

Using GIS Techniques for Conference Tourism Management: A Case Study of World Youth Forum - Sharm El-Sheikh, Egypt

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ABSTRACT:

Egypt works to implement the tourism sector's development vision: Egypt is a sustainable and attractive tourist destination at the regional and international levels, as well as an important supporter of the national economy and the United Nations' goals for sustainable growth (SDG 2030). In 2010, Egypt's tourism sector is the largest in North Africa. Expectations for Gross Domestic Product (GDP) in 2022 are reaching \$ 483 billion. Moreover, tourism's overall economic impact is expected to be \$91,4 billion. The main elements that push tourism to success depend on the ability to sufficiently develop, manage and market the tourism facilities and activities. Therefore, there is a need to invest in the tourism industry and develop it to meet international standards. Egypt in the last 5 years was oriented to hold and host many conferences like the Youth Conferences, Misr can, and Comesa, etc... Egypt in 2017 hosted around 3000 visitors to attend the World Youth Forum WYF in Sharm El-Sheikh. In 2018, Egypt decided to invite more than 5500 participants. But the **problem** appeared as a lack of a system of managing, analysing, and reporting to the decision maker with the whole image. The system has to track the visitors since their arrival at Sharm El-Sheikh international airport till their check-in at hotels and attending the conference halls etc... The **research objective** is to develop a methodological framework to manage any conference tourism with its whole events while creating a connection between the tourists participating in such events and the Vector data created by the GIS tools, making use of the prototype used to manage the events that occurred in the WYF 2018. The **research questions** are focusing on How to create a loyal participant by exceeding his/her imagination due to using GIS? How to track our foreign guests to take care of them during their visit? What are the required features for the database to support the decision-taker? The research mainly is divided into three sections; as first is an overview of conference tourism and its relation to GIS, second analyzing the case study which focused on creating the full vector data taken from the registration web page filled by the participants then linking the data mentioned before with the aviation team, transportation types, accommodation categories, IDs codes, given gifts and Halls capacity, third the results which refer to the frame of developing the technical reports of the decision makers during the event.

KEYWORDS:

Geographic Information Systems (GIS), Tourism Management, Conferences Tourism, World Youth Forum (WYF 2018)

الملخص:

تعمل مصر جاهدة نحو تنفيذ الرؤية التنموية لقطاع السياحة، مصر وجهة سياحية مستدامة وجذابة على المستويين الإقليمي والدولي، فضلاً عن كونها داعماً مهماً للاقتصاد الوطني وأهداف الأمم المتحدة للتنمية المستدامة ٢٠٣٠. يعد قطاع السياحة في مصر الأكبر في شمال إفريقيا خلال عام ٢٠١٠، حيث تصل توقعات نمو الناتج المحلي الإجمالي في عام ٢٠٢٢ إلى ٤٨٣ مليار دولار. علاوة على ذلك، من المتوقع أن يصل الأثر الاقتصادي الإجمالي للسياحة إلى ٩١,٤ مليار دولار. تعتمد العناصر الرئيسية التي تدفع السياحة إلى النجاح على القدرة على تطوير وإدارة وتسويق المرافق والأنشطة السياحية بشكل كافٍ. لذلك، هناك حاجة للاستثمار في صناعة السياحة وتطويرها لتلبية المعايير الدولية. توجهت مصر في السنوات ٥ الماضية لعقد واستضافة العديد من المؤتمرات مثل مؤتمرات الشباب، مصر تستطيع Misr can، والكوميسا، إلخ... استضافت مصر في عام ٢٠١٧ حوالي ٣٠٠٠ زائر لحضور منتدى الشباب العالمي WYF بمدينة شرم الشيخ. في عام ٢٠١٨، قررت مصر دعوة أكثر من ٥٥٠٠ مشارك. لكن المشكلة بدت على أنه يوجد نقص في نظام الإدارة والتحليل والإبلاغ عن صانع القرار بالصورة بأكملها. يتعين على النظام تتبع الزوار منذ وصولهم إلى مطار شرم الشيخ الدولي لإخبار فنادقهم بتسجيل الوصول وحضور قاعات المؤتمرات وما إلى ذلك... الهدف البحثي هو تطوير إطار منهجي لإدارة أي سياحة مؤتمرات بأكملها مع إنشاء اتصال بين السياح المشاركين في مثل هذه الأحداث وقاعدة بيانات data Vector التي يتم إنشاؤها بواسطة برنامج نظم المعلومات الجغرافية GIS، باستخدام النموذج الأول لإدارة كافة الفعاليات والأنشطة التي حدثت في WYF 2018. أتركز أسئلة البحث على كيفية إنشاء قاعدة بيانات تساهم في إدارة الفعاليات باستخدام نظم المعلومات الجغرافية GIS؟ كيف نتتبع ضيوفنا الأجانب للاعتناء بهم أثناء زيارتهم؟ ما هي السمات المطلوبة لقاعدة البيانات لدعم اتخاذ القرار؟ وينقسم البحث أساساً إلى ثلاثة أقسام؛ حيث أن أولها هو نظرة عامة على سياحة المؤتمرات وعلاقتها بنظم المعلومات الجغرافية، ثانياً، تحليل دراسة الحالة التي ركزت على إنشاء قاعدة بيانات من خلال صفحة التسجيل على الإنترنت التي ملأها المشاركون ثم ربط البيانات المذكورة من قبل بفريق الطيران، أنواع النقل، فئات الإقامة، رموز الهوية، الهدايا والقاعات، ثالثاً، النتائج التي تشير إلى إطار إعداد التقارير التقنية لصانعي القرار أثناء الحدث.

