GEOGRAPHIC INFORMATION SYSTEM AS A DECISION SUPPORT SYSTEM FOR TOURISM MANAGEMENT IN A DEVELOPING ECONOMY: A CASE OF ABUJA, NIGERIA

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INTRODUCTION

Surveys on the Nigeria tourism potentials conducted by the African development bank in 1971 revealed the country's existing and latest tourism potentials. The resources include physical attraction sites, cultural heritage, museum and monuments. The physical attraction sites are either man made or natural. Some of the natural attraction sites include the various National Park and Game Reserves, warm spring, waterfalls, beaches and hills, while the man-made attraction sites includes the hotels, city parks, palaces and ancient settlement areas. Cultural tourism has also a significant position in tourism destination areas within Africa. Nigerian cultural heritage is complex and each community is endowed with rich cultural heritage and different tradition.

In other to sustainably develop and manage tourism, profound understanding or knowledge of spatial distribution of tourist sites, tourism facilities, tourist flow, becomes imperative and also the spatial patterns of tourist movements between destinations, within destination, tourist motivation, tourist needs and facilities required. Geographic information system is an information system which has the capability to handle spatially distributed data, relate them to other numerical or descriptive data, and present the data visually on a map, reports, chart etc

STATEMENT OF PROBLEM

The success of tourism business is determined by the planning, development and management of the industry. Although Geographic information system is well suited to the practice of tourism planning, development and management, the use of Geographic information system technology in tourism is still limited in Nigeria, as the general lack of tourism database has led to poor tourist management, poor patronage of tourism destination, lack of awareness of existing tourism facilities by potential tourist, limited information about destinations, tourism manpower needs and planning. There is then need to improve tourism management with Geographic information system technology.

This research was therefore motivated by the need to fill the above gaps in knowledge by generating database on tourism in Abuja that could underpin future tourism management strategies and policies in the Federal Capital Territory (FCT)..

AIM OF THE STUDY

The aim of this paper is to develop a functioning tourism database and examine how geographic information system technology could serve as a decision support system for tourism management.
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OBJECTIVES OF THE STUDY

The objectives of the study include:

