

SCIENTIFIC AND EXPLORING CENTER

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Received: 22.04.2020

Revised: 27.05.2020

Accepted: 17.06.2020

Abstract

Saudi Arabia has launched a vision for 2030 aimed at creating a well-educated society that is well versed in the field of science. Thus, there is a need to develop a dedicated science center to meet the 2030 vision. Hence, this work presents the development of Scientific and Exploring Center at Jeddah, Saudi Arabia. In this work, two case studies were analysed in order to comprehend the requirements of science center. Thus, based on the analysed case studies, for the proposed Scientific and Exploring Center, the estimated gross floor area is 11826.81 m². Furthermore, the center is comprised of several zone, which are administration, public services, scientific and exploring, library, outdoor and parking. Likewise, two sites were proposed for constructing the science center. Site evaluation analysis was carried out on both sites to comprehend the most suitable site. The results of site evaluation analysis have shown that site 2 attained the highest score of 123 and it was selected as the proposed development site. This site is located at Alshati District, Jeddah. The Scientific and Exploring Center was designed based on the concept of DNA structure, which represents the idea of exploring with infinity circulation.

Keywords-- science, center, education, Saudi Arabia

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DOI: <http://dx.doi.org/10.31838/jcr.07.08.119>

INTRODUCTION

Islam is concerned with science, as the first word revealed to the Prophet-peace be upon him-is read, and this is a clear indication of the importance of science and learning in Islam [1]. This is because since science is the foundation of the Islamic state and the reason for its development and progress around the globe [2]. Educational societies are strong communities, because education helps sophistication, inventions and discoveries that increase the well-being of human life and increase its power. From this point of view, Arab countries are seeking to work with increasing means of learning, to reduce ignorance and to increase development [3].

Between the 7th century AD and the end of the 16th century AD, Damascus, Aleppo, Kufi, Bagdad, Kairouan, Cordoba, Cairo, Marrakech and Fez were the scientific centers of the world [4] Its universities were thriving, its industries sophisticated, and science was constantly evolving and growing. Arab countries have been a place for science-seekers and an unprecedented cultural wonder. Scientists have had a great deal of public respect. This period was the setting up of science in the world [5].

Saudi Arabia has introduced a vision for 2030, aimed at creating a well-educated society that is well versed in the field of science [6]. To achieve this, the government has intended to develop a scientific city. The scientific city is a city that allows visitors to explore the science of physics through science, art and human perception. Its mission is to create research-based experiences that transform learning around the world. In the long run, this scientific city will help to improve the level of education of people by focusing on their science simulations in a fun, interesting and challenging way. Thus, to fulfil the requirement of the vision 2030 [7], this work proposes the development of Scientific and Exploring Center at Jeddah, Saudi Arabia.

CASE STUDIES

This work has analysed two studies related to science center. The information of each case studies is discussed as follow:

a. Nemo Science Museum

b. Exploratorium Museum

Nemo Science Museum

Nemo Science Museum is located at Amsterdam, Netherlands (Figure 1). It was designed by architect Renzo Piano. Nemo is a science center incorporating hands-on experiment demonstrations, immersive exhibits and valuable opportunities to discover science in a fun and easy way. The building is designed like a ship anchored in the middle of the old port. The themed science exhibits available at this museum is miracle of science, phenomena, machine park, amazing constructions, water world, the joy of science, water power, teen facts, laboratory, journey through the mind, and smart technology. In addition, there are also multimedia exhibits, 3D reconstruction areas and interactive models. The space distribution of the science museum is comprised of several themed floors, which are phenomenon (25%), elementa (10%), technology (25%), energy (30%) and human (10%).



Figure 1. Nemo Science Museum

Exploratorium Museum

Exploratorium Museum is located at San Francisco, California, United States of America (Figure 2). It was designed by architect Frank Oppenheimer. This museum has an area of 31000 m². The museum has six central exhibits, each of which focuses on a specific field of exploration. Furthermore, this museum is fitted with solar panels on its roof top to generate its own renewable

energy. This museum has two floors. In the first floor, it consists of café, outdoor gallery, bay view walk, south gallery, west gallery, museum entrance, theater and box office, and museum shop. In the second floor, there is bay observatory terrace, teaching and research, media and communications and main office. The space distribution of the museum is comprised of several themed spaces, which are fisher bay observatory (10%), terrace (9%), east gallery (15%), Bechtel central gallery (30%), kanbar forum (10%) and full facility (25%).



Figure 2. Exploratorium Museum

PROGRAM ASSUMPTION AND SPACE DETAILS

In this work, for the proposed Scientific and Exploring Center, based on Table 1, the estimated gross floor area is 11826.81 m². In addition, based on Table 1, the center is comprised of several zones, which are administration, public services, scientific and exploring, library, outdoor and parking.

