



## Evaluation of Geographic Information Systems Technique Effect in the Planning of Tourist Areas in Egypt: a Study Applied to the Tourism Development Authority

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### ARTICLE INFO

#### Keywords:

Evaluation, Technique, Geographic Information Systems, Planning of Tourist Areas

### ABSTRACT

Tourism planning is one of the most significant tools for tourism development. It aims to increase national income and develop inclusive civilized development for all-natural, human, and material components of the countries. Therefore, tourism development planning is considered an integral part of the economic and social development plan. This requires all governmental and non-governmental departments to implement a tourism development policy. Planning must incorporate a lot of detailed and accurate information closely related to the earth. It must also include the process of collecting, organizing, analyzing, displaying, and coordinating this information in a system. This allows it to be recalled easily in a timely manner and used by decision-makers. Geographic Information Systems (GIS) could provide support to governments in infrastructure operations management by processing the data linked to tourist sites and dealing with several layers of data to achieve the integration of all various specialties' experiences in development projects. This research aims to show the effect of applying the GIS technique in the Planning of Tourist Areas in Egypt. The results demonstrate that GIS supports tourism planning quickly and effectively. The research recommends raising the efficiency of GIS employees at the Tourism Development Authority by providing appropriate training and qualifying them locally, regionally, and internationally.

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### 1. Introduction

Tourism is of great interest to both developed and developing countries of the world. Many countries consider it to be an important and main economic resource due to its contribution to their gross domestic product and foreign currency reserves. Therefore, it has become important to provide an inclusive base for tourism planning, to coordinate

accurately in setting goals, determine the available means, take into account providing a large amount of data and information, and limit and analyze them to enhance the available tourism possibilities and services related to tourism activity and preserve them to ensure their continuity in the present and the future (Thorsten, 2010).

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The emergence of GIS technology, which uses an enormous amount of data and information besides the technological revolution represented by the use of computers and various programs, has led to many studies interested in showing the spatial dimensions of tourist areas and archaeological sites, identifying their properties and features, and attempting to plan and develop them. With the availability of such systems, the process of planning has become more accurate and flexible (Peter, 2008). As a tool for analyzing and presenting tourist areas, archaeological sites, and other resources, GIS contributes to providing all the information and data that supports tourism planning. The use of GIS technology in modern planning is a crucial way to achieve development plans to raise tourism growth rates. This will achieve the desired benefits from this tourism activity (Srimathi, 2012).

### 1.1 Study Problem

The research problem is represented in the low level of awareness and interest in the basic informative infrastructure of the spatial data of Geographic Information Systems, in addition to the lack of experience dealing with modern technological information systems, which decreases the chances of developing good tourism planning for the tourism and archaeological areas in Egypt (Al Sabbagh, 2014).

Research importance appears in benefiting from Geographical Information Systems technologies and their effect on tourism planning for tourism areas and archaeological sites, which in turn reflects positive effects on Egypt's competitive feature.

This study aims to:

1. Shed light on the Geographic Information System, its components, and its importance.
2. Recognize the effect of Geographic Information Systems on tourism planning.
3. Show the effect of moving from traditional systems to Geographical Information Systems.
4. Specify the obstacles to the implementation of the Geographic Information System in Egypt.
5. Suggest some recommendations to activate the Geographic Information Systems application at the Tourism Development Authority.

## 2. Literature Review

### 2.1 Tourism planning

Tourism planning is defined as "*drawing an estimated future picture of the tourism activity in a specific country, and in a specific period*" (Clare, 2011). It was also defined as "*Organizing tourist areas to obtain economic, social, and environmental benefits from the development process*" (Shawky, 2009).

Tourism planning plays an extremely important role in developing tourism activity, that is because it is a scientific approach to organizing and managing the tourism activity with all types of tourism activity and provides a mutual framework to make decisions in the management of tourism resources (Ghoneim, 2013), it provides the responsible authorities with the methods and directions that they should follow, which ease their work and saves a lot of wasted effort, and help to unite the efforts of all units responsible for the development of the tourism sector and coordinate their work, and decreases the duplication of decisions, which helps to achieve general goals of this activity (Christian, 2018).