1. Design a tourism database for Abuja

2. Identify the geometric and attribute data of the tourists destinations.

3. Create a tourism database for Abuja tourism.

4. Carry out spatial analysis of possible routes from Hotel to tourism sites and from tourist locations to facilities of

THE STUDY AREA
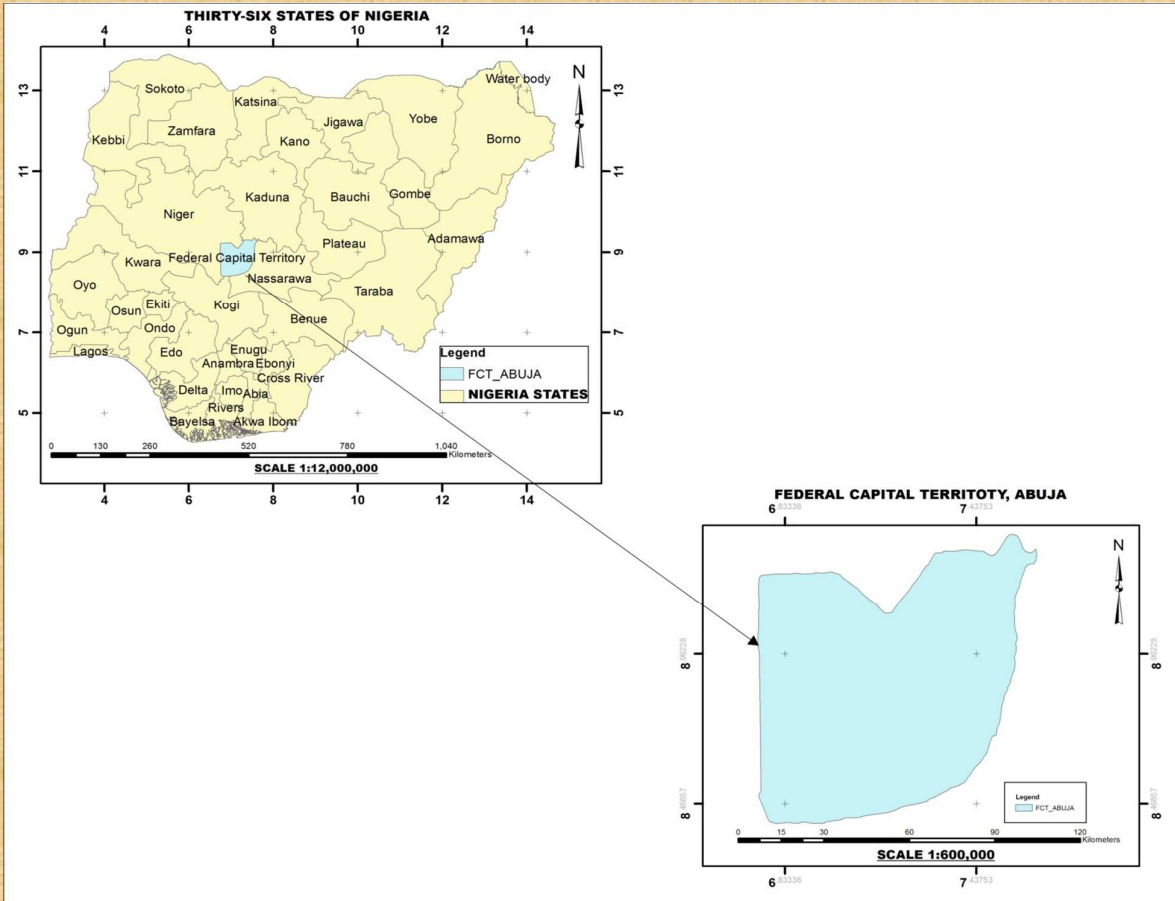
DATABASE DESIGN

A database is an integrated, well-structured collection of data that can be accessed by different logical paths. Database design is a process by which the real world entities, their attributes and relationships are modeled in order to derive a maximum amount of benefits using a minimum amount of data. (Kufoniyi, 1998). GIS database design process consists of three interrelated phases: *Conceptual design, Logical design and Physical design*

Conceptual Design:

This has to do with the representation of human conceptualization of reality and the objective is to determine the basic entities, the spatial relationships among the entities and attributes of each entity. To accomplish the objectives of the research the following entities were identified:

- Tourism sites
- Hotels
- Recreation Park
- Hospitals
- Police station
- Road
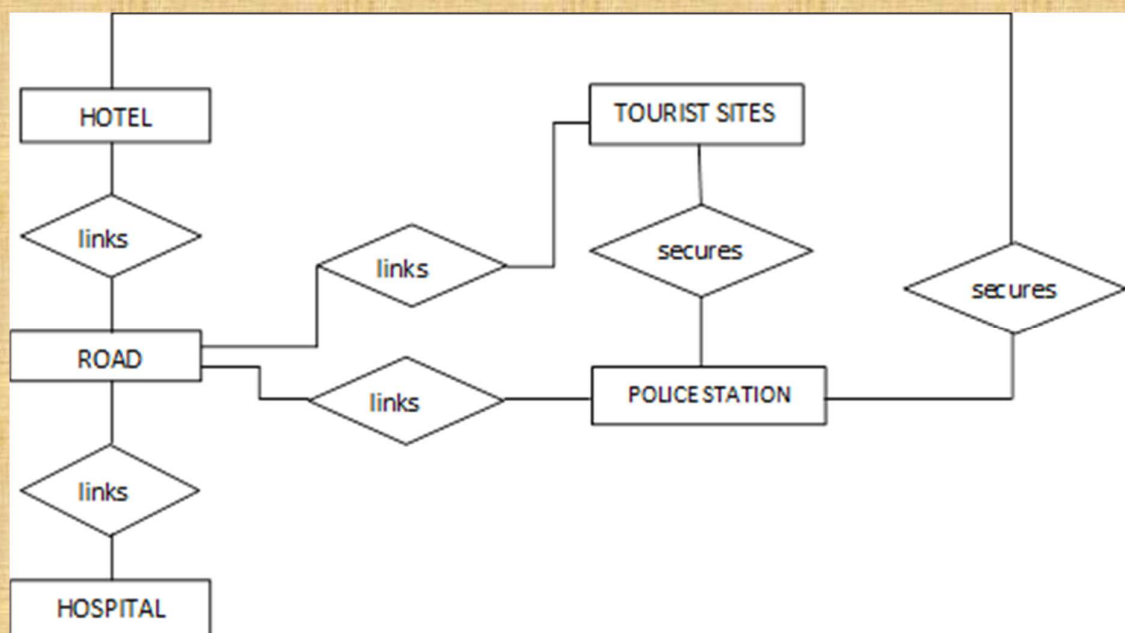
Entity Relationship diagram

