29]. Other researchers have found that the museum sector directly supports an estimated 195,000 full-time equivalent jobs and contributes more to the British economy than the automotive industry, the media, or the entertainment business. Additionally, it is predicted that 370 million visitors, the majority of whom are tourists, visit museums annually in Europe. As more cities in the U.S. and Europe develop sustainable development strategies that emphasize cultural tourism as a result of museums' economic potential [30, 31].

3.3.1. SDGs and museums

- The SDGs are a global framework that are receiving increasing support from many different sectors. Since museums have unique resources and play a significant social role so, they can participate in fulfilling SDGs as well as they can benefit from connecting with the SDGs in the following ways: McGhie [32]Design their spaces so that those interested in social and environmental issues may participate in instructional and interactive activities.
- Use their particular resources to achieve beneficial social and environmental consequences.
- Contribute significantly and distinctively to an ambitious global agenda.

Many studies discuss how museums can support the SDGs. They present a how-to manual for enhancing sustainable development contributions made by museums, galleries, the cultural industry, and their partners using the SDGs as a model. They offered a framework of key activities such as; conserving cultural and natural heritage, providing learning opportunities in support of the SDGs, and supporting sustainable tourism [32].

Globally, there are several museums that played a key role in fulfilling SDGs within their nations. For example, The Kiasma Museum for Contemporary Art in Finland, which opened for public in 1998. During the opening weekend the museum attracted around thirty thousand visitors. The museum plays a significant role in being a central local meeting place with regard to the city. In 2011, the total number of the museum’s visitors reached around three million. The museum met several SDGs within its design; the justice and social Inclusion was achieved by promoting the spirit of loyalty and belonging through displaying the Finnish art works, which participates in strengthening the link between Finnish citizens and their local culture. The museum plays a

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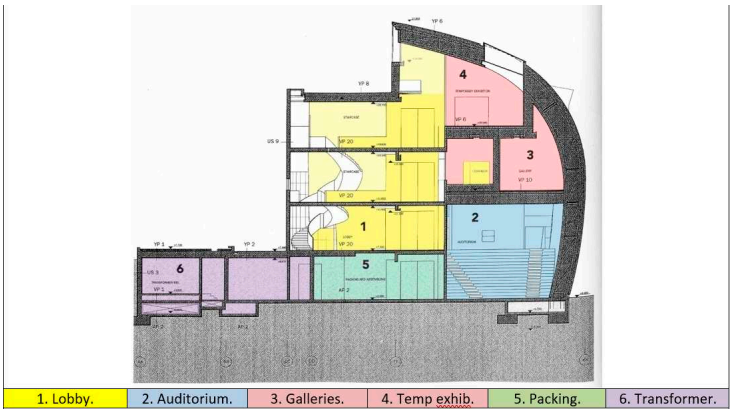
significant role in Enriching cultural life as it serves as a forum for community events such as seminars, poetry readings and dance and music programs [33]. A 240 – seat auditorium plays a significant role in extending the activities towards the performing arts including drama, dance performances, music, multimedia, film and video art. The museum's exhibitions, collections, and various events are all utilized in educational activities in cooperation with schools, day – care centers, other museums, art schools, business organizations and universities [34]

The museum achieved the economic sustainability by including the recreational, cultural, and educational spaces which attract visitors for practising several activities and attending different events, these functions play a great role in increasing the museum's income and therefore promoting its financial inclusion. Figure 3a,b

(a)



(b)

Figure 3. Kiasma Museum for Contemporary Art. (a) the exterior of the museum, (b) section illustrates the various activities inside the museum.

3.3.2. Egypt's Strategy to Achieve Sustainable Development Goals (SDGs)

The Sustainable Development Goals (SDGs) are seventeen objectives, along with their corresponding targets, that extend from diminishing poverty and education enhancement to gender equality and clean water and sanitation. All 193 United Nations General Assembly countries agreed upon the SDGs in 2015, which have been widely perceived as a significant stride in melding global issues by 2030. These issues include global warming, disparities of wealth, poverty abolition, sustainable urban and rural communities, peace and justice, transparency and accountability in good governance, and flourishing employment and economic growth. [35]In response to this pledge to realize the SDGs, Egypt configured its vision to accomplish the Sustainable Development Goals (SDGs). The Ministry of Planning and International Cooperation established Egypt's vision, with the assistance of UNDP Egypt, UN Women Egypt, and UN-Habitat Egypt, and sustained by the Government of Japan. Egypt Vision 2030 states:

