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Research Paper

"Application of Geospatial Data in Retail Banking"

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CHAPTER ONE

1.0 Introduction

Retail banking also known as Consumer Banking is the provision of services by a bank to individual consumers, rather than to companies, corporations or other banks. Services offered include savings and transactional accounts, mortgages, personal loans, debit cards, and credit cards. The term is generally used to distinguish these banking services from investment banking, commercial banking or wholesale banking. It may also be used to refer to a division or department of a bank dealing with retail customers.
Geospatial data can be used to identify the location of existing bank branches or ATM centres, site selection for new bank branches or ATM centres, location of security centres, location of major and minor roads leading to the banking or ATM centres. The base map or the open street map of Gusau, the capital Town of Zamfara will be used as case studies.

1.1 Aim And Objectives

The aim and objectives are:

- To use geospatial data to select sites for the establishment of new bank branches
- To use geospatial data to select sites for the establishment of new ATM centres
- To locate existing bank branches by the use of geospatial data
- To locate existing ATM centres by the use of geospatial data

1.2 Retail Banking Services/Activities

The services offered are listed and explained below.

1.2.1 Transaction Account

A transaction account or demand deposit account is a deposit account held at a bank or other financial institution which is available to the account owner "on demand" and is available for frequent and immediate access by the account owner or to others as the account owner may direct.

1.2.2 Savings Account

Saving accounts are accounts maintained by retail financial institutions that pay interest but cannot be used directly as money in the narrow sense of a medium of exchange (for example, by writing a cheque). These accounts let customers set aside a portion of their liquid assets while earning a monetary return.

1.2.3 Debit Card

A debit card (also known as a bank card or check card) is a plasticpayment card that provides the cardholder electronic access to their bank account(s) at a financial institution. Some cards may bear a stored value with which a payment is made, while most relay a message to the cardholder's bank to withdraw funds from a payer's designated bank account.

1.2.4 Automated Teller Machine

An ATM card is any payment card issued by a financial institution that enables a customer to access an automated teller machine (ATM) in order to perform transactions such as deposits, cash withdrawals, obtaining account information, etc.

1.2.5 Credit Card

A credit card is a payment card issued to users (cardholders) as a method of payment. It allows the cardholder to pay for goods and services based on the holder's promise to pay for them. The issuer of the card (usually a bank) creates a revolving account and grants a line of credit to the cardholder, from which the cardholder can borrow money for payment to a merchant or as a cash advance.

1.2.6 Mortgage Loan/ Mortgage

A mortgage loan, also referred to as a mortgage, is used by purchasers of real property to raise funds to buy real estate; or by existing property owners to raise funds for any purpose while putting a lien on the property being mortgaged. The loan is "secured" on the borrower's property. This means that a legal mechanism is put in place which allows the lender to take possession and sell the secured property ("foreclosure" or "repossession") to pay off the loan in the event that the borrower defaults on the loan or otherwise fails to abide by its terms.

1.2.7 Mobile banking

Mobile banking (also known as M-Banking, e-banking, SMS Banking etc.) is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as a mobile phone.

1.2.8 Internet banking

Internet banking (or E-banking) means any user with a personal computer and browser can get connected to his banks website to perform any of the virtual banking functions. In internet banking system the bank has a centralized database that is web-enabled. All the services that the bank has permitted on the internet are displayed in menu.

1.3 significance of retail banking

Resource Side

- Retail deposits are stable and constitute core deposits.
- They are interest insensitive and less bargaining for additional interest.
- They constitute low cost funds for the banks.
- Effective customer relationship management with the retail customers built a strong customer base.
- Retail banking increases the subsidiary business of the banks

Assets Side

- Retail banking results in better yield and improved bottom line for a bank.
- Retail segment is good revenue for funds deployment.
- Consumer loans are presumed to be of lower risk and NPA perception.
- Helps economic revival of the nation through increased production activity.
- Improves lifestyle and fulfills aspirations of the people through affordable credit.
- Innovative product development credit.
- Retail banking involves minimum marketing efforts in a demand — driven economy.
- Diversified portfolio due to huge customer base enables bank to reduce their dependence on few or single borrower.

CHAPTER TWO

2.0 Geospatial Data

Geospatial data is information about a physical object that can be represented by numerical values in a geographic coordinate system. Geospatial data represents features that have a geographic location. It has three basic symbol types as its entities: points, lines and areas. These entities should be located by a referencing system.

2.1 Attribute Data

Attribute data is non-spatial data. It is the information that describes the features. It is independent of all geometric considerations, for example, a height, a mass, and an age of a person is non-spatial data because they are independent of the person's location; or attributes of a river might include its name, length, and sediment load at a gauging station. Non-spatial information is usually stored in a table and linked to the feature by a unique identifier. Non-spatial databases are a set of tabular data records, and each record contains multiple data fields. In the context of spatial databases, one of these fields is the Unique ID Number of a corresponding map feature.

