Utilizing Information Technology Tools to Design and develop an E-travel Guide System for Tourism Industry (Applied study to The City of Misurata)

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استخدام أدوات تقنية المعلومات لتصميم وتطوير مرشد سفر إلكتروني لصناعة السياحة (دراسة تطبيقية على مدينة مصراته)

الملخص:

توفر تقنية المعلومات (IT) العديد من الأدوات لإنشاء بيئة أعمال جديدة. السياحة هي واحدة من الصناعات السائدة، فهي تؤثر على الصعيد الاقتصادي والاجتماعي والثقافي للدول. تعتبر التطورات في الإنترنت وتقنية المعلومات منصة مثالية لصناعة السياحة لتقديم منتجاتها وخدماتها مباشرة إلى العميل. أحد التحديات الرئيسية التي تواجه صناعة السياحة في ليبيا هو عدم وجود أنظمة السياحة الإلكترونية التي تستفيد من التطورات الأخيرة في تكنولوجيا المعلومات. بالرغم من وجود العديد من أماكن الجذب السياحي في مدينة مصراته، قد يكون لدى السياح معلومات قليلة عنها. الأنظمة الحالية المستخدمة في مصراته لا تسهل توفير المعلومات الدقيقة في الوقت المناسب. وبناءً على ذلك، فإن الهدف الرئيسي من هذه الدراسة هو حل هذا التحدي من خلال تصميم مرشد سفر إلكتروني يعمل على توفير معلومات دقيقة ومفصلة للسائحين المتوقعين قبل وأثناء الزيارات، كما يسمح لهم بالتعليق على كل مشهد وتقييمه والذي يمكن استخدامه بعد ذلك من قبل مزودي الخدمات السياحية لتحسين خدماتهم. تم تصميم النظام وتنفيذه باستخدام لغة النمذجة الموحدة (UML)، لغات البرمجة CSS، JavaScript وPHP. النظام متصل بـ MYSQL لتخزين البيانات. يعمل النظام المقترح على توفير العديد من الميزات لقطاعات السياحة من خلال تقليل تكلفتها وتقديم خدمات شاملة للعملاء. كما ناقشت الدراسة استخدام أدوات تقنية المعلومات وأهميتها في مجال السياحة، وأكدت الدراسة على أن تطبيقات تقنية المعلومات هي وسيلة ضرورية للتسويق السياحي وجذب المزيد من اهتمامات السائح. يساهم هذا العمل في استخدام أدوات تقنية المعلومات لتحسين صناعات الخدمات المرتبطة بالسياحة.

الكلمات المفتاحية: *مرشد السفر الإلكتروني، دليل السياحة الإلكتروني، تقنية المعلومات، صناعة السياحة، تطبيقات الويب.*

Abstract

Information Technology (IT) provides different tools to make a new business environment. Tourism is one of the predominant industries, it affects the economic and sociocultural of countries. The developments in the Internet and IT are an exemplary platform for the tourism industry to offer its services and products directly to the customer. One of the main challenges facing the tourism industry in Libya is the lack of having e-tourism systems which take advantage of the recent developments in IT. With

many attraction sites in Misrata, tourists might only have quality information on a few of them. The existing systems do not facilitate provision of accurate and timely information. Based on that, the main objective of this study is to solve this challenge by designing a e-travel guide system based Web-application to provide potential tourists with accurate information before and during visits. This application allows tourists to comment and rate each sight, which can be used by tourism services providers to improve services that they introduce. The system was designed and implemented using the Unified Modeling Language (UML), CSS, JavaScript, and PHP programming languages. The system is connected to MYSQL for data storage. Specifically, the study discussed the use of IT tools and its importance in the field of tourism. The system has provided many advantages to tourism sector by decreasing its cost and providing one-stop services to the customer. The study confirms that, applications of IT is a necessary way for tourism marketing to get more attention of tourists. This work contributes towards utilizing IT tools to improve the services industries associated with tourism.