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> "By 2030, the new Egypt will achieve a competitive, balanced, diversified and knowledge-based economy, characterized by justice, social integration and participation, with a balanced and diversified ecosystem, benefiting from its strategic location and human capital to achieve sustainable development for a better life to all Egyptians." [36]

The last update of Egypt's Vision 2030 made in 2020 is based on the Sustainable Development Strategy (SDS) which comprises eight goals. Each goal stands for a distinct element of the nation's development. The first goal is quality of life, it focuses on Improving the quality of life of the Egyptian citizen and improving their standard of living. The second goal is justice and inclusion, it addresses justice, social inclusion and participation. The third goal is about a strong economy, it focuses on a competitive and diversified economy. The fourth goal stresses knowledge and innovation, it fosters knowledge, innovation and scientific research. The fifth goal is Environmental Sustainability by building an integrated and sustainable environmental system. The sixth goal is about the governance of state institutions and society. The seventh goal concern with Egyptian peace and security. Finally, the last goal is pioneering position by Enhancing Egyptian leadership. [37]

3.3.2. The Compliance of the Contemporary Design of Museums with Egypt's SDS

From reviewing related literature and the dissertation results of Mazen, 2012, the main design principles of contemporary museums were concluded as follows:

- Promoting cultural heritage and fostering a sense of place
- Becoming socially responsible enterprises
- Supporting local economy

The compliance of these design principles with Egypt's SDS is illustrated in Table 1. The results show that adopting these design principles of museums supports four goals; quality of life, Justice and Social Inclusion, Competitive economy, and Knowledge, innovation and scientific research. **T**able 1

Table 1. The compliance of design principles of museums with Egypt's SDS.

Objectives	**Egypt's SDS**	**Main design principles of contemporary museum**		
		Promoting cultural heritage and fostering a sense of place	**Becoming socially responsible enterprises**	**Supporting local economy**
Quality of life	Reducing poverty in all its forms,			
	Eliminating hunger,			
	Providing an integrated system for social protection,			
	Providing education and ensuring its quality			
	The quality of health services,			
	Providing basic services,			
	Improving infrastructure			
	Improving the appearance of civilization			
	Controlling population growth			
	Enriching cultural life,			
	The development of digital Infrastructure.			
Justice and Social Inclusion	Achieving equal rights and opportunities,			
	providing resources in all geographical areas			
	Promoting financial inclusion,			

	Empowering women, youth and the neediest groups,			
	Supporting the participation of all groups in the development			
	Promoting the spirit of loyalty and belonging to the Egyptian identity.			
Competitive economy	Achieve knowledge-based economic growth and digital transformation,			
	Increasing the resilience and competitiveness of the economy			
	Increasing employment rates and decent job opportunities			
	Improving the business environment and promoting an entrepreneurial culture			
	Achieve financial inclusion			
	Inclusion of the environmental and social dimension			
Knowledge, innovation and scientific research	investing in human beings and building their creativity			
	Stimulating the culture of innovation			

4. Investigating the socio-economic sustainability within the Egyptian museums

The PhD thesis [2]and the published paper accomplished by the author [2] concluded several findings regarding the general state of almost all Egyptian museums being managed and operated by The Egyptian Ministry of Culture as well as The Egyptian Ministry of Antiquities, the most dominant finding is that almost all of the studied museums did not have enough spaces accommodating the modern cultural and recreational functions being introduced to the Architectural design standards of museums since the last decades of the twentieth century. These functions which proved to be of great use and importance to contemporary museums all around the world were absent either partially or totally from almost all Egyptian museums ten years ago. Only a few small museums were designed concerning contemporary measures and had spaces accommodating functions other than an exhibition with appropriate ratios and therefore were able to host cultural and recreational events, the most significant example here is The Nubian Museum in Aswan [2]

In chapter three (State of the Art of Contemporary Museum Architecture) of the PhD thesis [2], several eminent contemporary museums in several countries around the world were subject to a thorough analysis of their spaces and design measures. The analysis proved that all of them consist mainly of most or all of the spaces mentioned in the following table with similar ratios, minimal variations occurred from one museum to another but all of them proved to be within the same range.