الكلمات المفتاحية:

برنامج نظم المعلومات الجغرافية، سياحة المؤتمرات، إدارة السياحة، منتدى شباب العالم ٢٠١٨

Introduction

The success of tourism industry depends on the ability of the country to develop, manage and market its tourism facilities and activities. Most developing countries rely primarily on tourism for economic growth and diversity [1]. Tourism in Egypt is one of the most important sources of foreign exchange. Given the global economic challenges, Egypt has an opportunity to attract a larger share of tourists. If the strategic position between the three continents is exploited, it contributes to the rapid arrival of tourists and the low cost of travel and accommodation in Egypt when compared to competing markets, [2] as well as the diversification of tourist destinations to allow them to receive tourists all year in exchange for competitive markets that receive seasonal tourism and earn higher revenues from Egypt. [3]

The government is working to improve the quality of the tourism product while strictly adhering to environmental standards and green tourism to ensure sustainability and diversify the tourism product by targeting new tourism patterns, diversifying foreign markets to attract visitors from

emerging economies that are moving toward more openness, [4] as well as countries that are recovering from COVID-19 to serve as the starting point for Egyptian tourism promotion, through conferences, promotional missions and participation in international exhibitions such as the World Youth Forum organized by Egypt in 2017 with 3,000 visitors and also in 2018 with 5,500 visitors from all over the world. The tourism sector's gross domestic product (GDP) increased in 2021/2022 to \$ 91.4 billion, compared to \$ 69.5 billion the previous year, with the growth of 31.5% as stated by a Ministry of Planning and Economic Development report, production in the sector is expected to reach \$ 120 billion, up from \$ 93 billion in 2020/21, representing a 29% increase. The report also stated that tourism and antiquities sector investments are expected to be around 8.5 billion pounds in 2021/2022, up from around 5.2 billion pounds in 20/2021, representing a 64% increase over 5.5 billion pounds in actual investments in 19/2020. [5]

According to studies from Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS), the number of tourists arriving in the country increased by 85.4% in the first half of 2022 to 4.9 million compared with 2.6 million tourists in the first half of 2021. Before COVID-19, Egypt received one of the country's record 13.1 million tourists in 2019, before falling to 3.7 million in 2020, and jumping to 8 million in 2021. Eastern European countries were the most frequent tourist areas to Egypt in 2021, at 50.6%, followed by the Middle East at 18.9%, Western Europe at 16.4% and Africa at 7.1%. Egypt received the largest number of tourists by its date in 2010, which amounted to 14.7 million tourists, and revenue this year reached \$12.5 billion. [6] [7]