Good tourism planning is characterized by focusing on the tourism product as well as on promotion and marketing processes in a way that achieves a balance between economic, social, and environmental goals within a framework of inclusive and sustainable tourism development (David, 2016).

### 2.2 Geographic Information Systems:

GIS is defined as "*a comprehensive national system which includes the components of computers, programs, and databases, in addition to the members. It provides an accurate inventory of tourism information, stores, updates, processes, displays and outputs them developing tourism*" (Nash, 2011).

There are five basic components of the GIS (Figure 1) that make it effective (Sheldon, 2004, Worrall, 2007):

1. *Hardware:* Hardware consists of the technical equipment needed to run a GIS efficiently. It includes computers, standalone networks with

good configuration, good processing capability to run the Geographic Information System software, enough hard disk space to store large spatial data, and input and output devices such as scanners, printers, etc.

2. *Software*: GIS software helps to store, analyze, and display tourism information in the form of maps and reports. It provides the Graphical User Interface for easy display and access to tools for inputting, visualizing, processing, editing, analyzing and querying geographic data. Data is accessed and managed through Data Base Management System.

3. *Data*: Tourist information data and its related data tables are among the most important components of Geographic Information Systems.

4. *Methods*: To make a GIS work properly requires not only the necessary investments in hardware, software and data but also the knowledge to utilize the GIS technology. The methods are the procedures followed to answer the question that needs to be resolved. The method in GIS includes how data is accessed, stored, managed, processed, analyzed, and finally presented as output for a particular application.

5. *People*: GIS technology has a limited value without the people (users) who work on directing the system and finding plans to apply it to realistic problems.



Figure (1): Components of GIS,  
Source: (Nash, 2011)

GIS help to plan new tourism projects, and provide a larger number of the beneficiaries with tourism information quickly and with high effectiveness, whether for the decision-maker or tourists using

technology, developing tourism services, integrating tourism data into one database, and making the best decisions in the fastest time, which leads to encouraging tourism investments (Heywood, 2010).

### 2.2 Geographic Information System's goals

GIS aims to provide tourism information and an integrated vision for the future development of tourism management, integration between the various administrative sectors related to tourism through information networks, and to achieve a high level of administrative quality to achieve a competitive advantage presented to all the tourists as required (Al Saidi, 2011). The characteristics GIS technique are represented in decreasing the costs of tourism products and improving them, facilitating the development of tourism products, reducing the labour in the tourism sector, and contributing to making a decision by tourism agencies (Burrough, 2008).

### 2.3 GIS technique and tourism planning

Geographic Information System is an electronic archive for information in terms of the archaeological sites and their data and the ability to store large amounts of information to use it easily in a very fast time and link maps and data in one system accurately and effectively in order to develop the tourism services, in addition to providing data on the reasons and resources of pollution of tourism environment and how to get rid of them. (Burch, 2006).



Figure (2): Applications of GIS in managing the touristic sites, Source: (Al Saida, 2011).

The role of GIS in preparing tourism development plans include (Al Naqash, 2014):

1. Creating a tourist database.
2. Obtaining data easily and conveniently to exchange and preserve tourist data and information
3. Analyzing the data and displaying the potential related to the development of tourist areas.
4. Providing data on tourist areas, the level of tourist services, and the volume of revenues that accrue to the tourist destination.
5. Making the right decision for planners and investors in the tourism development process.
6. Issuing tourist references, books, and pamphlets for cities that own the most prominent sites visited by tourists represented in the tourist, archaeological and heritage areas, museums, parks, gardens, entertainment cities, popular markets, malls, commercial complexes, exhibition halls, celebrations, hotels of all kinds, places of transport stations, car rental, hospitals and police stations.

