



APPLICATION OF GIS IN PAKISTAN TOURISM INDUSTRY

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ABSTRACT

The success of tourism in any country depends on the ability of that state to sufficiently develop, manage and market the tourism facilities and activities in that country. Many developing countries are targeting tourism as a source of economic growth and diversity. Pakistan presents a variety of opportunities for travelers. It offers journey through time for archaeological enthusiasts, panoramic valleys for nature lovers, splendid peaks and above all culturally rich rendezvous for everyone. This paper gives a background of tourism in Pakistan. Also Geographic Information Systems (GIS) is now recognized as a valuable tool for managing, analyzing, and displaying large volumes of diverse data pertinent to tourism planning. This paper will discuss some of the problems and potential of GIS applications in tourism industry and how it offers solutions to planning issues faced by development authorities in Pakistan. The tourism promotion aspect related to GIS databases will also be discussed.

1. INTRODUCTION

Tourism can be described as the activities of people traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited (www.world-tourism.org).

Tourism is considered to be one of the major items of international trade (Ghosh, 1998). This industry helps in facilitating the flow of foreign currency among countries. During the UNCTAD June 1998 summit, tourism was cited as the only major sector internationally, in which developing countries have consistently maintained surpluses. Developing countries account for nearly 30 per cent of world tourism receipts (Dondo et. al, 2002). Tourism is the fastest growing global industry. In 1996, tourism revenue amounted to \$423 billion and the number of tourist arrivals recorded were 592 million that has now reached a figure of one billion. Tourism is now considered as the world's largest industry (Parkins, 2000).

In Pakistan, tourism is the industry that is most effected by the recent global security issues. But even in present circumstances tourist come to Pakistan in large numbers as it offers some of the most spectacular sceneries and rich cultural heritage to people from other countries. Pakistan has not exploited its tourism potential to its full extent. There is a vast room for improvement in the tourism planning and marketing sectors. This paper will explore the areas of improvement in the Pakistan tourism industry and will discuss the use of Geographic Information System (GIS) as a planning tool and as a source of promotion for the tourism in Pakistan.

2. GIS IN TOURISM INDUSTRY

Geographic Information Systems (GIS) and tourism share a common characteristic, that is, both crosses the boundaries of disciplines and application areas. GIS has been applied in many disciplines including geography, forestry, urban planning, and environmental studies. Similarly, tourism has been a subject of interests to geographers, economists, business, environmental planners, anthropologists, and archaeologists. As such, the potential for GIS applications in tourism is significant.

GIS is now recognized widely as a valuable tool for organizing, examining and presenting huge amount of diverse data applicable to many local and regional planning activities. Its use in environmental planning is rapidly increasing. Tourism is an activity highly dependent on environmental resources. It is also a phenomenon, which in the event of a lack of planning and management, is likely to erode its environmental base. Hence, the strength of tourism planning can be enhanced by GIS applications. GIS can be regarded as providing a toolbox of techniques and technologies of wide applicability to the achievement of sustainable tourism development.

According to Fridgen's (1991) study of an American model, the success of any tourism business could be determined by:

- Tourism planning
- Tourism development and research
- Tourism marketing

There has always been a direct relationship between tourism and cartography (Arragon and Wessels, 1994). From the definition of tourism in section 1, tourism is concerned with traveling between close and distant places and maps are an important aid for location of these places. Maps of travel routes and general information about the areas to visit are used in selecting the destination and in planning travel and stay.

Three different landscape features usually characterize tourism destinations in a GIS application: points, lines, and polygons. Point features are individual tourist attractions, for example, a dolphin pool in a park, or a historic site along the highway. Coastal beaches and resorts often follow a linear pattern, while big theme parks or natural parks are characteristics of a polygon feature. These attributes related to locations are essential to a geographic information system.

