Web-based Tourism Decision Support System (WBTDSS): Architecture and Application for Langkawi Island, Malaysia

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ABSTRACT

In the technological era of the present time, the development of “information technology (IT)” has drastically transformed the tourism industry. Similarly, the “information and communication technology (ICT)” has enabled the modern tools and distribution channels for tourism. Thus, it has created a new tourism business environment. Moreover, the integration of “web technology” into “tourism decision support system (TDSS)” has formed the “web-based tourism decision support system (WBTDSS)”. They usually vary in their capabilities, architectures, applications, and so each individual local system needs meticulous investigations. For this reason, the present paper reviewed the existing components of these systems and the specific capabilities of “Langkawi Island’s WBTDSS”. The qualitative analysis of comparative studies showed that, the geographic information applications of this “WBTDSS” provide tourism-related information to tourists and others who browse the website. Furthermore, there is a distinguishing feature of this system; which is presenting the tourist information in the map format instead of the typical text descriptions. Therefore, it is concluded that the fundamental architectural components of “Langkawi WBTDSS” is analogous to other existing systems. However, the interactive map which can be edited by the clients is an additional feature of this system. Hence, tourists acquire information from the website and simultaneously contribute their new discoveries about the place after it has been approved by the main server side.

INTRODUCTION

Based on the statistical evidence of the World Travel and Tourism Council, (2004) Tourism is reputed to be one of the world’s largest and fastest-growing industries. It holds a significant impact on GDP at the international and domestic level[1]. The application of “ICT” in tourism industry started in 1980s, and it has become a necessity of today’s information and technology-driven society. Recently, web technology has been integrated with the tourism decision support system “(TDSS)” which is known as the web-based tourism decision support system “(WBTDSS)”. Decision Support System “(DSS)” provides the decision makers with interactive capabilities to enhance their understanding and obtain information regarding decision problems through the use of models and data processing. The three fundamental components of a DSS viz.; “database management system (DBMS)”, “model-based management system (MBMS)” and “dialog generation and management system (DGMS)” have been described in this study. Moreover, the architecture and the application of “Langkawi’s WBTDSS” which is designed to provide tourism-related information about the Island in the form of interactive maps with Geographic Information System capabilities are discussed.

Decision Support System (DSS):
“DSSs” are interactive, computer-based system that aid users in judgment and choice activities. Alter (1980) described DSSs based on their three major characteristics [2]. DSS’s design should firstly, facilitate decision processes; secondly, support rather than automate decision making; and lastly, respond quickly to the changing needs of decision makers. The traditional “DSS” consisted of three components: (a) data management, (b) model management, and (c) dialogue/interface management. This system facilitates brainstorming, idea

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evolution, and team problem-solving activities. Three components are needed in “DSS” to generate the best result; a database of data used for query and analysis, a software system with models, data mining and other analytical tools and a user interface. The primary components of “DSS” have been depicted in figure 1; and figure 2, schematically represents the implementation of expert systems and knowledge-based system added to DSS.

DSS was typically used for strategic and tactical decision faced by the upper-level management. There are three fundamental components of DSS as shown in figure 3a: the Database Management System (DBMS), the Model-Based Management System (MBMS) and the Dialog Generation Management System (DGMS). These three components can be found in many DSS architectures and play a prominent role in their structures [4].

Tourism Decision Support System (TDSS):

The research on Spatial Decision Support System (SDSS) originated from two different sources: DSS and Geographic Information System (GIS). SDSS can be defined as an integrated computer system that supports decision makers in addressing semi structured or unstructured spatial problems. It is often carried out in an interactive and iterative way with functions for handling spatial and non-spatial databases, analytical modeling capabilities, decision supports utilities. Some of them are the scenario analysis, and effective data and information presentation utilities. User interface and system interface are the two interface components within the SDSS. The user interface is often the most important component in a system's development and perceived success. This interface provides the user with the access to the databases, model-based (analytical routines) and graphical and report generation. In the meantime, the system interface will transfer the data between the DBMS and the model-base. It also contains routines, which are invoked automatically during SDSS execution. In fact, User interface and system interface are integrated with model-base through the SDSS as displayed in Figure 4 [5]. The implementation of the SDSS in tourism research is also known as Tourism Decision Support System (TDSS). Through this system, the management of tourism enterprises and business can be conducted efficiently and ultimately the tourism industry digital process can be improved to achieve great development. In order to monitor the utilization of tourism resources and evaluating the development of market tourism, tourism management decision requires the dynamic system. The process of collecting data has not only focused on tourism resource types, quantity, distribution and characteristic, but also on tourist structure, market, and demand data. Moreover, these data have constituted the basis of tourism resource evaluation, tourism area development planning, tourism policy formulation and daily management within the tourism industry.