Keywords: *e-travel guide, e-tourism guide. Information Technology, Tourism Industry, Web Application.*

Introduction:

Information technology (IT) became an important and influence element in the tourism industry in general and especially travel guiding due to what this technology offers of rapid and suitable information which help the future tourists to get necessary information in suitable time. The use of Information Technology applications and the internet is rapidly increasing day after another. Tourism is animated the information for a lot of countries because of the income that generated by the utilization various of services and goods by tourists, and the employment opportunity in the services industries related to tourism as well. These services of industries will lead to formidable advantage from technology applications in tourism. Web service provides potential tourists with instant access to visual and textual information about pleases and destinations around the word, making it more powerful than a standard dictionary (Singh et al.,2019). Digital media (textual and visual) is a very remarkable tool that helps tourists to get information; which simplify relations and communications between the different tourism industry sectors (Weiler and Black, 2015b; Khatri, 2019; Sotohy, 2020). This ease and depth immediately access to information has stimulated a new generation of independent travel consumers who prefer to search online for holidays themselves, rather than through travel companies (Jadhav et al., 2011). This growth in modern technologies has led to introduce a chain of changes in the market of tourism which are apparent in tourism supply and tourism demand as well (Januszewska et al., 2015).

Tourists who travel to a new place always have issue of finding the sites of various facilities such as hospitals, hotels, and taxi stations (Singh et al.,2019). Tourists at the city of Misurata which is one of the biggest cities in Libya, always face problem of accessing tourism information, because the lack of technology that can be used for the tourism industry despite the tremendous developments in IT throughout the world. Both national and international tourists have facing problems to acquire the attraction sites during their stay in Misurata. Likewise, not every place and facilities in the city of Misurata is marked on the Google maps. This implies that, the Tourism industry in Misurata has not yet to

tap into the many opportunities which the IT offers. In order to alleviate these troubles, this study purposes to development an e-travel guide web application where the tourists can gain information about the tourism places anytime anywhere. Moreover, another issue that may foreign tourists faced when they visiting Misurata is they may not know Arabic language that they need when communicating with local people who have finite knowledge in English. So that, to relieve this matter, we have designed the proposed system with bilingual interface (Arabic and English). This study provides a comprehensive location and a centralized platform-based web application which gives all necessary information that may be used by tourists to plan their tour, visit the areas and locate touristic sites in Misurata.

This work will be serviceable to assist local and foreign tourists, also to support the development of websites and promote IT tools in tourism industry in general and especially travel guiding. Such that, can help to raise the growing industry of tourism in Libya and the city of Misurata in particular. In addition, the present study discusses the impact of utilizing of IT and the internet in particular in the tourism industry. Consequently, this proposed system can be a promising way to support the tourism sector in Misurata.

Objectives of The Study:

The main Objective of this study is to design and develop an e-travel guide system based web application for tourism industry in the city of Misurata in Libya, which will be useful in some areas where IT can be deployed in tourism. The specific objectives of this study are:

1. To provide sufficient accurate information to potential tourists in easier and faster way, on various tourism pleases includes hotels, restaurants, cafes, summer resorts, big malls and even hospitals with the ability of displaying maps to clarify locations.
2. To allow owners of the tourist places and facilities to promotion and adding advertisements for tourism and commercial activities.
3. To give the opportunity for the tourists to comment and rate each visit which is then used by potential tourists to plan and decide on place and sites in Misurata to visit.
4. To use IT tools towards facilitating an overall national development through tourism.

Literature Review:

Advanced in information technology (IT) over the last 20 years has a significant impact on the tourism industry sector, applications of IT brought great transformation and benefits to tourism sectors. From the tourists own point of view, utilizing such applications was an important shift in the experience of tourism presented to them. The expected tourists make extensive use of these user-friendly tools, thus they seek different experience in their trips (Sotohy, 2020). This provides a route to the growth of such trends depending on changed the tourist profile and digital technology, and the desire for more inclusive experience (Sotohy, 2020).

The Internet represents an ideal platform to introduce services and products to the customer in direct line without using traditional intermediaries. The web based tourism information system also provides service and value, not only the brochures online (Mahajan et al., 2016). The application of TIS cover was one of the first web based tourism information system (Gupta, and Gupta, 2008; Proll et al.,1989). The TIS cover application was introduced as a general data platform, thus it can be applied as a generic

data platform for new different applications based tourism information system. Following we consider the must closed systems related to this paper:

In study done by (Umanets et.al., 2014) a mobile and web application was designed for tourist guide. Their system works such that every user able to access and ask places of the touristic interest, the expected tourists able to received feedbacks and comments of unknown locations of tourist due to recommendations of other tourists. As a result, the system allows users to create their recommendation by using well known library called " the Mahout library".