It is apparent that GIS has tremendous potential for application in tourism. However, due to the general lack of tourism databases and inconsistencies in data, its applications are limited. For example, there is very little site-specific information about sources of visitors origin and destination, travel motivation, spatial patterns of recreation and tourism use, visitor expenditure patterns, levels of use and impacts, and suitability of sites for recreation/tourism development - all of which are appropriate application areas of GIS. So far, applications of GIS in tourism has been limited to recreational facility inventory, tourism-based land management, visitor impact assessment, recreation-wildlife conflicts, mapping wilderness perceptions, tourism information management system, and decision support systems. The following tables illustrate the functional capabilities of GIS and relevant applications in tourism (Table 1); and the range of issues and potential applications of GIS (Table 2).

Table 1: Capabilities of a GIS

Functional Capabilities of a GIS	GIS Basic Questions	Tourism Applications
Data entry, storage and manipulation	Location: What is at?	Tourism Resource Inventories
Map production	Condition: Where is it?	Identify most suitable locations for development
Database integration and Management	Trend: What has changed?	Measure tourism impacts
Data queries and searches	Routing: Which is the best route?	Visitor management/flows
Spatial analysis	Pattern: What is the pattern?	Analyze relationships associated with resource use
Spatial modeling	Modeling: What if...?	Assess potential impacts of tourism development
Decision support		

Source: Bahaire and Elliot-White, 1999

Table 2: Common tourism-related issues and GIS applications

GIS Application	Problem
Systematic inventory of tourism resources	Benchmark/database
Facilitating monitoring of specific indicators	Environmental management
Mapping recreational conflicts: recreation-wildlife; user conflict	Conflicts
Wilderness perceptions	Tourism behavior
Identify suitable locations for tourism/recreation development	Carrying capacity
Simulating and modeling spatial outcomes of proposed tourism development	Prediction
Integrating socio-economic and environmental datasets within a given spatial unit	Data integration
Decision support systems	Development control and direction

Source: Adapted from Butler, 1993

3. CASE STUDIES

Following are two case studies illustrating application of GIS in tourism industry:

3.1. Application of GIS in recreational facility inventory, Illinois, US:

A GIS-based recreational facility inventory was conducted in Illinois, United States. The pilot database was developed from an earlier non-spatial recreation facility inventory developed in 1986 and updated in 1994. The 1994 data demonstrated the use of the database for supply analysis of recreational facilities in the state of Illinois, and an equity-based model was used to determine if additional recreational facilities were needed. The approach focused on the supply of recreational facilities per person within specific region, and regions with a lower supply were targeted for further recreation facility development (www.urisa.org). The database contained 17 layers of 6 spatial themes including 3 layers with data on 2,523 recreational sites with associated attributes.

This comprehensive database allowed several types of analyses including facility supply analysis, equity analysis, site suitability analysis, and connectivity analysis. Facility supply analysis involved defining a geographic region and using the database to mark the supply of facilities in that region. Alternatively, one can define the service area of a facility by some distance measure and use GIS to identify the geographic region. Equity analysis can explore issues such as differences in access to tennis courts by racial groups. Site suitability analysis involves identifying sites for new park development. Connectivity analysis explores the linkages of park facilities with other natural and man made features, for example recreation sites within river and stream

corridor, bicycle trails, and potential for greenway corridors. This comprehensive inventory allows GIS queries of recreation use at different scales.

3.2. Trail Impact Assessment, Himalayas, Nepal

Another example is the use of GIS in identifying and mapping effects of visitor use on trails. Nepal (1999) conducted this research in Mt. Everest, which is a popular trekking destination in the Himalayas. The increasing number of visitors to Everest resulted in high levels of impacts on mountain trails, which is the main tourism infrastructure in the region. GIS was used in mapping trail impacts and in determining the relationship between impacts and environmental features. Trail-specific information such as soil erosion, vegetation loss along trail transects, trail braiding, bedrock exposure, trail displacement, muddy and wet trails were mapped and integrated with visitor use data such as visitor density along different sections of trail, pack stock density, and density of lodge accommodation.

Similarly, environmental features were also added into the database which includes information on trail position, vegetation type, trail gradient, altitude, soil type, and information about trail-specific hazard type (e.g., rockfall, landslide, etc). The trail database contained information for 208 trail segments. The Arc/Info GIS was used to map this information. The final composite map displayed site-specific information on type of trail impact and its relation with the use levels and environmental features. This information is crucial in analyzing which location variables contribute to what type of trail damage, and also provide guidelines to effective trail design and layout that minimize resource degradation.