The climate change conference (COP 27), which will be held in Egypt in November 2022, will be reflected by the arrival of approximately 30 thousand visitors from around the world, resulting in gains at the local, international, environmental, economic, and political levels by attracting investments from international and regional partnerships and tourism promotion, as well as the promotion of Egyptian products, and the provision of additional sources of funding for climate change projects in Egypt by international organizations, to strengthen the State's efforts in implementing its sustainable development strategy. [6]

As a result, there is a need to invest in and develop the tourism industry to meet international standards. Although tourism can be defined as experiences formed during the guest's stay from arrival to departure. This paper focuses on using geographic information systems to not only manage but also make a frame for conference tourism in Sharm El-Sheikh, South Sinai, and Egypt. This experience is shaped by all of the services provided to travellers, such as aviation, transportation, lodging, culture, and so on.

1. Theoretical insights review:

1.1 Tourism Concept

In general, tourism is a collection of activities, facilities, services, and industries that provide a travel experience. Transportation, lodging, eating and drinking establishments, entertainment, recreation, historical and cultural experiences, destination attractions, shopping, and other services available to travellers away from home shape these experiences. Tourism, as defined by Ghosh in 1998, is one of the most important items of international trade. The tourism industry aids in the flow of foreign currency between countries [7]. It can be defined as a movement of

people to various destinations that includes two key elements: The journey and the stay [8]. Tourism is primarily a leisure activity that makes use of readily available funds and free time. Tourism entails engaging in activities with the host population of the destination [9]. According to Medlik et al in 1991, tourism is primarily viewed as a growth industry in developing countries because the flow of tourists in these countries distributes foreign currency [10]. Tourism was cited as the only international major sector at the United Nations Conference on Trade and Development (UNCTAD) June 1998 summit [11]. The tourism industry grew from 6 billion dollars in 1980 to 62 billion dollars in 1996. According to Fridgen's (1991) study of an American model, the success of any tourism business could be determined by three factors, [12] as follows;

- 1st Tourism planning and management.
- 2nd Tourism development and research.
- 3rd Tourism marketing.

1.2 Tourism Types

Tourism types change over time and vary greatly. People all over the world travel for a variety of reasons. Some people travel for business, some for medical reasons in order to get good medical care, some to visit a holy place, and some to see the natural diversity. [11] The primary reason for travelling determines the type of travel and tourism, so tourism can be classified as follows:

- According to time:
 - Short-term (up to 3 days) and long-term (more than 7 days).
- According to the way of organization:
 - Organized (by travel agency) and individual (families, friends and neighbours on their own).
- According to a place of destination:
 - International tourism and domestic tourism.
- According to the direction of tourist flows:
 - Incoming tourism and outgoing tourism.
- According to spending time at the destination:
 - Seaside tourism: Recreation by the sea, water sports (swimming, rowing, sailing, surfing, windsurfing).
 - Mountain tourism: Mountain hiking, climbing, biking.
 - Sports tourism: Winter sports – skiing, snowboarding, cross-country skiing, summer sports, extreme sports (rafting, paragliding, sky diving, etc.) and sports events (world championships).
 - Cultural tourism: Historical sites, buildings and monuments and Places of historical events, e.g. battles (Waterloo), catastrophes (Pompeii).
 - Health tourism: Spas, fitness, relaxation, wellness.
 - Gastronomic tourism: Music, theatre or beer festivals, trying wines and meals of regions abroad.
 - Shopping tourism: Going shopping abroad due to lower prices of goods.
 - Business tourism international, national, regional, and local conferences, seminars, business trips, etc. [14]
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1.3 Tourism Management Concept

Tourism management is the act of developing a plan that includes directing and controlling people as well as managing resources in accordance with a set plan, particularly in terms of timing, access, and utilisation of resources. When Middleton and Hawkins [15] stated, "Tourism management focuses on ways and means to influence visitors' choices of location, access, timing, and product provision, as well as to develop local understanding and knowledge." The reality of influencing visitors' choices entails finding ways to persuade tourists and tourism businesses to voluntarily change their naturally occurring behaviour, where "naturally occurring behaviour" refers to what people do when exercising their instincts and choices in a free society [15]. Changing this behaviour may necessitate specific inducements, or compelling people and businesses to change through the imposition of various regulations, controls, taxes, or penalties [15] [16].