(Wolfgang, 2017), purposed an application for recommending travel location for assisting the independence tourists. The researchers implemented Knapsack based algorithm that uses dynamic programming to get estimated results to supply tourist a wide variety of list for tourist to select from. The application provides potential tourist a model that can help to determine and specify interests like preferred activities and budget plan. The results showed that the tourist guide application is efficient, but it was tested with a small number of entities.

A smart tour plan system was applied about the historical sites in Bangladesh, expected tourists can see the events and choose the site that they interest with and want to tour, then the guide will help them how they can travel in chosen sites (Mipu and Arefin, 2018). The advantage of this study tourists can move from an attraction place to another easily. Also, the tourists can do reservations of nearest hotels of their interests by using the application. On the other hand, the application only applicable for the historical places in Bangladesh. So that, other sites with different interests are not covered in their application.

In the study of (Almaimoni et al., 2018), the researchers aimed to design a smart system that provide tourists all relevant information about the touristic places in the kingdom of Saudi Arabia. The proposed system was designed using the Unified Modeling Language or UML adding to visual Studio Programming Language. The researchers summarized that providing accurate and relevant information about the touristic places is considered as the best way to encourage tourists and increase the number of travelers in any country.

The study of (Tzioras, 2018) concluded that tourism marketing is a necessary tool to be used in the tourism businesses management in order to obtain the goals of planned marketing.

More recently, Tripit is a web application have introduced in 2020 for compiles travel information from user's email such hotels, events booking, rental cars and converts them in to single journey. Users have to do is only send their emails to the Application. the Application can also be used for coordinating a group tour.

Adoption of IT Applications is rapidly increasing, so that tourists tend to get more information about their destination before traveling to the sites. This work presents a web application for e-travel guide which will let the tourist to display the various services, offers virtual tours of selected sites, and also to finds the locations on the Google maps.

Methodology:

In this work, we used design-oriented research method. The method of design-oriented research is basically a problem-solving model (Wolde and Muhie, 2020; Hevner et al., 2004). The steps of the method followed in this research are: problem identification, solution suggestion, application development including system analysis and design, testing and evaluation.

For the problem identification phase, we have conducted comprehensive review of research to acquire a deeper understanding of the research area and its problem domain. Then we made a survey to identify and point out direction in providing solution to the problem. According to the results of the survey, up to 78 % of users are prefer dealing with web applications rather than the existing long manual way of doing the process. Because of that, we suggest a web application to accomplish our aim. In the solution suggestion phase, this work aims to design and develop e-travel system based web application for overcome the problem.

The implementation of the system works such that users or potential tourists are able to create a new account after that they can login using the valid credentials set by them to access the features of the application. Users are then can navigate within the system and will be able to locate attractions, hospitals and hotels on the Google maps. Also, users are able to view a detail list of each of attractions places, events, and even delicacies. Lastly, they also able to provide feedback and comments about their tour in a particular place. And also will be able to rate and review visited attractions. Another type of users such as potential investors and owners or managers of the particular please of interests can create an account to be able to add advertisements and commercial activities for the users and potential tourists to view it at the lowest costs. Through the comments (or feedbacks) page the evaluation of tourist places can show the trends of tourists and their interests in the various sits. This information can be used by the investors and owners to make sound decisions or investments in particular sectors.

For the administrators' panel, the admin of the system is able to manage attractions tourist places including hotels, restaurants, hospitals, big malls, cafes, summer resorts. It also manages users and its reviews on the places. The system will support both local and foreign potential tourists by giving them accurate information that may help them in their tour in the places that they interested in city of Misurata. The stage of development and testing (and evaluation) are explained in more details in the following sections. The development stage includes both system analysis and design.

System Analysis:

The analysis phase is the main phase in which the requirements are identified in more details. This section involves a list of specified system requirements and approaches that were used. The Unified Modeling Language (UML) was used in drawing the analysis and design, also in planning schedule. The necessary tools that have been used in the development includes: PHP, HTML, CSS, and JavaScript languages. MYSQL database is mainly used for storing data about the system. MYSQL as fundamental tool was enabled by Apache (is local web server) and it was utilized to manage the database and providing storage. The reasons behind using each tool of these tools are: strong

- PHP is server scripting programing language, and is a strong technique for building dynamic and interactive web pages quickly.
- HTML (Hyper Text Markup Language) is the standard markup Language used to create web pages.
- MYSQL enables storage of data and works well with HTML and PHP.
- Google Maps is a web mapping organization made by Google. It offers many useful features such as airborne photography, street view, guides, and progressing traffic conditions (Harris et al., 2019).