The input data in GIS are represented in the elements of tourism attractions such as (tourism and archaeological areas, hotels and tourism villages, restaurants, museums, parks, popular markets, basic structures, amenities and services, tourism facilities, modern road networks, airports, railway stations and tourism statistics (Konstantinos, 2015). This depend on some success steps of GIS technique (Jones, 2008, Kronke, 2005):

1. Collecting data, information, and maps related to Tourist and archaeological sites.
2. Entering information and creating a tourist database.
3. Managing and processing information bases in Geographic Information Systems.
4. Maintenance of databases to keep tourist information base and update the system continually.
5. Learning and training to know the concepts of Geographic Information Systems, their goals, and methods.
6. Customizing GIS programs by developing specialized programs in various applications.

*2.4 The effects of (GIS) technology in tourist area planning:*

The effect of GIS applications on tourism development (Ghoneim, 2010, Al Azzawi, 2008):

1. Identification of the tourism resources and benefiting from them appropriately in the present and the future.
1. The complementarity of the tourism sector with other sectors and achieving the objectives of public policies for economic and social development at their various levels.
2. Providing suitable background for the decision-making method for the development of tourism in the public and private sectors, by studying the current and future reality.
3. Providing information, data, statistics, maps, plans, and reports on the nature of the sites that allow the establishment of tourism projects in the region.
4. Providing data and information that contribute to the gradual development of tourism by identifying the stages of tourism development.
5. Increasing the economic, social, and environmental benefits through developing the tourism sector, distributing the fruits of its development to members of society, and reducing the negative aspects of tourism.
6. Developing detailed plans to raise the level of tourism for some tourist areas.
7. Laying the appropriate foundations for the implementation of continuous development plans, policies, and programs through the establishment of agencies and institutions to manage the tourism activity.
8. Encouraging tourism appropriate to the nature of the archaeological areas and involving members of the local community in the decision-making process related to tourism development plans in the tourist areas.

*A) GIS applications and their impact on tourism planning (Al Sammak, 2012, Mahdi, 2014):*

1. Preserving tourist areas and archaeological sites through aerial photographs and 3D maps to identify tourist areas and archaeological sites, how to exploit, integrate and use them in tourism activity, and find and maintain economic sources of financing.
2. Dealing with archaeological sites according to the conditions of each site in terms of maintenance, restoration, protection, and re-employment.
3. Visual upgrading of the tourist areas, archaeological sites, and the surrounding areas

and removing any encroachments or negative effects that affect the archaeological areas.

4. The ability to predict and control urban growth in the surrounding areas of the archaeological area by collecting and entering data and information.
5. Developing tourism infrastructure services such as airports, roads, communications, water, electricity, and sanitation.
6. Controlling the development strategy and policy and addressing the causes of negative effects such as congestion, visual pollution and air pollution, defining road networks to tourist sites and archaeological sites, and providing infrastructure elements for tourist areas.
7. Supporting officials in taking the appropriate decision in planning and preserving tourist areas and archaeological sites.

*B) The effect of switching from the traditional system at the tourism planning process to GIS:*

The traditional methods which are used in tourism planning have limited capacity in processing and analyzing data, as they depend on installing paper maps (hard copy) manually, they take a lot of time and effort, and they do not give sufficient planning alternatives in the planning process.

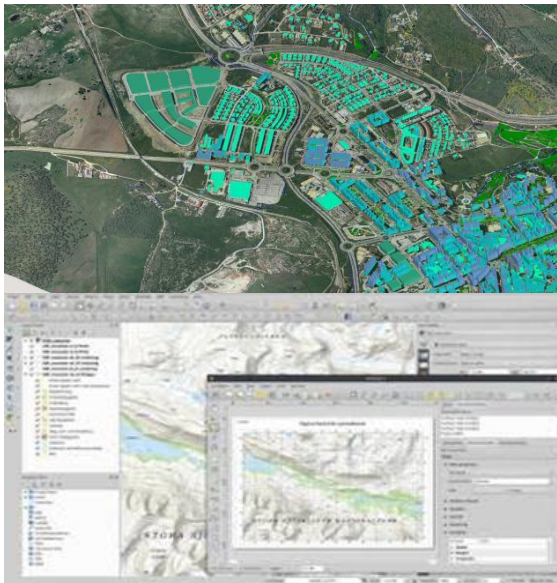


Figure (3): application of GIS in analyzing tourism services , Source: (Mahdi, 2014)