In most countries, controlling visitor numbers at destinations is beyond the control of either the public sector or private sector organisations. Control can be exercised in some cases through methods such as high entrance fees to attractions and/or limited parking spaces. However, such draconian measures are not used in the majority of destinations. Instead, Middleton and Hawkins [15] use the phrase "selective influences and control." These are intended to achieve stated and quantifiable goals at destinations. They are as follows:

- Making carrying capacity decisions.
- Selecting and targeting specific market segments or groups.
- Identifying partner organisations in tourism planning and marketing.
- Developing a variety of management techniques for visitor segments and products.
- Systematically monitoring results and making any necessary changes.

In the last few decades, Information Communication Technology Services (ICTs) have had a massive impact on travel and tourism. Most areas of management have been significantly impacted by ICT developments, particularly the use of Geographic Information Systems (GIS) in tourism management. As a result, some aspects of tourism have completely changed.

1.4 Conferences Tourism Concept

Tourism is heavily influenced by events. Conferences are one of the most important touristic events that have occurred. Conference tourism became established in a variety of fields for both the purpose of industry and tourism decades ago [17]. Branding conferences that are well-managed contribute to countries' Gross Domestic Product (GDP) growth. Conference tourism has emerged as a critical stakeholder in a country's success and attractiveness. Conference tourism can be defined from various perspectives. [18] It is defined as a gathering of 10 or more people for at least four hours at a contracted location more than 50 miles away from home. Furthermore, conventions, trade shows and exhibitions, incentive events, corporate/business meetings, and any other meetings where attendees conduct business, share ideas, or learn can all be considered meetings. [19]

Furthermore, a conference is a symposium, seminar, workshop, or any other organised and formal meeting, whether face-to-face or virtually, where individuals assemble or meet virtually to exchange information and views or explore or clarify a defined subject, problem, or area of knowledge, whether or not published report results from such meeting. A meeting where a

gathering discusses general matters as part of a normal course of doing business is not a conference. [20] The Department of Defence (DOD) is developing the Conference definition as follows: It is an events meeting, retreat, seminar, symposium, or conference that requires attendee to travel. It always requires the payment of a registration/conference fee and/or takes place in a hotel or conference centre. [21], [22].

1.5 The Role of GIS in Conferences Tourism

GIS is defined as "a logically organised set of computer hardware, software, geographic data, and users designed to enable the efficient collection, storage, organisation, manipulation, analysis, and display of spatial geographic and all other information of interest to the user." GIS is distinct from other types of information systems. Each data set in GIS has its space representation. GIS displays data in a visual and simple format that is always beneficial to users. [23] After the overlap process, GIS-enabled spatial data which is presented in the form of specific thematic maps called layers. When it comes to studies that link GIS and tourism, there is a 20-year gap. From the 1990s to the present, the situation has begun to change, with a large number of studies dealing with the integration of GIS in the tourism industry. For the time being, the majority of GIS applications in tourism have been related to the inventory of recreational capacities, management of the use of space for tourism, visitor impact assessment, and evaluation of conflicts between recreation-environment mapping, creation of tourist information management systems, and decision support [24]. As a result; a paper will carry out a series of spatial analyses based on the connections and relationships that exist between objects, phenomena, and processes.

Conference tourism makes insufficient use of GIS technology to improve business operations. Although the goals of using GIS in conference tourism policy planning are very wide as it provides integrated tourist information. Furthermore, it is a tool to integrate, store, and manipulate various types of data, both qualitative and quantitative, spatial and non-spatial, and to visualise the aforementioned information [23]

2. Methodology

2.1 CASE STUDY

The case study chosen is World Youth Forum (WYF), a tourism conference held in November 2018 in Sharm El-Sheikh, South Sinai, Egypt as shown in fig (1). WYF is a platform created by promising Egyptian youth. It conveys to the entire world a message of peace, prosperity, harmony, and progress. It brings together young people from all over the world in an enriching environment where they can exchange ideas and recommend initiatives to decision-makers, influential people, and public figures from various backgrounds. The forum provides an opportunity for young people to interact with policymakers and network with promising young people from around the world who are committed to making our world a better place for all. WYF chose to use GIS not only for its global impact, but also to manage Conference processes. The paper that created the product could help to orient the WYF to e-conference tourism.