Logical Design:

It is the representation of the data model, designed to reflect the recording of data in computer system. The phase translates the conceptual design in to data structured using relational data model. In a relational model, the entities become relations or tables. The following schema was derived.

1. TOURIST SITE **(Trmsite_id**, Trmsite_name, Trmsite_add, Trmsite_fac, Trmsite_owner)

2. ROAD (**rd_id**, rd_name, rd_type, rd_length)

3. POLICE STATION (**PS_id**, PS_name, PS-add)

4. HOSPITALS (**H_id**, H_name, H_add)

5. HOTEL (**Ht_id**, Ht_name)

DATASET USED

The secondary data used include the IKONOS image of the study area which was collected from the office of the Surveyor General of the Federation, Abuja, Nigeria while primary source involved direct acquisition of location data of Tourism sites, Hotels, Recreation places, Hospitals, Police station, and Cultural centre Position through field observation using the Garmin handheld Global Position System (GPS) receiver.

DATA CONVERSION

The ikonos image of the Local Government was updated, scanned, geo-referenced by converting the latitude and longitude coordinates to Universal Traverse Mercator (UTM) using ttCal software, which was used for the geo-referencing. The geo-referencing and on screen digitizing were done using ArcGIS technology and the various entities of interest were vectorised.

Physical Design

This is the representation of the data structure in the format of the implementation software.

The different entities were organised into geo-database structure which specified the table name, attributes, data type and width of the data.

The implementation software is ArcGIS 10.1.

The data types used were Text, Number and

Tourism Sites table, attributes and data declaration

| ATTRIBUTES	DESCRIPTION	DATATYPE	DATA WIDTH
TRMSITE _ID	TOURISM SITE IDENTIFIER	NUMBER	
TRMSITE_NAME	TOURISM SITE NAME	TEXT	30
TRMSITE_ADD	TOURIS SITE ADDRESS	TEXT	30
TRMSITE_FACI	TOURISM SITE FACILITIES	TEXT	100
TRMSITE_OWNER	TOURISM SITE OWNER	TEXT	10

DATABASE IMPLEMENTATION.

Database was created and populated in ArcGIS 10.1. Polygon, Line and Point layers were created respectively for Tourism sites, Hospitals, Recreation centres, Hotels, police station and Roads data

Table 8 is a Sample table created in ArcGIS environment.

OBJECTID	x	y	Trmsite_Name	Trmsite_Address
1	336660.6	1002684	National Arboretum	43 Circular way
2	335198.1	1002852	Millennium Park	14 Circular way
3	334150.5	999964.4	International Conference Center	92 Herbert Macaulay Way
4	336407.1	1004570	IBB Golf Course	84 Muritala Mohammed
5	330082	999826.2	Wonderland Amusement Park	19 National Stadium
6	329608.8	999506.6	National Stadium	26 National Stadium
7	335092.8	1002087	Eagles Square	120 Shehu Shagari
8	333372.6	999432.6	Abuja Art and Culture	25 Moshood Abiola
9	333338.6	1002425	Art and Craft Village	61 Memorial Drive