GIS technique has become an essential application tool in processing and analyzing and it is a means of displaying tourist and archeological places in the

shape of geographic maps contributing to saving and storing data and information centrally, and the possibility of editing through the internet for more than one user (Reahman, 2013), in addition to managing tourism database, developing different tourism services which are presented to tourists and workers at tourism field, facing tourism crises which face tourism sector through providing correct information, reducing time and cost on the short and long term, which supports tourism planning (Moustafa, 2017).

From the foregoing, it is clear that (GIS) can achieve many benefits in the field of tourism planning, development of tourist areas, and detection of antiquities by building maps of tourist places and identifying areas where archaeological discoveries are expected, in addition to contributing to improving analytical performance, which helps support decision-making processes. It is noted that (GIS) is still being implemented slowly in Egypt, and is hindered by some difficulties such as the lack of databases for all tourist and archaeological sites.

The lack of human resources that are proficient in working on GIS programs, and the decision-makers lack of awareness of the benefits of GIS affect the financial support provided for the development of this technology, which needs continuous development to meet the changing requirements of governments, businessmen, natural resources, nature protection, education, and services.

*2.4 The Strategy of applying GIS to build a database for tourist areas in Egypt:*

The researcher proposes a strategy for the Geographic Information System to be followed by (the General Authority for Tourism Development) as the authority concerned with the development and planning of tourist areas in Egypt, and this strategy includes several different stages as follows:

*(A) Determine the area to be planned and developed:*

The geographical boundaries of the target area are determined and the proposed system applied to it, thus identifying the lands and their characteristics, in addition to knowing the processes of water and air erosion,



environmental hazards, flood corridors, valleys, agricultural and urban areas that affect tourist facilities (Rafeeq, 2007).

*B) Laying the foundations and standards for planning:*

After identifying the area to be planned from its natural borders, planning foundations and standards must be developed to deal with it. The planning foundations and standards can be summarized to identify the contents of the tourist areas as follows (Shalaby, 2011):

1. Studying the soil, vegetation cover and the different uses of the land in the tourist areas.
2. Choosing the most suitable geological formations for the establishment of tourist facilities on them.
3. Studying the slope of the earth's surface, and determining the appropriate height above sea level.
4. Excluding agricultural areas from areas suitable for establishing tourist establishments.
5. Determining the appropriate distance for the tourist facilities from the places of the rocky cracks and the dangerous torrents and floods.
6. Studying the main and secondary road networks in the tourist areas.

*C) Collecting the data in the proposed system:*

After determining the tourist area, the data that will be entered into the database is collected. The Geographic Information System is characterized by its ability to deal with many types of tourism data and descriptive information. Satellite and aerial photos are considered one of the most important sources of tourism data for the proposed area (Al Qahtani, 2009).

*D) Entering tourist data and building an information base:*

The principle of entering previously collected data into the tourist database depends on converting all information from the traditional paper form to another digital form, that is, the form that a computer can deal with through (GIS) software, and this process is called data entry (Helal, 2007).

*E) Managing information bases in GIS:*

Small databases are characterized as sufficient to store tourist information in ordinary files, but when the volume of data becomes large, and the number of users is large, it is better to use an aggregated

database system to facilitate data storage, organization, and management and processing (Al Sabbagh, 2014).

*F) System analysis and report writing:*

The process of data analysis in the (GIS) helps researchers and decision-makers to obtain information related to the tourist area, such (Al Assar, 2009):

1. Choosing the perfect location within any tourist site for the establishment of tourist facilities.
2. Phenomena and variables affecting the tourism planning process.
3. Elements of tourist attractions within the tourist area.
4. The number of tourists coming from a particular country compared to its population.
5. Finding the number of tourists, their nationalities, their ages, and their standard of living.
6. Calculation of distances and dimensions of roads.
7. Identifying the priorities of investment and tourism projects.