Fig no. 1- Regional entrance for the case study, Left: Egypt, Middle: South of Sinai, Right: Sharm El-Sheikh city, Source: By the Authors.

2.2 Materials and techniques

WYF 2018 teamwork decided to develop a unique mobile application connected with the personal geodatabase. The geodatabase downloads the mobile application during his / her arrival as shown in fig (2,3,4). After that the participant has to apply the required data like Ticket ID as shown in figure no.3. Not only the application will be sent to the participant notifications with the personal data he/she needed during the stay, but also he/she can search about any needed data during the stay. Once the participant landed at Sharm El-Sheikh international airport he has to scan his / her QR code through the forum's ushers who are waiting at the airport as shown in figure no 4. Thus the operation team who uses the system can easily know who arrived in addition to the numerous participants who arrived, the arrivals' categories, the no. of the no show in the received flights etc...



Fig no. 2: the interface of the WYF mobile application, Source: Play store, Android.



Fig no. 4: The used QR code during WYF 2018, Source: by the Authors.

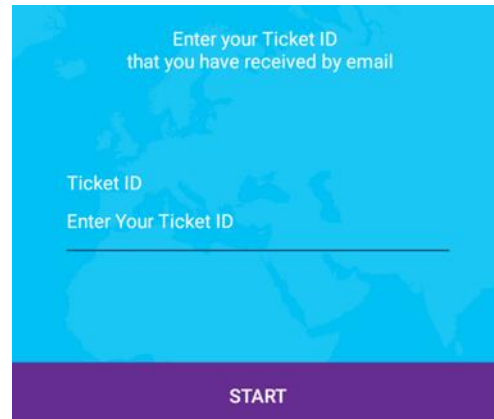


Fig no. 3: The registration phase using the mobile app, Source: Play store, Android.

The participant can view full data about the stay including the hotel name, hotel facilities, hotel destination, transportation type, call centre for any help, the timetable for his / her stay, WYF halls destination, forum calendar, his / her departure airlines and date and the main events he or she will attend. All of these data already exist in the personal geo-database created by the engineering developers and GIS developers.

The WYF 2018 consisted of a Central operation unit, a team who integrates the main team’s organizers like accommodation, registration, ticketing, transportation, MAAS team, social media, marketing, production, and technical support team. These teams could manage the forum using new technologies with a special reference to Spatial Data, for example, the accommodation team using GIS to present the updated data for the hotel capacity, blocked rooms, room categories, numbers of no-shows, a key person in the hotel and his/her phone number.

3. Material and methods:

3.1 Feature data set & feature classes

The team of the project applying the application takes into consideration many feature classes during creating a database to meet guest satisfaction and operation team needs. These feature classes are represented in table (1).

Table (1) the feature classes used while designing the application to create the guest’s database

source: By the Authors

No.	Layer name	Layer Description	Type
1	Roads	Road class A, Class B, Class C etc...	Line
2	Coasts	The entertainment activities in the neon coast	Line
3	Transportation	Bus, Coaster, Car, Taxi, microbus, bike, etc...	Points
4	Hotels	Hotel name, capacity, type of hospitality, guests’ type, hotel rate, and distance from it to the Halls etc...	Polygon
5	Markets	The nearest market	Polygon

6	Theatres	The near theatres, cinemas etc..	Points
.	Summit	Location, schedule, main speaker, distance from your location to the main hall.	Polygon
8	Halls	Location, distance from your location to the main hall.	Polygon
9	Main events	Morning events according to the forum schedule, night events.	Points
10	Side events	Schedule of the side event, location, number of guests invited to attend.	Points
11	Restaurants	The nearest, meals provided, rates etc...	Points
12	Malls	The nearest, product provided, distance from the hotel rates etc...	Points
13	Shopping Streets	The nearest, product provided, distance from the hotel rates etc...	Line
14	Historical Areas	The nearest, brief description, distance from the hotel rates etc...	Polygon
15	Religious points	The nearest, brief description, distance from the hotel etc...	Points
16	Traveling agencies	The nearest, distance from the hotel etc...	Points
17	Bank	The nearest, distance from the hotel, rate etc...	Points
18	Police station	The nearest, distance from the hotel etc...	Points
19	Hospital	The nearest, distance from the hotel, rate etc...	Points
20	Gardens	The nearest, distance from the hotel, rate etc...	Polygon

3.2 Coding system color code:

The operation team in WYF 2018 started with colour coding, Hotel type and Hotel code for the hotels assigned to the participants and guests as shown in table no.2, after that prepare the maps which show hotels allocation presented by colour coding as shown in fig no.6, and then the attribute table filled according to data from the accommodation committee in the WYF 2018 as shown in fig no.7.