The functional spaces mentioned in Table 2 with their area ratios were not applied in almost museums in Egypt mentioned above with very few exceptions. This fact states that there was a significant problem considering museums in Egypt a decade ago.

The current study focuses on tracing the evolution of Egyptian museums to investigate how far they apply the previous recommendations as well as the socio-economic sustainability demands of a wide scope.

The study has revealed that the only significant change that took place regarding museums in the past decade is the soft opening of two mega museums: The Grand Egyptian Museum next to the Giza pyramids, and The National Museum of Egyptian Civilization in Al-Fosstat. Both museums are way larger than any other museums found in Egypt including the old Egyptian Museum in Tahrir

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Square. Both museums are not yet ready for full operation and still in need of funding to be ready for appropriate operation.

Table 2. Optimum Areas Distribution of a Typical Museum of Medium or Large Size Scale [2].

Function		Approximate Percentage to the Total Built Area
Public – Collection spaces (Exhibition Halls)		35-40%
Public – Non-Collection spaces	Restaurant	20-25%
	Café	
	Thater	
	Education center	
	Multipurpose Hall	
	Bookshop	
	Retail, Gift shops	
	Library	
	Public Spaces	
	Circulation	
Non-Public – Collection spaces	Storage Spaces	10%
	Conservation lab	
	Workshops	
Non-Public – Non-Collection spaces	Administration	5%
	Service Spaces	

4.1. The National Museum of Egyptian Civilization (NMEC)

The National Museum of Egyptian Civilization (NMEC) witnessed a major opening ceremony around two years ago for transporting the Royal Mummies from the old Egyptian Museum (Tahrir) to the Mummies exhibition hall found in NMEC. This event was organized on a presidential scale with the attendance of several kings and Presidents to witness this event. Although the museum is not fully finished nor equipped it is operating since then on a partial basis, the main exhibition halls of the museum are not yet ready for operation, but the museum is operating and hosting visitors almost daily with just two exhibition halls (Mummies exhibition hall and the temporary exhibition hall), but spaces other than exhibition such as seminar halls, theatre, restaurants, cafes, shops, and the cinema are operating hosting several cultural, educational, and recreational events. The organized events as well as the income resulting from the other functions are the main source of funding for the museum to achieve financial sustainability planning to complete the unfinished exhibition halls and be able to open the museum on a full operation basis with the aid of the resulting revenues. As shown in Figure 3a,b, these spaces are located in the external part of the museum building giving the most possible exposure to these spaces to be easily accessible for visitors and to be operated independently from the main exhibition halls building, which is among the main design regulations of contemporary museum buildings.

As shown in Figure 3 a,b, the external entrance building is dedicated to cultural, recreational, and educational functional spaces as well as other services such as the huge parking indoor area that is capable of hosting hundreds of vehicles as well as buses. The footprint of the entrance building excluding parking is around six thousand square meters with a total built area of around eighteen thousand square meters being distributed among three storeys. While the main building devoted to the exhibition has around fifty-two thousand square meters distributed between exhibition halls, administration, storage spaces, workshops, and other services. [38]

This shows that the total built area of the entrance building excluding the garage is around 30% of the total built area of the project which is within the average range dedicated for similar spaces of

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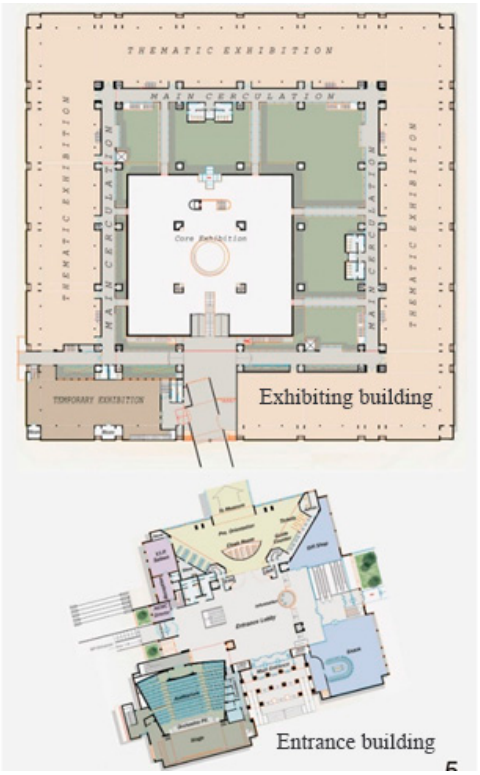
the eminent museums studied and analyzed by the author in the PhD Thesis [2]as shown in the previous table. At the same time, almost all of the functional spaces devoted to cultural and recreational facilities other than the exhibition are present appropriately in the museum in the entrance building enabling it to be operated independently of the exhibition building. Accordingly, the NMEC. when being assessed for its recreational and cultural spaces can be easily concluded that it was designed and built concerning the contemporary museum design standards.