Based on the results obtained at the stage of system analysis, the shape of the database is clearly defined and new systems are proposed.

From the above, it is possible to develop a vision for the proposed system so that it can deal with an infinite amount of data and can link tourist data and descriptive information to their locations and carry out complicated processes of analysis of the ground's elements and identify the appropriate places for the establishment of tourist facilities within any tourist site based on certain determined conditions, which facilitates the work of the tour planner in determining the best suitable sites for tourism development.

### **3. Methodology**

This study used the descriptive approach by collecting data about the phenomenon, analyzing it, and eliciting deductions related to the research problem. One of the types of descriptive approach was chosen, which is the survey study emphasizing the study of this problem in all its aspects, and the use of the statistical analysis method as one of the tools of the descriptive approach to analyze

questionnaire forms (Younis, 2008). Concerning research tools, the library tools used in reviewing references, research, and previous studies were used. In addition, utilizing the World Wide Web to access the latest developments in GIS techniques in tourism planning.

*Collecting data*

The researchers submitted (30) questionnaire forms to some officials in the Information Center, the Tourism Planning Department of the General Authority for Tourism Development, as it is concerned with developing the tourism areas in Egypt, and some tourism experts in order to analyze the current situation of the uses of these systems and their application in the tourism field, and to study it and in particular determine tourism planning in Egypt, and benefit from them in answering the questions related to the research topic, and the form included a set of questions related to the research topic, and the forms had been submitted from August to September 2022. The statistical rule that states that the number of sample items should not be less than 30 has been taken into account to ensure the accuracy of the results, and the possibility of using statistical methods of analysis.

**4. Results and Discussion**

The results of the table number (1) show that out of the 30 officials surveyed at Tourism Development Authority, 19 (63.3%) were male and 11 (36.7%) female.

Table (1): Demographics of respondents.

Variable		F.	%
Gender	Male	19	63.3
	Female	11	36.7
Age	21 - 30	6	20
	31 - 40	9	30
	41 - 50	13	43.3
	51 - 60	2	6.7
Level of Education	Higher education	23	76.7
	Postgraduate	7	23.3

The largest group of respondents (43.3%) were aged 41-50 years. The 31-40 year olds represented the second largest group (30%) of respondents. The 21-30 year olds represented the third largest group

(20%) of respondents. The lowest percentage of the respondents was (6.7%) between 51-60 years old. The largest portion of the respondents had a higher level education (76.7%), followed by a postgraduate education (23.3%).

The results of the table number (2) show that 60% of the officials do not see a clear strategic plan for the General Authority for Tourism Development to apply GIS technique in planning in Egypt, and 40% acknowledged the existence of a clear strategic plan for implementation and this indicates that the authority's lack of interest in this technology as a modern tool for tourism planning in Egypt.

Table (2): having a clear strategic plan for the Authority to apply GIS technique in the tourism planning in Egypt.

The answer	F.	%
Yes	12	40
No	18	60
Total	30	100%

The results of the table number (3) shows that the fields of using Geographic Information System according to the opinions of officials are as follows: 13.3% in showing the places of tourism areas, 6.7% in keeping the natural environment of the tourist areas, 16.6% in developing and planning tourist areas, 26.7% in developing tourism services, and 36.7% do not know, and this refers to lack of interest of the Tourism Development Authority in GIS technique and its benefits and uses in tourism planning.

Table (3): the fields of using GIS in tourism planning in Egypt.