Color code	Type	Hotel Code	Hotel name
Black	SVIP	1	Rixos Sea Gate
		1	Rixos Sea Gate
Purple	VIP	21	Hyatt
		2	Sensatory
Red	Public Figures	3	Jaz Mirabel
		22	Maritim jolie ville golf
		4	Rixos Sharm
		22	Maritim jolie ville golf
		23	Grand Rotana
Grey	Foreign Media	4	Rixos Sharm
		24	Baron Beach
		25	Baron Palm
		5	Continental Plaza
Yellow	Foreign youth	6	Coral Sea Holiday resort
		7	Royal Holiday Beach
		8	Sheraton Main Building
		9	Sheraton Villas Area
		10	Hilton Sharks Bay
		11	Xperience Kiroseiz Premier
		12	Laguna Vista Sharm
		13	Cleopatra
		14	Novotel Beach
		15	Sharm Grand Plaza
Orange	Egyptian Youth	26	Tropitel Naama Bay
		27	Concorde Sport
		28	Marriot Beach
		29	Aurora
		25	Baron Palm
Blue	Egyptian Media	16	Steigenberger Alcazar
		27	Concorde Sport
Green	Panelists*	21	Hyatt
		31	Maritim Jolie ville royal peninsula
Pink	Organizers*	32	Marriot Palm
		33	Renaissance Sharm El Sheikh

Table no. 5: color coding, Hotel type and Hotel code for the hotels assigned to the participants and guests
Source: By the operation team in WYF 2018.

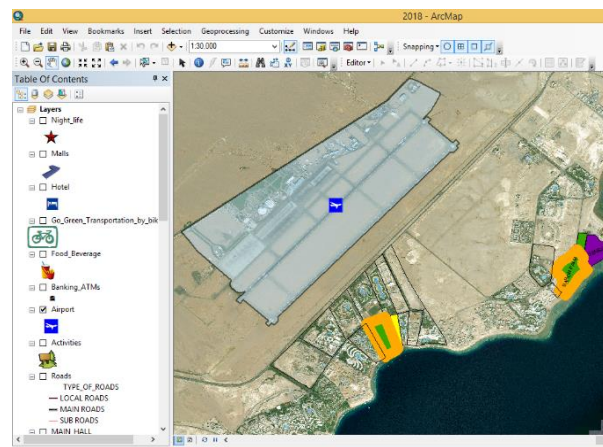
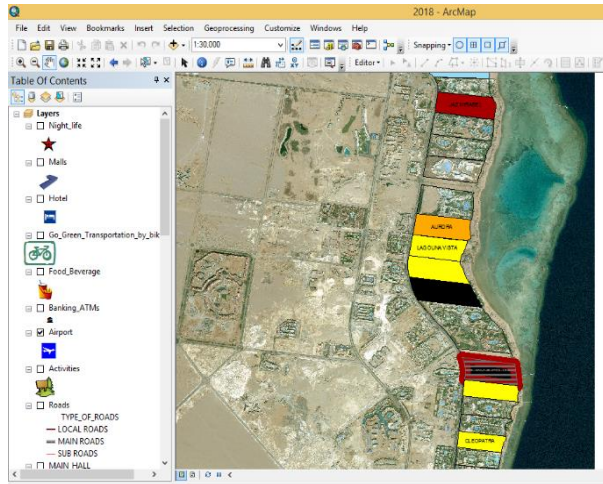


Fig no. 6: Samples for hotels allocation presented by color coding, Source: By the Authors.

