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# DEVELOPMENT OF GEOSPATIAL MODEL FOR INFRASTRUCTURE AND SPACE MANAGEMENT OF ENGR. A. A. KURE ULTRA MODERN MARKET AND PARKS IN MINNA, NIGER STATE

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## ABSTRACT

Lack of relevant geospatial database models of market infrastructure, space and facilities within the Engr. A. A. Kure Ultra Modern market in Minna have caused the Government huge difficulties in effective infrastructural management and colossal loss of revenue. The study therefore aims at the development of a geospatial information model of Engr. A. A. Kure Ultra Modern Market and Parks in Minna, Niger State, to aid effective and sustainable infrastructure and space management of the market. The materials and methods used in the study include Leica TC1201 Total Station and GPS Receivers for the acquisition of spatial and attribute data of the market infrastructure and facilities. ArcGIS, AutoCAD Software and MS Excel Macros were used to develop the unique geospatial database model for the study area. Some results of the query outputs include geospatial database models of completed building structures, administrative buildings structures, shops occupied by female operators, block numbers and codes, etc, in the market. The major spatial and attribute information themes in the database include a total of 2090 shops, 60 stalls, 2 administrative buildings, 1 mosque, 1 fire fighting station, 1 police post, 4 security/entrance gates (provision for 7 entrances gates at the completion of phase-1), 6 lanes/streets, 56 walkways, 1955 shop owners/operators, a cash center (for interested banks), a clinic for interested organizations, restaurants for interested operators, cold-room, electricity transformers, and incinerator/refuse dump site. All the facilities are located on a total land area of about 2312.024 square meters.

**KEYWORDS:** GEOSPATIAL INFORMATION MODEL, DATABASE, MAPPING, MARKET INFRASTRUCTURE

## INTRODUCTION

One of the common features in most markets and commercial settlements in Nigeria is the proliferation of illegal and haphazard structures on the walkways within markets; which has always made it difficult for government and relevant authorities to effectively manage disaster risk and control in market and commercial places. For instance, it is the desire of the Government of Niger State to boost her internally generated revenue, and market/commercial sector is one of the major sources of this drive. Other benefits eluding the state and individual market operators due to dearth of relevant geospatial database models include integrated geospatial information-based sustainable management of public resources in the market, digital geospatial master planning tool for sanitation, effective risk and disaster management in the market area and environs. A database is a unified computer-based collection of data, showed by authorized users with the capability for the controlled definition to access, retrieval, manipulation, and presentation of data within it (Worboys, 1995). Database is the heart of geospatial information system (Kufoniyi, 1998; Burrough, 1999); hence without it, there would be no structural basis for retrieval and manipulation to produce decision support system.

The study therefore aims at the development of a geospatial database model for infrastructure and space (*road networks with the market and its immediate environs, Blocks spacing and alignment of the shops and stalls, parking spaces and drainages within and around the market, overall site layout, and block identification numbering and zoning*) management of Engr. A. A. Kure Ultra Modern Market and Parks in Minna, Niger State.

## MATERIALS AND METHODS

The materials and methods deployed in the study include Leica 1201 Total Station and Global Positioning System (GPS) for acquisition of spatial data, and attribute information about the Market infrastructure and facilities. ArcGIS, AutoCAD Software and Excel Macros were used in integrated manner to map and develop the unique geospatial database model.

## RESULTS

Some results of the query outputs of the geospatial models developed in the study are shown in figures 1-4. The database accounts for a total of 2090 shops, 60 stalls, 2 administrative buildings, 1 mosque, 1 fire fighting, 1 police post, 4 security/entrance gates (provision for 7 entrances gates at the completion of phase-1), 6 lanes/streets, 56 walkways, 1955 shop owners/operators and a total land area of about 2312.024 square meters. Other facilities in the database include cash center (for interested banks) clinic for interested organizations, restaurant for interested operators, cold-room, electricity transformers, and incinerator/refuse dump site.

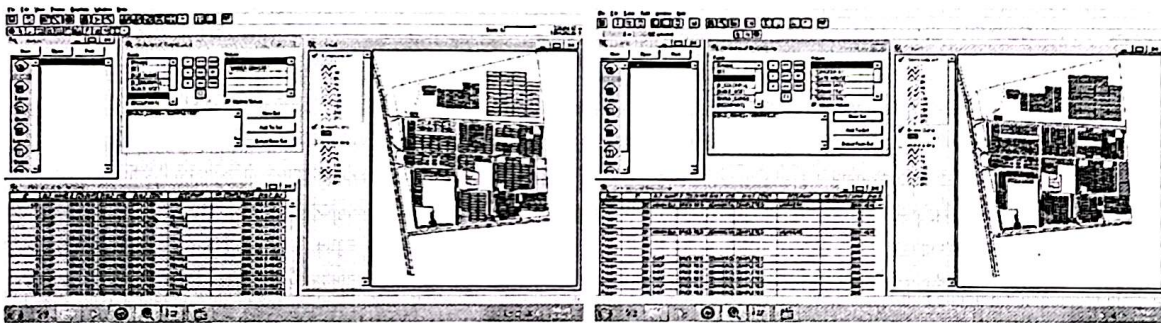


FIG. 1: (A) GEOSPATIAL MODEL OF COMPLETED BUILDINGS STRUCTURE IN THE MARKET; (B): GEOSPATIAL MODEL OF ADMINISTRATIVE BUILDINGS STRUCTURES IN THE MARKET.

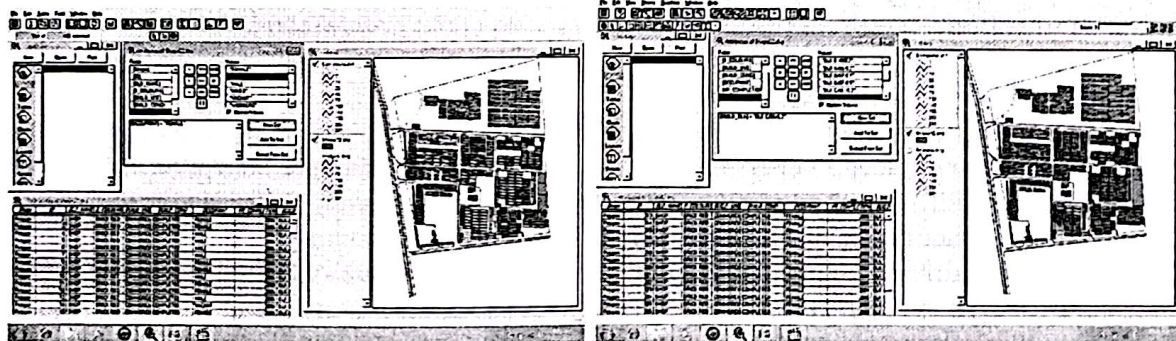


FIG 2: (A) GEOSPATIAL MODEL OF SHOPS OCCUPIED BY FEMALE OPERATORS (B) GEOSPATIAL MODEL OF BLOCK NUMBER(BLK C/06/E2)

## CONCLUSION

The study has developed a customized geospatial database model for the sustainable infrastructural management of Engr. A. A. Kure Ultra Modern Market and Parks in Minna, Niger State. This unique set of database solution, which has never existed for the study area, is flexible for up-date and user friendly.

## REFERENCES

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