SPATIAL ANALYSIS

The spatial data acquired in this research were linked to the attribute data and used to demonstrate how GIS as an analytical tool can be used to answer basic generic questions in GIS

COMPOSITE MAP OF THE STUDY AREA
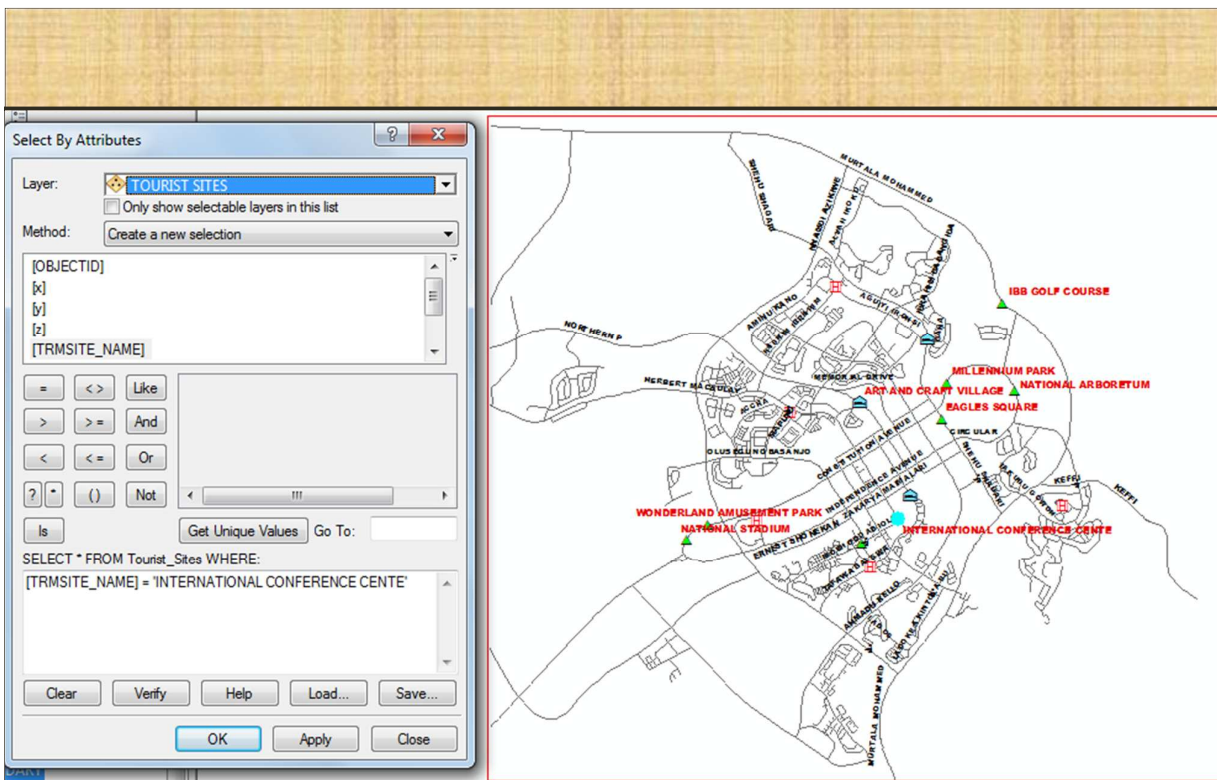
FIGURE 2