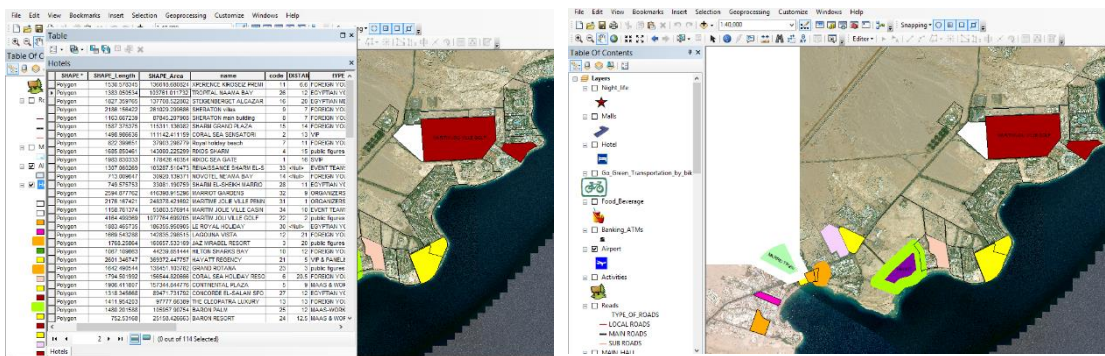


Fig no. 7: Attribute table filled according to data from the accommodation committee in the WYF 2018, Source: By the Authors.

4. Results and discussion

Successful implementation of GIS promotes the importance of information over technology. GIS has been successfully used during the WYF 2018 forum through collecting, analysing, modelling and visual presentation of tourist data. Moreover, it supports the decision-taker with fully updated data in every system's minutes. It can make a strong integration between the teams, easily the central operation unit can read and analyse the developed data. In addition to contact with the other teams after reading the whole image of the working flow of the forum.

Moreover, the registration team can view the full database for the participant and export accurate statistics reports about them according to flight arrivals after the participant scans his / her QR code. Then, the Transportation team always know the expected participants so that they can offer suitable transportation for each category. It happened automatically according to the GIS rec-concerning reference to the entered attributes. After that, the accommodation team send the rooming list for the transport to the team and each contact person in the hotels. Once the participant checks in at the hotel and scan the QR code for the second time the team can export the reports about the remained rooms, the blocked rooms and the total rooms. At the same time, the giveaways team can identify the required oriental Egyptian gifts made in Egypt and by Egyptian youth. The next day of his / her check at the hotel the participant receives the gifts from the hotel's key person.

During the stay, the participant received notifications about his / her location, forum schedule, bus attraction points, Gala diner, site visits, WYF theatre schedule show, gallery and Marathon event etc... The WYF 2018 management team argued that using system technologies and Geographic information systems helped them to manage, integrate, analyse and report in easy and accurate ways. Moreover, the system makes the participant familiar with Sharm El-Sheikh city, forum, transportation types etc... Finally, the integration of tourism data and GIS data isn't still a big challenge for the tourism industry today. It is used for many purposes achieving results to meet the tourists' satisfaction during their visit, exploring competitive advantages for the city and its tourism facilities and extending the field for the tourist to know the spatial data and information of the city hosting the conference.

5. Conclusion

Geographic Information Systems (GIS) plays an important role in the management of the World Youth Forum 2018 as its role can be shown as follows;

- The establishment of a complete database of visitors since their arrival at Sharm El-Sheikh international airport till their check-in at hotels and attending the conference halls.
- It made it easy to map the most attractive parts of Sharm El-Sheikh.
- It showed hotels and tourist resorts locations.
- It assisted visitors in identifying this glamorous city.
- It shared in contributing in the promotion of tourism to achieve its tourism development at a global level.
- It helped in the establishment of land use maps to identify the investment areas located in Sharm el-Sheikh city to present them to foreign investors during the conference which helped in achieving economic development.
- It created a complete database of all companies contributing to the exhibitions of the Conference.
- It shared in preparing easy access maps from first access to the airport, housing hotels, and moving to the Conference through the network of roads, stations, and trails of public transport through a wide range of electric-powered buses.
- Identifying routes for both pedestrians and bikes.

Finally, the results refer to the frame of developing the technical reports of the decision makers during the event.



Fig no.8: The role of GIS in Conference tourism, Source: By the Authors.

6. Recommendations

It is recommended to manage conference tourism with its whole events while creating a connection between the tourists participating in such event and the Vector data created by the GIS tools.

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