(a)

(c)



(b)

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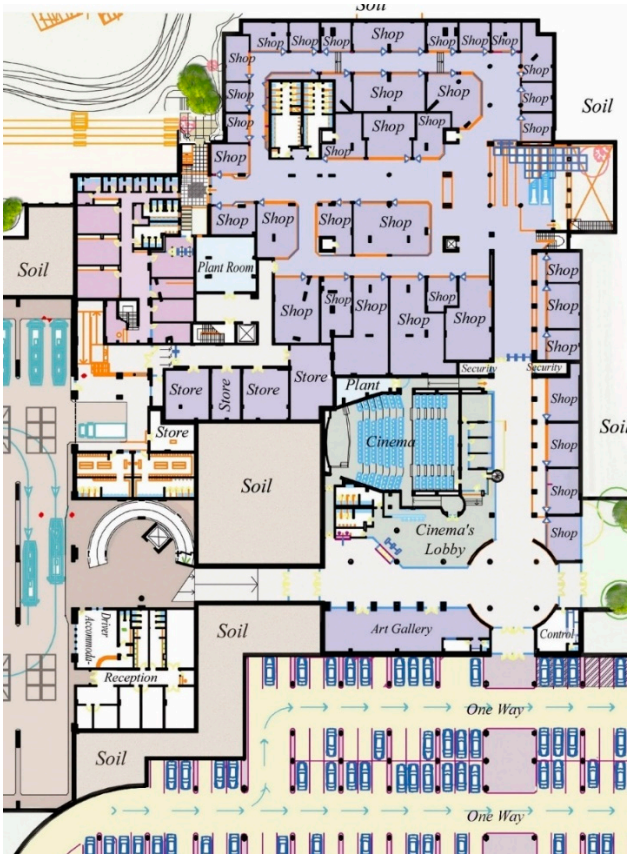

(e)

Figure 4. Bird's eye view of NMEC., b) Entrance Floor Plan, c) Entry level of the Entrance Building (+15m), d) Plan level -1 of the Entrance Building (+10.7m), e) Plan level -2 of the Entrance Building (+7.2m) [38].

Table 3. Evidence of meeting the national SDS within the design of the NMEC museum.

SDS		Evidence of application
Quality of life	Improving the appearance of civilization	The museum has a great impact on its context, the whole region has been renovated and developed, adding recreational areas and residential buildings within the museum's context. the museum has become the core of developing its context hence improving the appearance of Egypt civilization. The design presents the Egyptian role in world civilization in a way that includes information about knowledge, abilities, and values in addition to what is visible. That is done directly through the exhibition halls, and indirectly through the shows and performances that take place in the cinema and the Amphitheatre.