4. METHODOLOGICAL ISSUES

Although widely used in forestry and environmental planning, use of GIS in recreation and tourism has been slow. The major reasons are lack of funding, and uncoordinated and ad hoc data collection procedures. For example, in the context of recreation and tourism planning in parks, the process of informed decision-making has been conceptualized but, in most instances, not put in operation (www.urisa.org). Data derived from planning or policy-making studies typically are collected at different times, by different researchers, for different purposes, and using different units of analyses and samples. This often results in incompatibility between data sets and an under-utilization of data that could otherwise be very valuable to administrators. Only when these data are used in combination with other information or are collected longitudinally can their usefulness be preserved and economically justified.

To secure a viable, reliable, and useful database, it is crucial that there is an on-going process of updating and maintaining the database. Updating and maintaining data is most effective if incorporated into regular organizational procedures of the public agencies, which hold relevant boundary and attribute information. To make the GIS-based inventory and analyses more useful for local agencies and researchers, it is necessary to raise awareness about its utility to a large number of partners that might be interested in its application.

The most important point, however, is that although GIS may influence the analytical process within tourism and recreation planning, it may not necessarily influence the

ultimate decisions or improve outcomes. Planners not familiar with these complex tools can often question the significance of quantitative data used in a GIS. Also, there is the danger in viewing GIS as a technological solution to complex issues such as tourism in which human values, emotions, and behaviors are often far more important than mere quantitative data. Maps can often be misleading and it will much depend on how the GIS analyst presents the data to the practitioners. While there is no doubt GIS can be a powerful tool in facilitating decisions, it can often be misused and interpreted as the end in itself rather than the means to an end.

From the marketing point of view it is important to concentrate on the multimedia aspect of GIS application. There are two basic approaches to creating a multimedia GIS Database viz. “Multimedia in GIS” approach in contrast to “GIS in Multimedia” (Schneider, 1999). It is difficult to integrate GIS functions into multimedia. Therefore, the first approach may be more suitable in many cases because of its simplicity and user-friendliness. The procedure for developing a GIS Database may be summarized as follows:

- Conversion of analogue map to digital format.
- Creation of relational tabular database with their attributes and hot-linking with shape files in Arc View GIS environment.
- Creation of GIS database for Tourism with capabilities for queries.
- Conversion of recorded digital photographs, video clips and sound to easily downloadable and viewable formats such as wav, avi or mpeg.
- Linking multimedia files to files in GIS database.

All the constituents of the multimedia GIS database are depicted in figure 1.