The fields GIS in tourism planning	F.	%
Showing the places of tourism areas	4	13.3
Keep the natural environment of the tourist area	2	6.7
Developing and planning the tourism areas	5	16.6
Developing tourism services	8	26.7
I don't know	11	36.7
<b>Total</b>	<b>30</b>	<b>100%</b>

The results of table number (4) shows that 46.7% of the officials' opinions acknowledged the existence of general policy for the state to use GIS technique in the tourism field in general, 33.3% believe the opposite, and 20% do not know, and this refers to a lack of awareness and knowledge of the importance of using this technology in all fields, on top of them is the tourism field, especially in the tourism planning process for archeological and tourist places in Egypt.

Table (4): the presence of general policy for the country to use the GIS technique in the tourism field generally.

The answer	F.	%
Yes	14	46.7
No	10	33.3
I don't know	6	20
Total	30	100%

The results of table number (5) show that 6.6% of the officials' evaluation of the level of GIS technique which is used in the authority is rated as excellent, 10% consider it very good, 20% consider it good, 26.7% consider it acceptable, 36.7% consider it weak, and this indicates the lack of clarity in determining the purpose of possession the system and the purposes for which it will be used.

Table (5): evaluate the level of GIS technique which is used in the Authority.

The answer	F.	%
Excellent	2	6.6
Very good	3	10
Good	6	20
Acceptable	8	26.7
Weak	11	36.7
Total	30	100%

The results of table number (5) show that 6.6% of the officials' evaluation of the level of GIS technique which is used in the authority is rated as excellent, 10% consider it very good, 20% consider it good, 26.7% consider it acceptable, 36.7% consider it weak, and this indicates the lack of clarity in determining the purpose of possession the system and the purposes for which it will be used.

The results of the table number (6) show that 6.6% of the officials believe that providing tourism

information and data which relate to the authority on its official website like plans, strategies, planning policies and others are rated as excellent, and 20% consider it very good, 16.7% consider it good, 23.3% consider it acceptable, and 33.4% consider it weak, and this indicates the need to update the database, information and tourism statistics continually.

Table (6): availability of information, data and tourism statistics of the Authority on its official site.

The answer	F.	%
Excellent	2	6.6
very good	6	20
good	5	16.7
Acceptable	7	23.3
Weak	10	33.4
Total	30	100%

The table number (7) shows that 63.4% of officials believe that traditional programs are the most common to collect data and the information for planning archaeological and tourism sites and 36.6% believe the opposite, and this indicates the lack of accurate data and information about the nature of archaeological and tourist sites which hinders the tourism planning in Egypt.

Table (7): the used programs to collect data and spatial information for planning archaeological and tourism sites.

The used program to collect data and special information related to archaeological and tourism sites	F.	%
Traditional programs	19	63.4
Recent information programs	11	36.6
Total	30	100%

The results of table number (8) show that 43.4% of officials' opinions acknowledged the existence of specialized cadres in GIS in the authority, and



56.7% believe the opposite, and this indicates a lack of t experience which deal with modern information technology systems and its newly developed technology, which decreases opportunities for good tourism planning in tourism development processes of archaeological and tourist areas in Egypt.

Table (8): the presence of specialized cadres in GISin the Authority.

The answer	F.	%
Yes	13	43.3
No	17	56.7
Total	30	100%

The results of table number (8) show that 43.4% of officials' opinions acknowledged the existence of specialized cadres in GISin the authority, and 56.7% believe the opposite, and this indicates a lack of t experience which deal with modern information technology systems and its newly developed technology, which decreases opportunities for good tourism planning in tourism development processes of archaeological and tourist areas in Egypt.

Table (9): training the employees of the authority continues to follow the development in Geographic Information Systems.

The answer	F.	%
Yes	0	0
No	24	80
I don't know	6	20
Total	30	100%

The results of table number (9) shows that 80% of officials acknowledged that there are no training courses for the authority's employees on a continuous basis to follow the development in Geographic Information Systems, and 20% don't know, and this indicates a lack of reliance on modern scientific methods and techniques in building and developing the technology and the severe shortage of tools and needed auxiliary factors for the information technology industry.