System Design:

After analyzed of the system requirements the proposed system was designed using PHP, HTML, CSS, and JavaScript languages. MYSQL are used as database storage. The system design phase includes two main steps: database design step and interfaces design step. Both steps are described in the next sections:

Database table's structure design

At present, current mainstream databases (DB) used for storing and retrieving the data, include MYSQL, Oracle, Access, etc. In this work, we have implemented the MYSQL queries, the reason to choose MSQL due to comparison with other DBs, which is more advanced in performance query speed and support schema than SQL SERVER and more lightweight than Oracle. As well as, MYSQL have better management of data.

All the details about the e-travel guide application such as user, admin, owners, and places will store depends on the table which is allocated, as shown in following tables:

Table 1. Users.

Field name	*Data type*	*Character length*	*Type of key*
User_ID	Varchar	30	Primary key
User _NAME	Varchar	50	
PassWord	Varchar	20	
User_Type	Varchar	50	
First_Name	Varchar	50	
Last_Name	Varchar	50	
Gender	Varchar	20	
Phone_NO	Varchar	20	
E_mail	Varchar	50	
City	Varchar	50	

Table 2. Owners.

Field name	*Data type*	*Character length*	*Type of key*
Owner _ID	Varchar	30	Primary key
Owner _Name	Varchar	50	
Phone_No	Varchar	20	
E_mail	Varchar	20	

Table 3. Comments.

Field name	*Data type*	*Character length*	*Type of key*
Comment_ID	Varchar	30	Primary key
Comment _Text	Varchar	300	
E_mail	Varchar	20	
User_ID	Varchar	30	Foreign Key

Table 4. Tourist Places.

Field name	*Data type*	*Character length*	*Type of key*
Place_ID	Varchar	30	Primary key
Place _NAME	Varchar	100	
PICTURE	Varchar	300	
Opne_Days	Varchar	20	
Opne_hours	Time	20	
Address	Varchar	200	
Phone_NO	Varchar	20	
E_mail	Varchar	20	
Description	Varchar	200	
Type_ID	Varchar	30	Foreign Key
Owner_ID	Varchar	30	Foreign Key

Table 5. Tourist Place Type.

Field name	*Data type*	*Character length*	*Type of key*
Type_ID	Varchar	30	Primary key
Type_NAME	Varchar	100	
PICTURE	Varchar	300	

Table 6. Advertisements and events.

Field name	*Data type*	*Character length*	*Type of key*
Ad_ID	Varchar	30	Primary key
Ad _Text	Varchar	250	
PICTURE	Varchar	300	
Start_Date	Date	20	
Expiry_Date	Date	20	
Time	Date	20	
E_mail	Varchar	30	
Type_ID	Varchar	30	Foreign Key
Owner_ID	Varchar	30	Foreign Key

Interface design

Interface design is the process of defining how the system will interact with the system users or other systems (Almaimoni at el., 2018). Any successful wed based system should have an easy to use graphical user interface. The programming languages utilized for designing of the interfaces in this work are PHP, HTML, and CSS. The main function modules of this system include view detailed information about tourist places, maps, and advertisements about tourist services. Based on Figure (1), this page is displayed first when the application is opened. Then users can start with the system (application) in English or Arabic interface such as shown in Figure (2).

In addition, there are two navigation placed implementation of user registration and login. **Figures** (3- 4) illustrate user registration and login recursively.

Figure 1. start page interface

Figure 2. Home page interface (in Arabic, also availed in English)