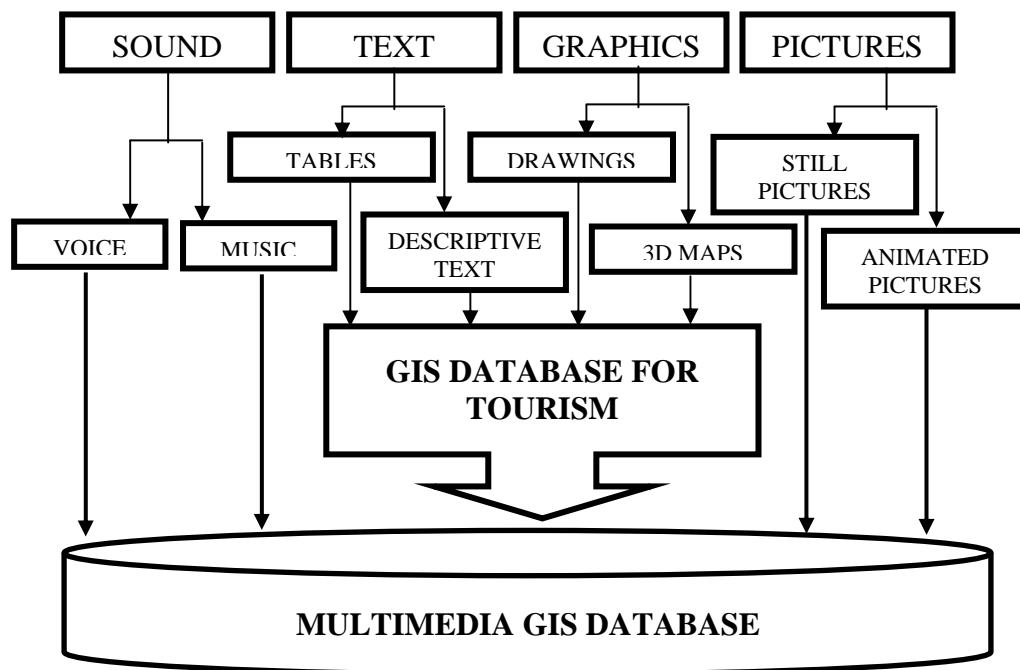


Figure 1: Multimedia in GIS Database. *Source: Ayeni et. al. (2002)*

5. TOURIST SITES IN PAKISTAN

This chapter provides an overview of the tourism potential Pakistan poses. Pakistan offers some splendid countryside for nature lovers, a terrain that challenges the adventure seekers, and excavations, museums and artifacts in profusion for the historians. With an enormous potential for tourism, it is a country with an area of 803,950 square kilometers and a population of some 114 million. Pakistan is divided into four geographic regions: plateau in the west, plains along the Indus and Punjab Rivers, hills in the northwest and mountain ranges in the north (Karakoram, Hindu Kush and the Himalayas). The country is bordered by Afghanistan, India, Iran, China and the Arabian Sea.

Pakistan is a center of half a dozen ancient civilizations. The Indus Valley civilization flourished at Moenjo Daro and Harappa 5000 years ago. Evidence of the glorious Gandhara era is under constant exploration in the Taxila and Swat regions. In the northern region of Pakistan stand five of the fourteen peaks in the world more than 8000 m high. Karakoram Highway, popularly known as the Eighth wonder of the world meander through north of Pakistan. It is an epic feat of modern day engineering and it winds its way up to a height of 16,000 feet above sea level serving as a vital link of Pakistan with the People's Republic of China. The beaches on the shores of the Makran are perhaps few of the unspoiled ones in the world. It is in this scenario that Pakistan has emerged as a favorable tourist destination. Following is a list of cities with the tourist attractions they offer.

Chitral

In the heart of the Hindu Kush Mountains, this town is accessible by road only during

the summer. Most people go to Chitral to see the Kalash people and enjoy the spectacular scenery where mountains reach 7,750 m. The town also has an interesting fort and a bazaar. One full day could be spent driving through the surrounding valley to see the hot springs, terraced farmland and Kalash villages. It is said that the Kalash are descendants of Greek soldiers from the army of Alexander the Great.

Gilgit

Mountains surrounds this beautiful valley once a Buddhist center in the Northwest Frontier Province. It offers beautiful scenery, traditional music, trout fishing, polo matches and excellent mountain and trekking trips. Chinar Bagh in Gilgit has 300-year-old trees along the banks of the River. In Kargha, a small village, there is a fish hatchery and the Buddhist rock carving in the side of a mountain.

Kaghan Valley

This impressive region is set in the heart of the Himalayas. Kaghan Valley offers the beautiful deep blue Lake Saiful Muluk at an elevation of 3,200 m, interesting bazaars, stunning waterfalls, glaciers, boat rides and picturesque small villages.

Hunza Valley

A special area in northern Pakistan, the Hunza Valley offers spectacular scenery and the Batura Glacier. The people of the valley are famous for their longevity, which they claim is due to their isolation from modern civilization. The capital of Hunza is Karimabad, which has an intriguing bazaar, fruit orchards and excellent views of the surrounding valley and mountains. From there, a trip could be made to the Khunjerab Pass on the Chinese border.