The results of table number (10) shows that 40% of officials' opinions acknowledged the existence of

coordination and cooperation between the authority and specialized agencies in GISat the local and international levels, and 60% believe the opposite, and this indicates poor access to the experiences of others in the field of this technology and make use of it.

Table (10): Coordination and cooperation between the authority and the specialized agencies in GIS at the local and international levels.

The answer	F.	%
Yes	12	40
No	18	60
Total	30	100%

Table (11): the effect of applying the GIS technique in preparing tourism development plans in Egypt.

The effect of applying GIS technique in preparing tourism development plans	F.	%
Building a tourism and informational database	3	10
Getting the data easily to exchange tourism and informational data and save it	2	6.6
Analysis of information and data related to the development of tourism areas.	7	23.4
Providing data about tourism services level and revenue extent that accrue to tourist destination.	4	13.4
Increasing the economic, social, and environmental benefits through developing the tourism sector.	2	6.6
Contributes to issuing references, books, and tourism publications for the cities which have the most popular tourist areas that tourists flock to	3	10
All the above	9	30
Total	30	100%

The results of table number (11) shows that 10% of officials' opinions believe that the impact of

applying GIS technique in preparing tourism development plans will lead to building a tourism and informational database, 6.6% see that data can be obtained and saved in an easy way, 23.4% see that it will analyze data and information related to the development of tourism areas, 13.4% see that it will provide data on the level of tourism services and about the extent of returns which related to tourism destination, 6.6% see that it will help in increasing environmental, social and economic benefits through the development of the tourism sector, 10% see that it will contribute to issuing references, books and tourism publications for the cities which have the most popular tourism areas that tourists flock to and 30% of the total of opinions agree with all above, and this indicates that the impact of the application of tourism information system technology in preparing tourism development plans in Egypt will lead to an increase in the number of tourists, an increase in tourism revenues, achieving economic prosperity and developing the tourism sector in Egypt.

Table (12): Constraints of applying GIS in tourism planning in Egypt.

Constraints of using GIS in tourism planning in Egypt	F.	%
Low level of general awareness of the importance of applying GIS.	7	23.3
The fragility of infrastructure which is needed to build and develop GIS.	3	10
Not depending on recent scientific ways and methods in building and developing technology.	4	13.4
Lack of financial resources and needed possibilities to meet the requirements of the system entry process	3	10
Absence of trained cadres to implement the system	2	6.7
All the above	11	36.6
<b>Total</b>	<b>30</b>	<b>100%</b>

The results of table number (12) shows that 23.3% of officials see that the low level of general awareness of the importance of applying Geographic Information System is considered an element which hinders its use in tourism planning in Egypt, 10% see the fragility of infrastructure which is needed and develop Geographic

Information System, 13.4% believe that there is a lack of reliance on modern scientific ways and methods in building and developing technology, 10% see that it is due to weak financial resources and needed possibilities to meet the requirements of the system entry process, 6.7% believe that there are no trained cadres to apply the system, whereas some see that all of the above is regarded as main constraints, with 36.3% of the total of opinions. This indicates that applying GIS in Egypt faces many different constraints, which entails the need of urging officials in the tourism sector to apply these systems by showing the results of applying these systems to the tourism industry.

Table (13): suggestions to activate applying GIS in the authority.

Suggestions	F.	%
Providing financial resources and needed possibilities to meet the requirements of the system entry process	9	30
Raising the efficiency and experience of the workers in the field of GIS through providing training and appropriate rehabilitation locally, regionally and internationally.	7	23.3
Developing the infrastructure which is needed to build and develop GIS.	3	10
Depending on modern scientific ways and methods in building and developing technology.	5	16.7
Looking forward to the experience of others in the field of this technique and benefit from it.	4	13.3
Updating the available data in the authority so that it becomes a valuable data that can be used in GIS.	2	6.7
<b>Total</b>	<b>30</b>	<b>100%</b>

The results of table number (13) shows that 30% of the officials suggested providing financial resources and needed possibilities to meet the requirements of the system entry process. Raising the efficiency and experience of the workers in the field of GIS by providing appropriate training and rehabilitation locally, regionally and

internationally by 23.3%, then depending on modern scientific ways and methods in building and developing technology by 16.7%, then accessing the experience of others in the field of this technique and benefit from it by 13.3%, then developing the infrastructure which is needed to build and develop GIS by 10%, and update the available data in the authority so that it becomes a valuable data that can be used in Geographic Information System by 6.7%.