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Justice & Social Inclusion	Enriching cultural life	Museums are among the typological buildings playing major roles in enriching cultural life. The NMEC. is specialized in Egyptian Civilization displaying its progress through history till the present time, which gives a great positive impact on the knowledge of its visitors and therefore enriches the cultural life. The visitors' journey through different cultural eras demonstrates the depth and variety of Egyptian culture. The designer uses cutting-edge display techniques to showcase creative and interactive interpretations of Egyptian civilization and considered the existence of a library. Such techniques in architectural design bridge the gap between the past and the present. The NMEC. has the potential to become a global hub for intercultural communication. This was evident in the opening ceremony, which was watched by nearly a billion citizens on television screens all over the world.
	Supporting the participation of all groups in the development	There is not any significant evidence of a positive role played by the museum regarding this aspect up till now. But the cultural and educational spaces of the museum can be easily used in organizing workshops and events focusing on introducing this concept to the attendees.
	Promoting the spirit of loyalty and belonging to the Egyptian identity	The NMEC. is specialized in displaying the history of Egyptian Civilization is surely among the most important factors in promoting the spirit of loyalty and belonging to the Egyptian identity to its Egyptian visitors. In an era of globalization, The NMEC. is a pedagogical "lighthouse" that projects the various aspects of Egyptian culture onto Egyptians, including crafts, history, languages, and so on. The museum design provides spaces for these activities This helps Egyptians in the present, particularly youngsters, by enabling them to self-discover their identity.
Competitive economy	Increasing the resilience and competitiveness of the economy	Such Grand museums are among the most important touristic attractions anywhere, therefore within a country like Egypt depending on tourism as being one of the main sources of its national incoming such a museum plays a great role in increasing the resilience and competitiveness of the economy.
	Achieve financial inclusion	The recreational, cultural, and educational spaces are present appropriately in the museum to accommodate visitors for practicing several activities and attending different events regardless of the exhibition halls which are not yet ready for operation, these functions play a great role in increasing the museum's income and therefore promoting its financial inclusion. However, since the museum is not opened yet, it didn't achieve this goal yet.
Knowledge & Innovation	Investing in human beings and building their creativity	The history of Egyptian Civilization is something that all Egyptians should be aware of. The museum should play a great role in achieving this goal appropriately. The museum is considered a national centre for storing and preserving ancient Egyptian artefacts, it provides spaces and facilities to make more studies and enrich the academic field.

4.2. The Grand Egyptian Museum GEM

The cultural complex (Figure 6), which is regarded as the largest museum in the world devoted to a single civilization, will house about 100,000 ancient artefacts and feature 24,000m² of permanent exhibition space, a children's museum, conference rooms, learning spaces, a conservation centre, and sizable gardens both inside and outside the museum[39]. **Figure 5**

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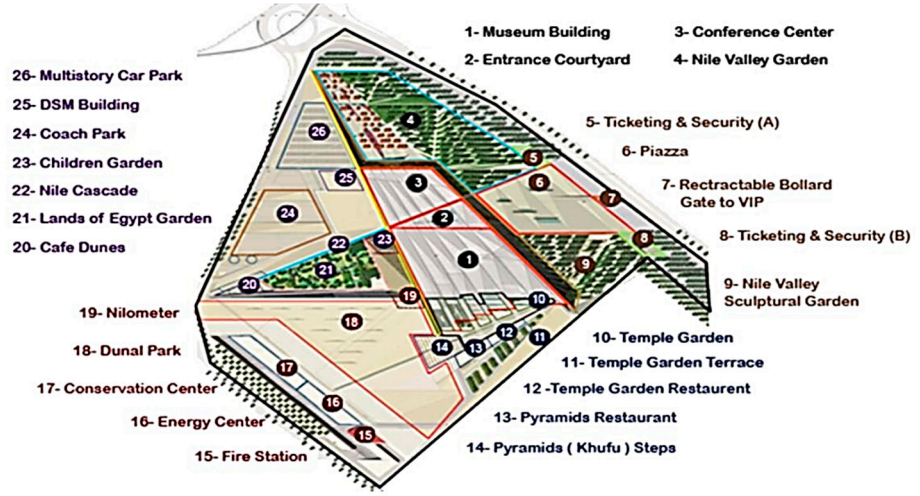

Figure 5. The functional zones in GEM [40].

Grand Egyptian Museum GEM has stated to be softly opened by the first of March 2023, pre-booked visits are available to the general public following several delays. The project was started in 2003 and was created by the Irish company Heneghan Peng Architects. The museum is intended to house some of the most priceless pieces in human history and is situated on a 500,000 m² area about one mile from the magnificent Great Pyramids of Giza. Its main exhibition halls are not ready for full operation and it is just partially open in some limited spaces.