Table 1. Space details

Zone	Gross floor area
Administration	384.48
Public services	1316.25
Scientific and exploring	3306
Library	1820.08
Outdoor	1000
Parking	4000
Total	11826.81

PROPOSED SITE

Proposed site: Site 1

For site 1 (Figure 3), this site is located along Prince Faisal bin Fahad street near to Sheraton Villas at Alshati district, Jeddah. This site has an area of 22500 m².

Proposed site: Site 2

For site 2 (Figure 4), this site is located along Corniche Street near to Atalla Park at Alshati District, Jeddah. This site has an area of 15620 m².



Figure 3. Site 1



Figure 4. Site 2

SITE EVALUATION AND ANALYSIS

For this work, two potential sites were proposed for developing the Scientific and Exploring Center. Thus, to determine the most suitable site, both sites were scrutinized using site evaluation analysis. The sites were analysed based on few criteria's, which are capacity, shape/proportional, topography, access/traffic, noise levels, utilities, security and safety, visual quality, visibility, future development plans, demographic patterns, surrounding and views. In addition, weighting factors (WF) were used for evaluation, where 1 = not very important, 2 = somewhat important, 3 = important. Table 2 presents the results of the analysis. Based on Table 2, the results have shown that site 2 exhibited the highest score of 123, compared to site 1 with score of 97. Hence, site 2 was selected as the development site. It is located in the middle of the town of Jeddah. The site is characterized by its high and easy access, an appropriate environment and a high visual quality. In addition, the site is surrounded by a number of international hotels, such as the Sheraton Hotel and shopping centers such as the Atalla Commercial Center and amusement parks such as Atalla Park Happy Land. In terms of climate, the good winds originates from the northwest and the sun is concentrated on the south side of Jeddah.

Table 2. Site evaluation

	Weighting factors (WF)	Site 1	Site 2
Capacity	3	15	15
Shape/proportional	2	10	10
Topography	1	1	1
Access/traffic	3	6	12
Noise levels	1	3	5
Utilities	1	3	4
Security and safety	3	15	15
Visual quality	2	6	8
Visibility	2	6	10
Future development plans,	3	12	15
Demographic patterns	2	8	10
Surrounding	3	9	15
View	1	3	3
Total	-	97	123

PROJECT DESIGN

The Scientific and Exploring Center is a center that allows visitor to explore the science. This center is based on a fully educational and recreational center with sufficient technology and facilities that is related to science. In terms of architectural design, the concept of the building is based on DNA structure, which represents the idea of exploring with infinity circulation. Furthermore, this center is characterized by the presence of a strong movement, and it has incorporated distinctive walk path within the building. For the auditorium, steel frame were used

and the whole building structure was constructed using flat slab. The spacing of the building is comprised of auditorium (25%), exploring halls (40%), library (10%), administration (5%) and public zone (20%). The architectural design of the Scientific and Exploring Center is shown in Figure 5 to Figure 9.

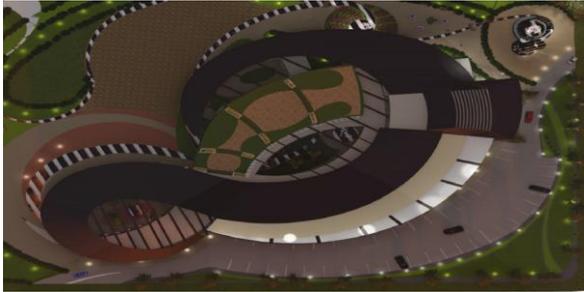


Figure 5. Top view of Scientific and Exploring Center



Figure 6. Aerial view of Scientific and Exploring Center



Figure 7. South elevation of Scientific and Exploring Center

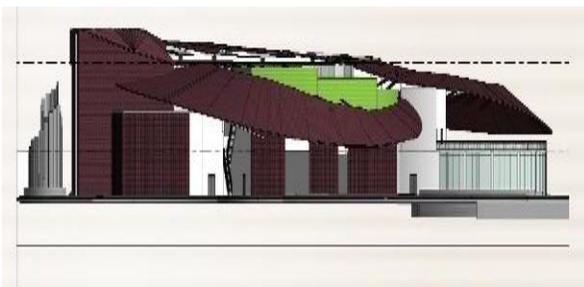


Figure 8. North elevation of Scientific and Exploring Center



Figure 9. East elevation of Scientific and Exploring Center

CONCLUSION

This work has presented the development of Scientific and Exploring Center at Jeddah, Saudi Arabia. The estimated gross floor area is for the center 11826.81 m². Furthermore, the center is comprised of several zone, which are administration, public services, scientific and exploring, library, outdoor and parking. The development of the Scientific and Exploring Center will create a city of science, education and entertainment for the dissemination of scientific knowledge in the community and increase people's desire to know more about science in Saudi Arabia.

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