2.2 Types Of Geospatial Data

2.2.1 Raster Data Type

A raster data type is, in essence, any type of digital image represented by reducible and enlargeable grids. Raster data type consists of rows and columns of cells, with each cell storing a single value. Raster data can be images (raster images) with each pixel (or cell) containing a color value. Additional values recorded for each cell may be a discrete value, such as land use, a continuous value, such as temperature, or a null value if no data is available. While a raster cell stores a single value, it can be extended by using raster bands to represent RGB (red, green, blue) colors, color maps (a mapping between a thematic code and RGB value), or an extended attribute table with one row for each unique cell value.

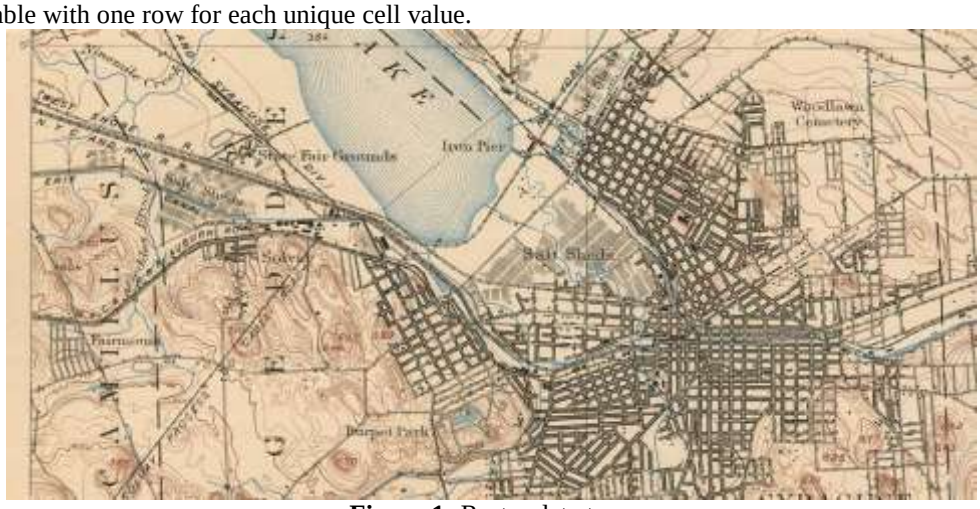


Figure 1: Raster data type

2.2.2 Vector Data Type

Vector data type is data that has a spatial component, or X, Y coordinates assigned to it. Vector files can contain sets of points, lines, or polygons that are referenced in a geographic space.

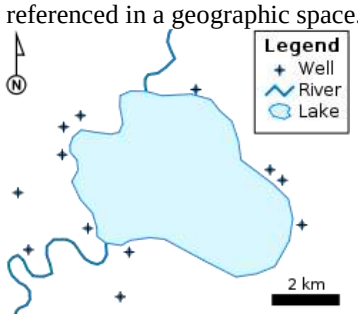


Figure 2: A simple vector map, using each of the vector elements: points for wells, lines for rivers, and a polygon for the lake

2.3 Sources Of Geospatial Data

2.3.1 Base Map

A map depicting background reference information such as landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed. A basemap is used for locational reference and often includes a geodetic control network as part of its structure.

2.3.2 Satellite Imagery

Satellite imagery consists of images of Earth or other planets collected by satellites. Imaging satellites are operated by governments and businesses around the world. Satellite imaging companies sell images under license. Images are licensed to governments and businesses

2.3.3 Open Street Map

Open Street Map (OSM) is a collaborative project to create a free editable map of the world. Two major driving forces behind the establishment and growth of OSM have been restrictions on use or availability of map information across much of the world and the advent of inexpensive portable satellite navigation devices. OSM is considered a prominent example of volunteered geographic information.

2.3.4 Aerial Photographs

Aerial photography is the taking of photographs of the ground from an elevated/direct-down position. Usually the camera is not supported by a ground-based structure.

2.4 Application Of Geospatial Data In Retail Banking

2.4.1 Site Selection For New Bank Branches Or Atms

Retail banks have to take into account different geospatial data to establish new bank branches or ATMs. Geospatial data help to pinpoint where the customers, competitors are with address locating, database management and query tools. Then retail banks may examine the demographic attributes of the customers with the census data. With the help of geospatial data, banks can identify underserved areas, analyze the competitor's market, and create acceptable new branches or ATMs.

ATM

For providing an ATM machine to an area, retail banks need to think different geospatial issues. For example, if establishing an ATM in a residential area, the existing ATM centers in an area and the density of demography should be taken into account; or establishing an ATM in a commercial area, then the concentration of commercial land use should be considered. Also banks have to attach importance to concentration of debit/credit card holders of an area, route for taking money to the ATM, security centres of the area etc. All these can be done with the help geospatial data without doubt.

New Bank Branches

According to Thulasi, banks should take into account different geospatial components to establish a new bank branch, for example

- Exiting bank branches.
- Land value, or socio-economic condition to make a general idea of the area for establishing branch.
- The commercial land use of the area.
- Locations of the residential area and business area.
- The road network.

All these can be achieved with the help and the use of geospatial data.