The Museum was designed to have a huge conservation centre, a children's museum, conference and educational facilities, and 24,000 m² of permanent exhibition space, in addition to expansive gardens, which are accessible from the Museum. [40]

However, through the last months, the museum has been frequently hosting several events (many of which are not related by any means to the museum's content or cultural message) such as the ceremony of launching the new BMW 7 series in Egypt which was organized in the museum as well as the Concert of Egyptian Opera singer Fatma Said, and several other events. Such events play a very important role in contemporary museums gathering more potential visitors who are not necessarily interested in the museum or its exhibits, but their visit to attend an event or so forth. This helps significantly in raising the income of the museum playing a major role to achieve financial sustainability. Figure 6

(a)

(b)

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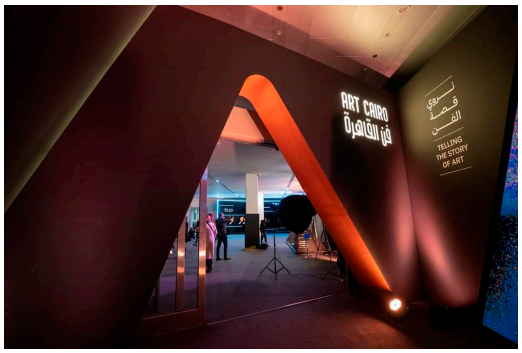
(c)



(d)

(e)

Figure 6. Various kinds of activities are taking place in the GEM: a) Fatma Said concert at GEM. b) Launching new BMW 7 series, c) & d) Arct Cairo exhibition, Feb. 2023 e) GEM hosted the RiseUp Summit. [41].

Table 4. Evidence of meeting the national SDS within the design of the GEM.

	SDS	Evidence of application
Quality of life	Improving the appearance of civilization	The architect aimed to make the museum a showcase of old Egyptian civilization in a Contemporary design. He visually connected the location of the museum with the view of the pyramids. Moreover, the museum's façade was clad in stone to let light pass through the geometric shapes. However, the designed façade is not the implemented one
	Enriching cultural life	The museum presents the full collection of King Tutankhamun's acquisitions, which consists of 5,000 unique artefacts, including 2,000 artefacts that will be displayed for the first time, and 5000 items relocated from the Egyptian Museum in Cairo, the museum includes special cultural and archaeological treasures, that characterized Egypt, as it will display the rare mask of King Tutankhamun placed in the middle of the exhibition hall [37].
Justice & Social	Supporting the participation of all groups in	Following the design principles of a contemporary museum, the GEM is considered a leading social enterprise because its interactive, community-led activities will strengthen society and foster the

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	the development	participation of various groups such as; children, youth, and civil organizations.
	Promoting the spirit of loyalty and belonging to the Egyptian identity.	The GEM offers services for kids, youth, and special needs people in its museum which promote their sense of belonging to Egypt.
Competitive economy	Increasing the resilience and competitiveness of the economy	Establishing networks linking the regions with each other through Chairlifts that travel through ten stations, in addition to subway access to the area. According to [39], the GEM project will improve tourism services and boost the number of foreign visitors because it is built to accommodate eight million visitors annually from around the globe. In addition, the GEM will encourage visitors to extend their stay by offering a variety of services that are aimed at their entire family. In addition to the 5,800 new job opportunities in the museum's economic projects in the fields of manufacturing, transportation, insurance, and services, the project will help to create new permanent job opportunities for about 500 people. It also offers 1500 job opportunities in the services sector.
	Achieve financial inclusion	The Great Pyramids and the GEM will host festivals, concerts, ceremonies, events, and recreational activities in Egypt, and the GEM will promote conference tourism in Egypt by housing a hub for international conferences with a conference hall that can accommodate up to 1,000 people, a theatre, and open areas The recreational, cultural, and educational spaces are present appropriately in the museum to accommodate visitors to practice several activities and attend different events regardless of the exhibition halls which are not yet ready for operation. these functions play a great role in increasing the museum's income and therefore promoting its financial inclusion. However, 98 % of the construction is achieved as the museum doesn't officially open yet, it didn't achieve this goal yet.
Knowledge & Innovation	Investing in human beings and building their creativity	The museum is supported by a research center for education and training, an arts and crafts center, and a library.

5. Results and Discussion

The analytical study of the NMEC. museum revealed that the cultural, educational, and recreational spaces that have been added to the museum play a great role in transforming Egyptian museums from lagging behind international standards [2]to being compatible with the SDGs, hence being more and more useful to the Egyptian citizens participating effectively in their cultural and recreational activities while being almost financially independent and sustainable. Because of all of the above The National Museum of Egyptian Civilization NMEC. deserves to be a role model for developing museums in Egypt.

The architectural design provides particular consideration for most of the mentioned SDGs, however, it may determine groups activities which, such activities can be recognized in some other museums abroad, such as designing treasure hunt games or other creative ideas that attract teenagers and group visitors [13].