### **Results of the field study:**

- 1- There's no clear strategic plan for the authority to apply the technique of GIS in tourism planning in Egypt.
- 2- The Tourism Developing Authority is not interested in GIS in tourism planning in Egypt.
- 3- GIS technique is used in tourism planning to show the tourist places, develop, plan tourist areas and develop tourism services.
- 4- There is no general policy in Egypt to use the GIS technique in the tourism field in general.
- 5- No clarity in specifying the target of using GIS and its purposes.
- 6- Fragility of the tourism data and information which relates to the authority on its official websites.
- 7- Traditional programs are the most common to collect data and information which relate to planning the archaeological and tourism sites.
- 8- Absence of specific cadres at GIS in the authority.
- 9- Lack of sufficient experience to deal with the recent information technology systems.
- 10- Absence of training courses for the workers at the authority, which makes them not follow the development in Geographic Information Systems.
- 11- Lack of coordination and cooperation between the authority and the specialized authorities of GIS at the local and international levels.
- 12- There are futuristic effects of applying the GIS technique IN preparing tourism development plans in Egypt, the most important of which is analyzing information and data related to the development of tourism areas.
- 13- Applying GIS in Egypt faces a lot of different constraints; the most important of which is the low level of public awareness of the

importance of applying Geographic Information Systems.

- 14- The study reached the most important suggestions to activate the application of GIS in the authority, the most important of which is raising the efficiency and experience of the workers in the field of GIS through providing training and appropriate rehabilitation locally, regionally and internationally.

### **Recommendations:**

There are several recommendations which can be provided to activate the role of GIS in the field of tourism planning and developing tourism areas, and that's to achieve a lot of benefits through the following:-

- 1- Activate depending on GIS in the tourism development and planning projects which need large tourism information and databases.
- 2- Providing the necessary financial resources and possibilities to fulfil the requirements of the system entry process.
- 3- Looking forward to the experience of others in the field of this technique and benefit from it.
- 4- Depending on modern scientific methods and techniques in building and developing technology.
- 5- Updating the currently available data in the General Authority for Tourism Development so that it can be used in Geographic Information Systems.
- 6- Developing the organizational structure in line with the nature of work in the General Authority for Tourism Development.
- 7- Creating a central tourism database at the national level in which basic data is available to prevent the duality of decisions and reduce the time, the effect and the cost of tourism development projects.
- 8- Supporting the tourism promotion centers, research agencies and various governmental organizations with this technique, this has become widely used internationally.
- 9- Expediting the development of this technique in the inclusive national plans to face the constraints which face the development of the archaeological and tourist areas and their tourism development.
- 10- Using the GIS technique in the comprehensive survey of the tourist areas, and clarifying and processing data to make decisions that

contribute to the development of tourism planning.

- 11- Setting some priorities by the officials for planning futuristic tourism projects whether in the North Coast or Sinai.
- 12- Paying attention to the training of human cadres on the use of GIS technique to benefit from its server software and the available means to retrieve and display information and to establish special units inside each institution working on developing this new technology according to each institution and its applications.
- 13- Paying attention to preparing a base of specialists in GIS techniques and databases and their applications in the universities and institutes to develop the student's skills and form a wide base of human competencies to meet the growing needs of labour market, and catch up with this technique internationally.
- 14- Seeking to Arabize the books of GIS and its applications, which expand the scope of their spread in the Arab World.
- 15- Carrying out activities and lectures that raise the awareness, especially for decision-makers on the importance of using GIS in the field of environmental and tourism planning.

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