SCALE 1:100,000
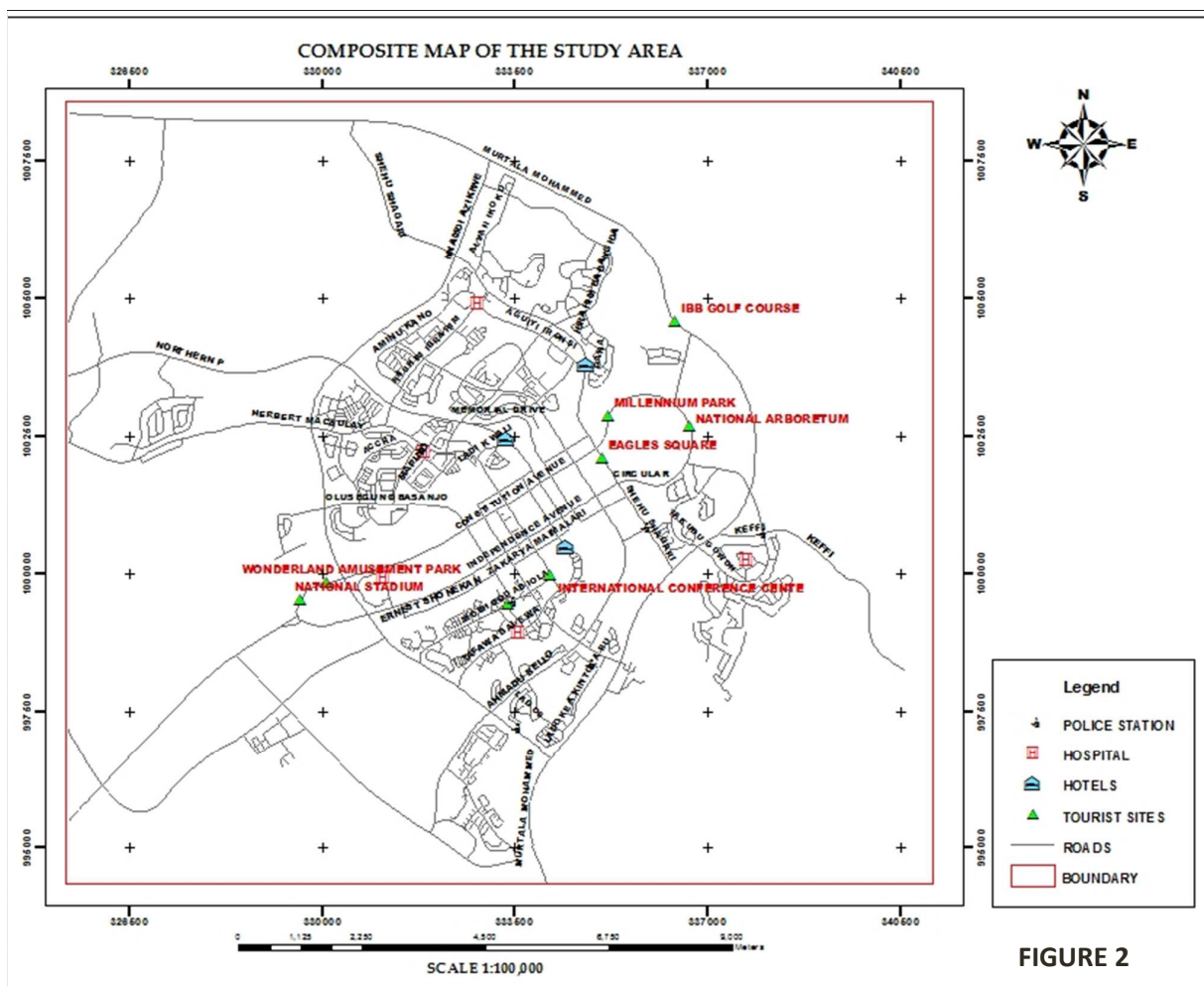
Spatial Search

Spatial search was used to test the database created by looking for certain attributes within Abuja, which was logically and systematically defined.