Islamabad And Rawalpindi

Islamabad and Rawalpindi are so close together that they can be treated as one city. The cities are in north-central Pakistan, at the edge of the Potohar Plateau. Islamabad 16 km north of Rawalpindi, was built from scratch in 1961 to be the capital of Pakistan, and there's little local color. It does have the Museum of Folk and Traditional Heritage, parks and an impressive honor guard on horseback that performs for visiting dignitaries. The new King Faisal Mosque is one of the largest in the world. Travelers can replenish their libraries at some excellent bookshops in Sadr Market.

Rawalpindi, which is much older, was originally called Fatchpur Boari: It is frenetic, cramped and fun - much more typical of the subcontinent than Islamabad. It has colonial-style buildings, a mall and two colorful bazaars (the older is Raja Bazaar, the newer one is Saddar Bazaar). Nearby are Shakar Parian Hill and Muree for excellent views and an escape from the summer heat. Also in the area are a few archaeological sites some date back nearly 7,000 years, such as the ones at Taxila, 56 km from Islamabad, was the center of the Buddhist Gandhara for 1,000 years. There you'll find the sites of three ancient cities and an interesting museum.

Lahore

This busy metropolis was once the capital of the Mughal Empire. It has some of Pakistan's best sights, including the Tomb of Emperor Jahangir with its beautiful surrounding gardens, the narrow streets of the Old Town, the Bara Dari Pavilion, the Shish Mahal and the Lahore Fort. The city also has two beautiful gardens: the Shalimar (designed by the architect of the Taj Mahal) and Jinnah (a lively city park).

Some other places we've enjoyed include the 350-year-old, white-marble-and-pink-sandstone Badshahi Mosque and the Lahore Museum that has 16 galleries containing carpets, Korans and 1,500 miniature paintings.

Moenjodaro

Moenjodaro (Mound of the Dead) is an ancient city that claims to be the birthplace of the 4,500-year-old Indus Valley Civilization. So far, archaeologists have uncovered streets and brick houses, a covered drainage system and a public bathhouse. Many findings, including intriguing necklaces, are displayed in a local museum.

Multan

Multan is located in the central Pakistan. Here tourist can find blue-tiled monuments, the 14th-century tomb of Rukn-i-Alam, a good bazaar and local handicrafts.

Skardu

At an elevation of 2300 m, this scenic but stark area has some of the world's highest mountains, lakes and glaciers - an ideal place to trek and relax in a cool climate. Attractions include the Karpochu Fort and Lake Satpara, as well as the somewhat arduous but interesting and scenic trip to the Shigar Valley, about 72 km away. Travelers who make it that far will be rewarded with a view of the Braldu Glacier, lovely fruit orchards (peaches, pears, apples and apricots) and the chance to buy local embroidery and pattu (hand-woven cloth). Near Lake Satpara is a large Buddha carved from a single rock. One of the world's most productive aquamarine mines is

outside of Skardu; topaz and beautiful examples of crystal quartz are plentiful, too. Skardu is also the starting point for treks to K2 Mountain and the Baltoro Glacier.

Swat

This far-northern district offers the chance to see an ancient kingdom that is relatively unspoiled by tourism. Once a seat of Tantric Buddhism, Swat is believed to be the garden mentioned in ancient Hindu fables. Alexander the Great passed through, and the region has been the site of numerous battles. Most visitors stay in Saidu Shariff, the capital of the region. While there, visitors can experience the Gandhara Buddhist carvings, various archaeological digs, the old ruler's palace and the Stone Lion. In the rural areas, you can observe nomadic shepherds, ruins of Buddhist statues, monasteries and stupas. The mountain scenery is beautiful but dry. In Swat, shopping can be done for emeralds, sapphires, wool blankets, hand-woven rugs and other locally produced goods.

6. STRUCTURE OF TOURISM INDUSTRY IN PAKISTAN

The tourism industry in Pakistan consists of both the private and public sectors. Within these sectors, each stakeholder has its own role.

6.1. PRIVATE SECTOR: Tour Operators

In Pakistan, the role of tour operators is not as dominating as it should be. Their role should be emphasized, because they mediate between the local level and the foreign/domestic tourist level. Tour operators are an economically sensitive sector that responds quickly to maximize business earning potentials, and to promote growth in tourism and avoid negative impressions that decrease tourism. Different categories of tour operators working in Pakistan are as follows;

- Domestic Tour Operators/Trekking Companies.
- Tour Operators Abroad.
- Hotel Operators
- Transport Operators
- Larger NGOs, that work with host communities on the environment and tourism.