Referring to the first objective of the research, that consider tracing the evolution of the design of museum in Egypt, particularly the presence of the recreational areas, and its area percentage from the total surface area, we can observe from the floor plans of the museum, that the spaces designed for other exhibiting activities exceed 50% of the total area of the museum. This is a tremendous development in the museum design in Egypt. The floor plan -2 of the entrance building, consists mostly of gift shops. Such an activity is direct economic one. Other recreational areas, in the other floor plans, are varied between: services, such as; restaurants, coffee shops and water current areas. These zones help the museum to financially and economically sustain itself in a direct way. In addition of that, the designer considered to merge with them other – non-exhibiting- areas that support the cultural role of the museum, for instance; cinema (that present the Egyptian civilization documentaries), art gallery, educational classes, zones for conferences and others of kids. The main purpose of such spaces is reducing the gap between the audience and the artifacts pieces in the exhibiting building. Those pieces that are inherited from hundreds of years ago. So, the designer was keen to attract various kinds of audience through cultural activities that can tack place inside its walls. By this design technique the museum attracts tourists, researchers and students, families or even ordinary people that may enjoy the theatre performances. Moreover, those kinds of activities, also, are considered as indirect financial resources for the museum, that plays both roles to achieve both; cultural and social sustainability, and economic sustainability. To prove this in a concrete way, the following table, illustrates the deduced architectural criteria that can be applied in designing museums and achieve the Egyptian plan 2030. Using this tool helps to assess the sustainability performance of this museum.

From the previous analyses, we can notice that the existence of recreational areas in the NMEC provides the Egyptian strategy for 2030 proceeding from the role of the museum as a building type. Those areas added value for the museum from the sustainability point of view. the design of the NMEC facilitates areas to accelerate the Egyptian strategy to the UN SDGs. Table 3 illustrates that the design of the museum contributes directly in; the 1st step in the 2030 strategy (Wellbeing), the 2nd one (justice), 3rd (competitive economy) and the 4th (knowledge and innovation).

Starting from the point of choosing the location of the museum, until the end of the whole process of design and the ceremonial opening the NMEC can be considered as insignia for the architecture of museums in Egypt. One of the aspects that aided the designer and forced him to achieve his concepts is the museum location. It is located at a central area between number of popular and international religious site-visits, whether Coptic or Islamic. Such an opportunity is not provided for many architects around the world, where architects are challenging how to the design of his museum is attractive for its own.

Another issue is attracting the youth and kids' audience by providing more and different activities. The visitor is satisfied to find entertainment activities integrated by the magic and ambiguity of the Egyptian history along its various civilizations. Such entertaining activities do not need hi-technology to apply, however, people in Egypt tends more to the simplicity.

Regarding the GEM, this museum is unique in its nature and the nature of its exhibits, which attract visitors of different cultures and backgrounds. That made it easier for the designer to operate the rest of the activities in the museum. In this context, the design is compliance with the SDGs. However, it needs very strict management to maintain and preserve achieving the goals.

Although the final architectural drawings of this museum are not published yet, however, we cannot address the issue of contemporary museums in Egypt without mentioning it. It is unique in itself in several respects. First, its location is nearby the pyramids of Giza, the most important monuments in the whole world. Second its surface area which make it the largest museum in the world [42]. When the ministry of antiquities announced for the project competitive, architects from all over the world wrestle to compete in the competition. Which provided the opportunity to receive ideas on a global level. Here, we have to stress on the point that architects abroad used to provide their museum designs with a considerable recreational areas or other exhibiting areas (theater, library…etc.). When the Irish firm Heneghan Peng Architects won the first prize (*About the Grand Egyptian Museum*, official website), the executive authorities made some minor modifications to the

design [42]. The uniqueness of the museum for its location and its precious pieces, makes the mission of attracting audience easier for the designers. So, they took benefit from that by concentrating their design on making that "cultural" visit more entertaining through various activities. The scale of the building is monumental which reflects the sense of dignity. The construction treating for the ceiling provides natural lighting and well ventilation without air conditioners most of the time. From the floor plan, we can deduce considering a cinema hall, restaurants, gift shops, kids' area, library, theatre. In addition of the outdoor area with the hanging obelisk and simple landscape design with calm water features. Moreover, is the bridge that links between the monumental site of the pyramids and the museum itself. This bridge is currently under construction.