Query Syntax:

[TRMSITE_NAME] = 'INTERNATIONAL CONFERENCE CENTE'

Query for International Conference center within the study area
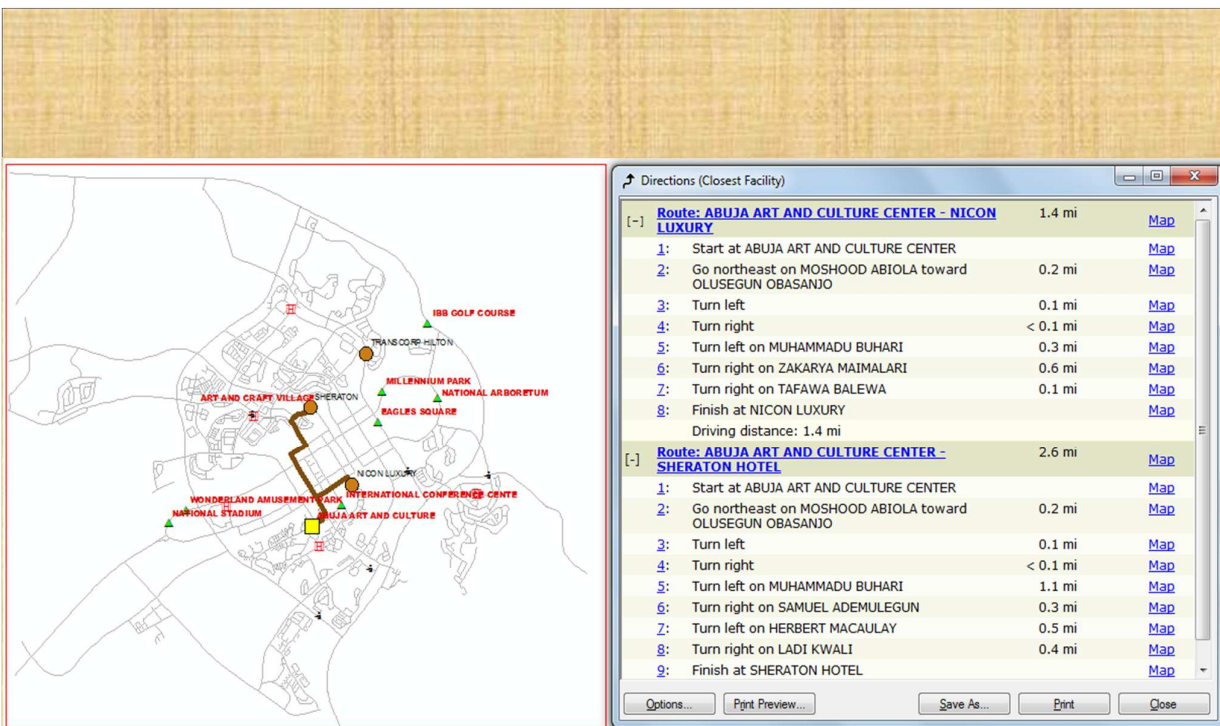
FIGURE 3

NETWORK ANALYSIS

Network Analysis is a set of interconnected lines making up a set of features through which the research can flow.

It allows solution common to network problems, such as finding the best route from one registration centre to the settlements in the study area

Closest facility Analysis

Closest facility is a network analysis that is used to determine facilities from a current location or to any location on the network. Two Closest five star hotels were determined from a tourist site – Abuja Arts and Cultural center

Result of closest facility analysis and the direction window

FIGURE 4

DISCUSSION OF RESULTS

Figure 2 shows the extent of the study area and the various features that were identified and mapped. These include the tourist Sites, Five Star Hotels, Police Stations and the Hospitals. In figure 3, a spatial query was performed to show the International Conference Center. Similar queries can also be performed on the database to reveal tourist sites of interest.

Figure 4 shows the two closest hotels to the Abuja Art and Culture Center based on Closest facility analysis performed. The hotels are Nicon Luxury and Sheraton Hotels which are 2.2km and 4.2km respectively away.
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CONCLUSION

This research has revealed the tourist potentials in Abuja, the Federal Capital Territory of the Federal Republic of Nigeria. The tourist sites include physical attraction sites, cultural heritage, museum and monuments. Spatial database and a digital road network for decision support in tourism management have been created.

This spatial database created can be manipulated to answer basic generic questions which can help tourists, tourism managers, planners, policy makers, and the tourism industry in general to achieve sustainable tourism development and provide better facilities and services to cater for the needs of the tourists and the environment

THANK YOU FOR LISTENING