6.2. PUBLIC SECTOR

6.2.1. Tourism Division of Ministry of Sports & Tourism

They publish two brochures. *Trekking Rules and Regulations* and *Mountaineering Rules and Regulations*. All tourists with a restricted area destination must obtain a

permit from this office and attend briefing and debriefing meetings here. Tourism Division determines which areas are in open, restricted, or closed zones, and sets maximum wages for porters in all areas. Because all tourists visiting restricted areas must also utilize the services of a licensed domestic tour operator/trekking company, Tourism Division is directly involved not only with tourists, but with domestic tour operators.

6.2.2. Pakistan Tourism Development Corporation (PTDC)

Pakistan Tourism Development Corporation (PTDC) is the only public sector hotel and tour operator. PTDC is the promotional arm of the Tourism Division of the Ministry of Sports & Tourism. They run several top-end motels, maintain tourist information centres in several towns that offer brochures and advice, hold priority seats for tourists on Northern Areas flights, and book vehicles for hire. Pakistan Tours Ltd. (PTL) is a subsidiary of PTDC and makes bookings for domestic flights, jeeps, hotels, and tours. PTDC owns and operates several hotels in Chitral and the Northern Areas.

6.2.3. Pakistan International Airlines (PIA)

Pakistan International Airlines (PIA) is the only airlines serving Chitral and the Northern Areas.

6.2.4. Northern Areas Transport Corporation (NATCO)

Northern Areas Transport Corporation (NATCO) operates buses between Rawalpindi-Gilgit, Gilgit-Skardu, Gilgit-Sost, Gilgit-Gakuch-Gupis, and Sost-Tashkurgan.

6.2.5. Regional Finance Development Corporation (RFDC)

Regional Finance Development Corporation (RFDC) finances hotel construction.

6.2.6. Northern Area Public Works Department (NAPWD)

Northern Area Public Works Department (NAPWD) operates rest houses in most Northern Areas towns and larger villages where tourists can stay.

6.2.7. Construction and Works (C&W) Resthouses

The Ministry of NWFP operates Construction and Works (C&W) Resthouses in most NWFP towns and larger villagers where tourists can stay.

7. POSSIBLE APPLICATIONS OF GIS IN PAKISTAN TOURISM BUSINESS

The main obstacle in a productive use GIS is the availability of high-quality data. The complex set of records required for various planning operations in tourism planning has to be collected over a long period of time with corresponding accuracy level and appropriateness for the use in GIS applications.

Although there is a vast potential of GIS application in various areas of tourism and recreation planning in Pakistan, the most useful and pertinent application from the point of data availability would be analyzing the spatial and temporal patterns of visitor use of various services and facilities at numerous popular tourist sites in Pakistan. Through powerful analytical techniques of GIS, a macro-level analysis of spatial and temporal patterns of visitor use of services and facilities can be conducted.

This requires two types of data sets: annual visitor statistics, and a complete inventory of services and facilities at a particular tourist site. The first set of data should contain information on where visitors are coming from, what recreation activities are they interested in, their demographic and economic profile, and how much money they spend on their visits to a particular place. The second data set should have information on the location and types of services and facilities provided there including types of attractions, recreation settings such as hiking, biking, and fishing areas, establishment of visitor services, current physical state of visitor facilities and level of visitor use (e.g., number of visitors per season). Manipulation of these two types of dataset will provide useful information to tourism planners. For example, they will know which

locations and what types of facilities and services is in popular demand, where visitors are coming from, how much money are they spending where, and what the current condition of visitor facilities is. Specific queries can be made as well, for example, popularity of hiking areas (high, medium, and low popularity).