As the GEM, Table 4uses the tool that we deduced from the literature review of this research to explain how such non-exhibiting areas in the museum play role in achieving the Egyptian vision of sustainability 2030.

The GEM as an architectural case study and according to table 4, plays a considerable role in the first 4 steps of the Egyptian vision of sustainability 2030, although it is not fully opened yet (only the main exhibiting hall, restaurants and gift shops are open) and surrounded currently by construction sites to develop the area. However, it attracts various types of audience, tourists, and many famous companies held events there. Providing spaces for such activities answer our initial question about developing the mental image of the museums in Egypt. The GEM is intended to be in the ranks of the international museums. Similar to the NMEC, GEM recreational areas can be divided into two sections. The first one which pours directly into supporting the economic factor of the project, where the events of the companies, shops and services. The second one playing role in the socio-economic factors, where the cinema, kids' area, performances and other activities which are mainly plays a cultural, also helps to sustain the museum financially.

6. Conclusions

This study addresses the issue of architectural design of museum in Egypt. It focuses on the presence or un-presence of recreational areas in the contemporary Egyptian museums, and the role of such areas in achieving the Egyptian vision of 2030. The two analyzed case studies one was designed by Dr. El-Ghazali Keseeba, while the other one was designed by the Irish firm Heneghan Peng Architects. In spite of the different background of both designers, both of them gave considerable attention to the recreational areas in the museums. Such areas played shared in and only the first 4 steps in the Egyptian vision for 2030.

In addition of that and through the research, the authors argue that the definition of the term "museum" need a simple, however, deep meaning that redraws the role of the museums not only to promote, enhance or foster sustainability but to be sustainable by itself, as a piece of architecture.

As our world accelerates faster towards economic and social sustainability, the study advocates that the design of museums, as cultural institutions have become increasingly important and play a crucial role in this effort. By their very nature, museums promote both education and the preservation of artefacts, making them ideal locations for engaging communities with available resources and demonstrating the importance of sustainability.

The study concluded that the design of contemporary Egyptian museums is directing towards consistent evolution, that plays significant role in supporting socio-economic sustainability through the whole process, from its construction to its management and operations. Moreover, the study offers clear criteria and guidelines that connect the design of Egyptian museums with the local strategy for achieving SDGs. The strategy of building this tool can provide architects worldwide to build up their guidelines for their local museums, according to their vision to 2030 considering such criteria may turn museums to serve as beacons of sustainability, inspiring and engaging visitors while demonstrating to them the importance of a sustainable society.

7. Recommendations

The design of a museum dedicated to supporting socio-economic sustainability should be carefully considered. To have a positive impact, museum design should be inviting to the public and

offer sustainable learning opportunities. Educational programs, exhibits, and interactive activities should be developed to engage visitors with topics related to sustainability, such as renewable energy, clean technology, and green design. Additionally, the museum should incorporate energy-efficient features such as solar panels, recycled materials, and low-flow fixtures.

For future researches, scholars should study the ability of museums to achieve the other 4 steps in the Egyptian vision for 2030; environmental sustainability, governance, peace and security and leading position. Where architects face a huge challenge to design monumental buildings using environmental materials. Such a duty needs multidisciplinary researches including material engineering. Developing this area may open the opportunity to turn the constructions into self-sustainable projects. In addition of that, practically and particularly in Egypt, there is a gap between the architect's design and the administrative team in museums, researches and make more studies about the reasons of that state and put guidelines for the decision makes and architects simultaneously to improve the governance aspect. Concerning peace and security aspect, we cannot miss or forget the images of 2013 events. That year and due to political circumstances, museums have been looted. So, building with environmental materials and ensuring the security and safety of the museum is a contradictory that needs more deep studies. The last aspect in the Egyptian 2030 vision concerning the leading position, we can admit that the illustrated case studies in this research of Egyptian museum put the base of the role of the museums as a building type in this point, however, scholars and researchers can analyze it and introduce a set of guidelines that architects may consider to develop their designs of museums in Egypt.

Finally, the museum should provide visitors with a sense of community and a connection with local organizations. By connecting the museum to organizations that focus on sustainability and the environment, visitors can learn more about how their local community is striving to be more sustainable.

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