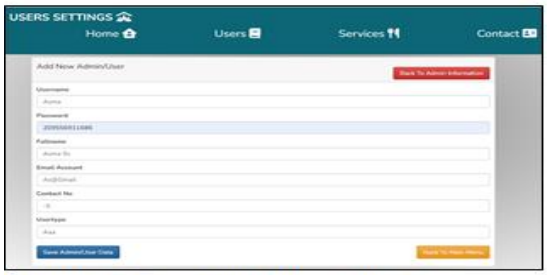

Figure 3. User registration interface

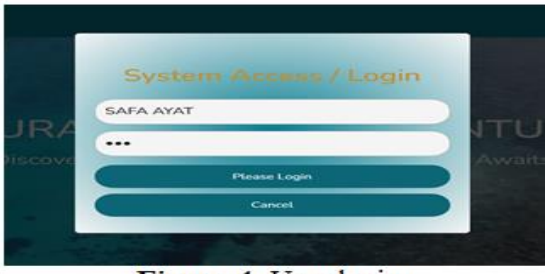

Figure 4. User login

According to Figures (5-6), the system displays the places when required facility is clicked, as an example when hotels selection is clicked then nearby hotels in the area will be displayed on the map. lastly, if a desired icon is clicked on will give the detailed information list on the facility and direction. By using Google Maps can reach to the particular location. The main interface of the system management is presented in Figure 7.

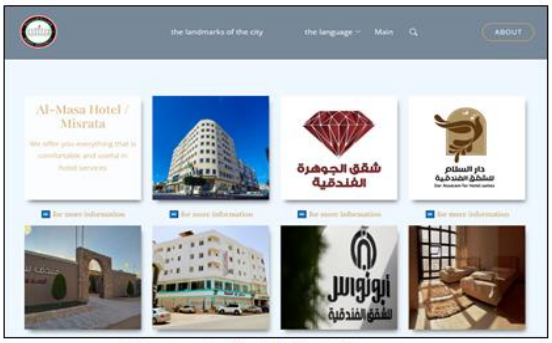

Figure 5. Hotels Interface

Figure 6. The Details of Selection Hotel Interface

Figure 7. The main interface of the system administration

function test and evaluation

This section majorly focused on the system testing, detecting system failures, and whether the system functionalities have worked successfully or not. Testing has an important role in systems to detect failures and to see if all functions worked accordingly to specification. Therefore, this system was fully tested before implemented it and all defects was discovered and corrected. There are many parts of the system that were tested, the following sections illustrate some of them.

1- User Registration Test

Information of user such as user' name, gender, and password are supposed to be input other necessary information are also. Table (7) shows the results of user registration test.

2- User Selections Test

The test of user selections is done to check whether user's selections function is implemented correctly or not. Table (8) shows detailed testing process:

3- Administration Test

Lots of processes have been prepared to be tested, the goal of this is to certify the security and accuracy of the input data and avoiding expected errors. Also, to make it easier for administration to manage the system, management processes include query, delete, add, and modify the information of tourist places.

Table 7. Test results of user registration.

Test case		*Test results*		
Requirement	***Pre-requisite***	***Expected results***	***Actual results***	***Status***
The system should allow a new user for registration.	The user must be registering for the first time.	The system checks that if all fields are filled in.	The system displays a warning message if one of fields that are required is not filled.	Pass
The system should validate login.	The user must be already registered in the system.	The system checks that if all fields have been filled in.	The system displays a warning message if one of the required fields is not filled in.	Pass
Response on an incorrect entering (invalid password or email.)	The user must be accessed to login page of the system.	The system output error message and deny login.	The system displays an error message and denies login.	Pass

Table 8. Test Result of Users Selections

Test case		*Test results*		
Requirement	***Pre-requisite***	***Expected results***	***Actual results***	***Status***
The system should allow users to select their interests.	Users should be logged in to the system.	Users should be able to select their interests from the list provided in the system.	Users managed to select their interests successfully from the list provided.	Pass
The system should filter out the interests of users.	Each user should have selected his interest places from the questionnaire.	The system should filter the interest places selected by the user.	Every selected interest places was displayed on the page of the system.	Pass
The system should allow users to display google map of locations that selected by users.	A user should have selected his interest places from the questionnaire.	The system should display a map with each place that selected by the users.	a map with markers of places that selected by the users was displayed.	Pass
Users should be able to navigate from a section to another easily.	The sections should be interconnected.	Users can navigate through the system easily.	Users can move easily from section to section while they are logged in.	Pass

Results and Discussion

The obtained results from the implemented solution are discussed and summarized through this section. The system was implemented by running it on Groom and Mozilla Firefox using the apache server as local server. We expected that the suggested system will work according to its main functionalities due to the positive test results done to the system, which encourage to be applied for tourism uses. Moreover, the system had all necessary information and it provides various services and features which will be essential to tourists to plan their tour. The e-travel guide system is entirely web based application and it is appropriate for web based search, thus the feasibility of the system on both technical and economic sides does not necessitate any technical skills from the potential users since the users can use the application easily without much difficulty.