Spatial and temporal analysis of these data should provide adequate information on where park planners need to focus their attention, such as potential visitor impacts, levels of visitor crowding, adequacy of facilities and management levels required, and recreational settings and use levels. Other applications could include longitudinal studies of visitor impacts on campgrounds and hiking trails, wildlife and visitor conflicts, effects of motorized recreation in parks, spatial analysis of recreation use patterns across tourist sites, and location analysis of backcountry lodges.

GIS applications can also be efficiently used for the marketing of Pakistan tourism. GIS Internet applications are emerging as an interactive way to provide accurate information in a presentable way. These websites include location maps, travel information, hotel price comparisons, flight schedules, attractions at any place etc. The development of such site has a pre-requisite of high-quality data collection and collaboration of many agencies contributing data to such websites.

8. CONCLUSION

Tourism is a highly complex activity, and thus require tools that assist in effective decision making to come to terms with the competing economic, social, and environmental demands of sustainable development. Applications of GIS in tourism and recreation planning illustrate that GIS is a strong and effective tool that can aid in tourism planning and decision-making. The power of GIS lies not only in the ability to visualize spatial relationships, but also beyond the space to a holistic view of the world with its many interconnected components and complex relationships.

Impact assessment and simulation are increasingly important in tourism development, and GIS can play a role in auditing environmental conditions, examining the suitability of locations for proposed developments, identifying conflicting interests and modeling relationships. However, because of the highly data-driven applications of GIS, its use in tourism and recreation planning in Pakistan has been very limited. This is mainly due to lack of long-term, comprehensive, and systematic data on tourism issues. With consistent collection of spatial data on tourism locations, characteristics of these locations, and long-term visitor use data, its applications can grow significantly. The enormous opportunity of tourism development Pakistan poses certainly demands encoding sophisticated and complex applications of GIS to utilize it to its maximum potential.

9. RECOMMENDATIONS

- Pakistan must organize all the sources of information for contributing pertinent data related to the tourism planning and development. The standards must be set for the data collection that could lead to the creation of a GIS application useful for correct decisions making regarding tourism in Pakistan.
- GIS application should be used for trail impacts and spatial analysis of facilities as in other parts of the world. The pattern of visitor's interest must be studied for development of facilities in various parts of the country.
- Internet GIS is essential to be utilized for the providing large amount of accurate information in a presentable way to the tourist

REFERENCES

Ayeni, O.O., Saka, D.N. & Ikwuemesi, G., 2001 Department of Surveying and Geoinformatics, Faculty of Engineering University of Lagos, Yaba, Lagos, Nigeria.

Bahaire, T. & White, M.E., 1999, The Application of Geographical Information Systems (GIS) in Sustainable Tourism Planning: A Review, *Journal of Sustainable Tourism*, 7(2): 159-174.

Dondo, C., Bhunu, S.T. and Rivett, U., 2002, GIS In Tourism - A Zimbabwean Perspective.

Ghosh, B., 1998, Tourism and Travel Management, Vikas Publishing House Pvt. Ltd.

<http://www.iexplore.com/res/d.jhtml?destination=Pakistan&type=Where%20to%20Go>.

<http://www.urisa.org/abstract/understanding%20interorg/11-1>.

http://www.world-tourism.org/statistics/tsa_project/TSA_in_depth/chapters/ch3-1.htm.

Mock, J. & O'Neil, K., 1996, A consultancy report for The World Conservation Union (IUCN) – Islamabad, Pakistan.

Fridgen, J., 1991, Dimensions of Tourism, Amer Hotel & Motel Association.

Parkins, K., 2000, Globalization - Tourism the new imperialism [Online] <http://www.heureka.clara.net/gaia/global03.htm>

Butler, R., 1993, Tourism: An Evolutionary Perspective, *Tourism and Sustainable Development: Monitoring, Planning and Managing*, 27-43.

Schneider, B., 1999, "Integration of Analytical GIS-functions in Multimedia Atlas Information Systems", Proceedings, *19th International Conference of ICA*, Ottawa.

Wessels, J.C. & Arragon, V., 1994, Travelling by the computer: application of GIS in tourism and recreation, *Proceedings of the Fifth European Conference and Exhibition on Geographic Information Systems, EGIS '94*.