WBDSS application in Langkawi Island:

Web-based DSS is defined a system that communicates decision support information or tools to decision-makers with the help of a web environment [6]. It involves two indicators that can be the measurement factors for the comprehensive web GIS-DSS; firstly, the conceptual factors and secondly the technical factors. In first
Tourism has played an important role in economic development of Malaysia. In addition, the use of “DSS” has strengthened its position by providing information and various data to tourists. Lately, application of “GIS” has improved the efficiency of tourism activities by resolving spatial problems. Besides that, the advancement of the Internet and mobile technologies has transformed DSS to WBTDSS, which assists anyone in need of tourist

Application of Web-based Tourism Decision Support System:

Langkawi Web-Based Tourism Decision Support System is a website which provides tourism-related information about the Island in a form of interactive maps with Geographic Information System capabilities. In contrast to usual websites, it presents the information contents by using maps and not only text descriptions. This TDSS contains information about the whole island, including the accommodations, sightseeing attractions, shops, restaurants, and public facilities. In addition, the users can perform a number of GIS operations on the map. Applications on this website are divided into three categories which are Navigation Tools, Map Switcher and Map Function Menu. Navigation tools consist of functions used for navigating the map, such as zoom in, zoom out, pan (‘hand’ tool), zoom slider, zoom to full extent, previous and next extent, and move up/down/left/right. The Map Switcher is a group of buttons which allows users to change the base map between the “Langkawi Topo” (topographic map) and “Imagery” (satellite imagery). Map Function Menu consists of data, find, direction, tools and some extra functions which each of those applications uses for getting the information about Langkawi Island (Figure 6) [9]. Through this web-based TDSS, tourists who are planning to visit Langkawi Island can manage their vacation either before or during the vacation. Moreover, it assists them in making the decision and planning a perfect vacation in this island.The TDSS has developed applications that helps tourist in getting their information about the places where they have planned to visit. This system has been constructed by spatial and tourism information as well as the analytical power that help users to search and browse through tourism related information such as destinations, scenic views, cultural events, accommodations, trip packages, tourism vendors by regions and amenities. Besides that, TDSS uses the inputs and maintain personalized travel objectives and preferences set up evaluation criteria and activate the product search and election procedure for selecting suitable trip packages and vendors. Furthermore, it assists in designing personalized travel plans when no existing trip packages meet the tourist’s needs. It organizes consumers with similar interests to exchange ideas and form a community group with commonly accepted trip plans, to initiate auctioning events for inviting tourism vendors and service providers to bid on the group trip plans. Therefore, TDSS is a system that is useful for tourists in getting their information in the most efficient way across the globe.

Conclusion:

Tourism has played an important role in economic development of Malaysia. In addition, the use of “DSS” has strengthened its position by providing information and various data to tourists. Lately, application of “GIS” has improved the efficiency of tourism activities by resolving spatial problems. Besides that, the advancement of the Internet and mobile technologies has transformed DSS to WBTDSS, which assists anyone in need of tourist

Fig. 5: Geographic query of tourism [7]

Fig. 6: “WBTDSS of Langkawi Island” [8]
information for decision making. WBTDSS for Langkawi Island, Malaysia provides tourists with Information about Langkawi and helps the clients to plan a more effective journey. It facilitates everyone through one integrated system without the need to browse other websites. Moreover, its GIS capabilities allow clients to select layers, zoom in/zoom out, click on the POI and get the information, and it also provided search functionality that allows the users to do query in the database. Besides, a special feature of this WBTDSS is that tourists acquire information from the website and simultaneously contribute their new discoveries about the place after it has been approved by the administrator.

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REFERENCES