According to the results of the survey that we conducted about the design and development of e-travel guide application by using IT tools, a large number of users agree that the system is useful and practical. The survey was prepared consisting of diverse questions, as 100 samples were obtained, the ages of users ranged between (20-50) years old. The most important questions are illustrated in figures (7-11) below.

Based on Figure (8) 55% of users always have difficulty to access and communicate whit facilities and attraction touristic places. Also, 30% of answers was to some extent have difficulty to communicate whit these places. Moreover, Figure (9) shows that 72% of users have faced problems while they searching for a specific location in Misurata, also some locations could not be found on Google Maps. That is way we thought about a solution to make the process almost easy.

According to the result of another statistics Figure (11) shows that 64% percentage of answers are strongly interested with e-travel based web application which uses IT tools for touristic sites guiding. While 21% percentage of answers says to some extent interested in e-tourism. In addition, Figure (10) shows that there is 80% of answers

indicate that e-tourism based web application is faster and better than traditional tourism in guiding for touristic sites. This motivates the provision of reliable answers that support the results of the study.

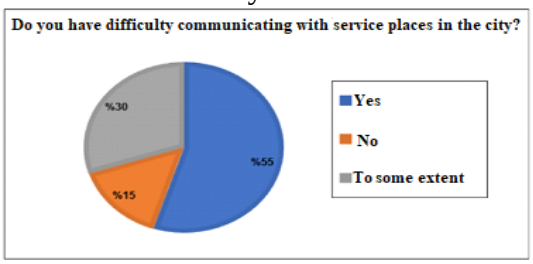

Figure 8. percentage of difficulty communicating whit facilities and attraction places in Misurata.

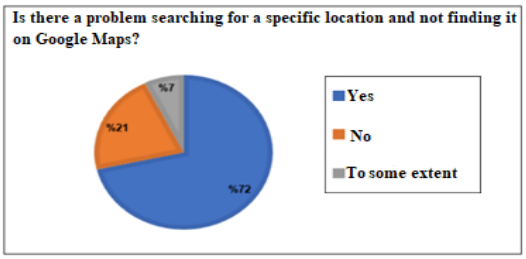

Figure 9. percentage of searching problem for a location couldn't be found on Google Map.

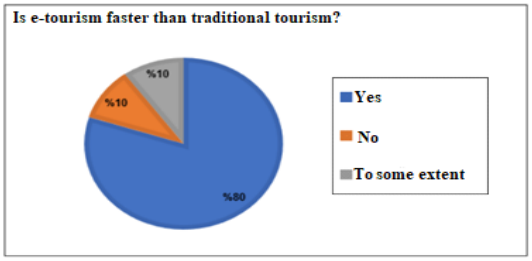

Figure 10. Statistics show that e-tourism is faster and better than traditional tourism.

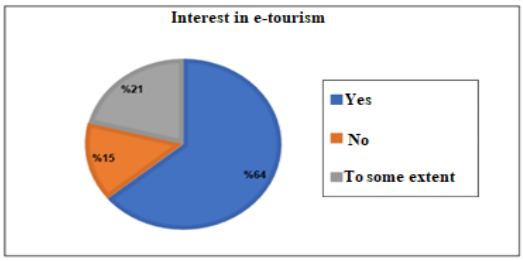

Figure 11. The statistics show the interest in e-tourism.

Conclusion:

With the tremendous development in information technology (IT) including services of electronic tourism as an inevitable necessity, which no one can tourism activity ignored at present. The lack of tourism knowledge is one of the traditional tourism issues in most developing countries. As well as, the weak of development activities as a significant element to the programs of tourism for national growth. The reason behind these deadlock is the lack of using IT tools in promoting. That is why the idea of this study used IT tools to design and develop a centralized e-travel guide system for electronic tourism industry in the city of Misurata in Libya.

This work is important academically and economically for both the community and the government. The reasons behind that are: it would be easier and cheaper to get an extensive accurate information about the touristic places in the city of Misurata, which will enable tourists to decide on touristic sites to visit and plan such visit. Hence, derive maximum pleasure out of this money. As another reason, owners of touristic places and facilities are able to register in the system then they can add advertisements to get more attention of tourists. As result, the system of e-travel guide has achieved its main goal through a flexible model and very efficient and secured system.

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