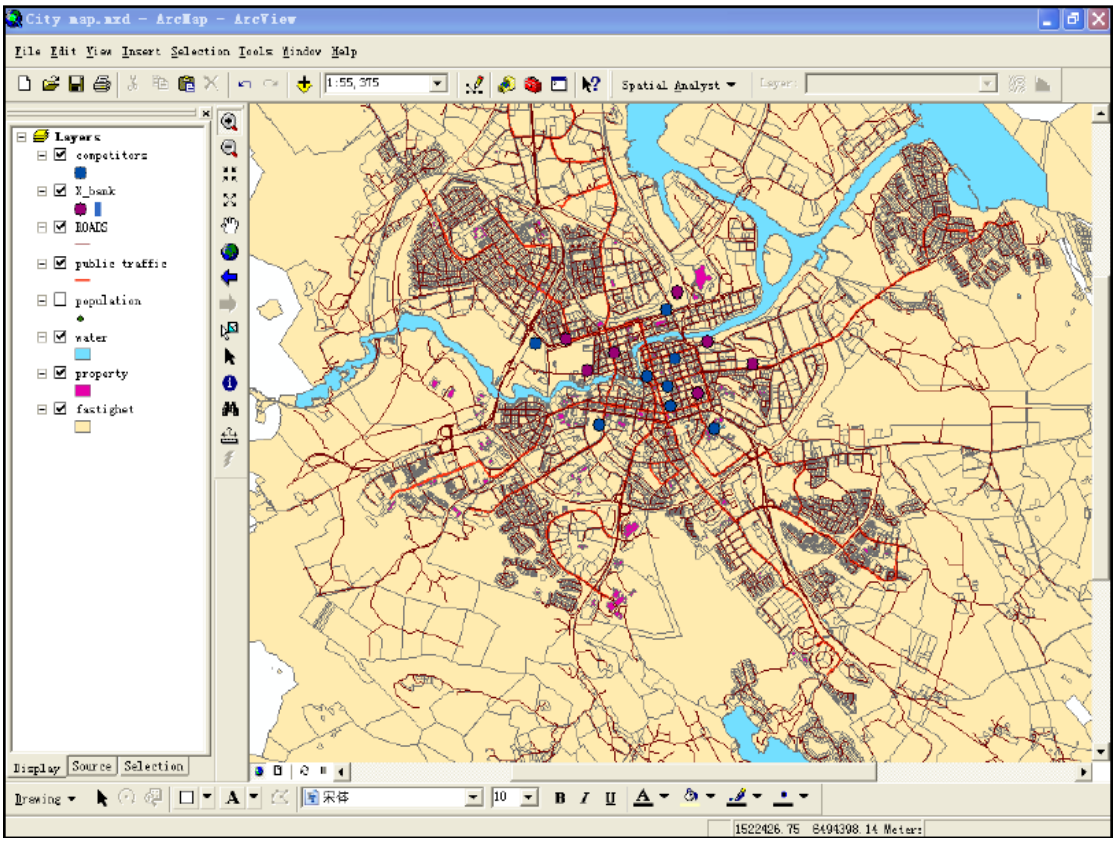


Figure 3: map showing the exiting Bank branches orATMs

We assume there is a bank called X bank, and there are other competitors in this city.In general, geospatial data with the help of GPS can be used to find the exact and suitable location of new bank branches/ATM. In the map shown above, Figure 3, the branches of X bank and competitors are displayed in pink points and blue points. You can see most of the branch/ATMs are in the center of the city, but there are some residential areas that have few branch/ATM centers. The maps shown in figure 4 to figure 7 display the locations where bank X can site new bank branches or ATM centres within the Residential areas. (i.e. residential area1, residential area2, residential area3, and residential area4).

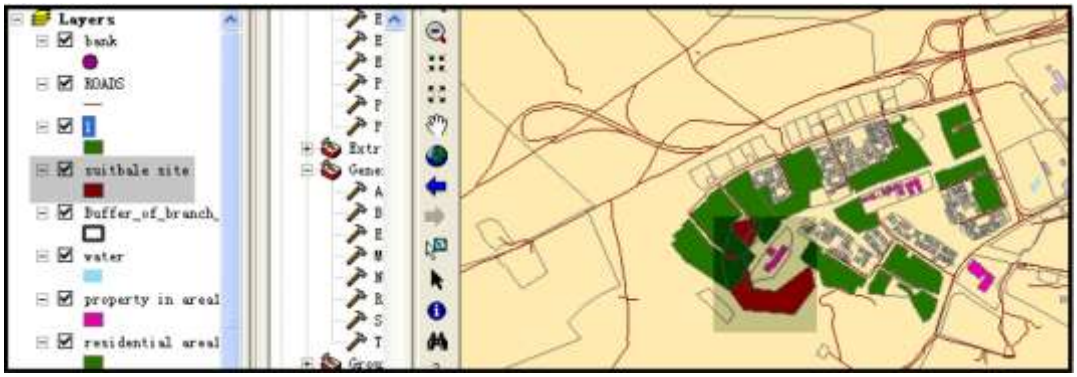


Figure 4: map showing suitable branch sites for residential area1

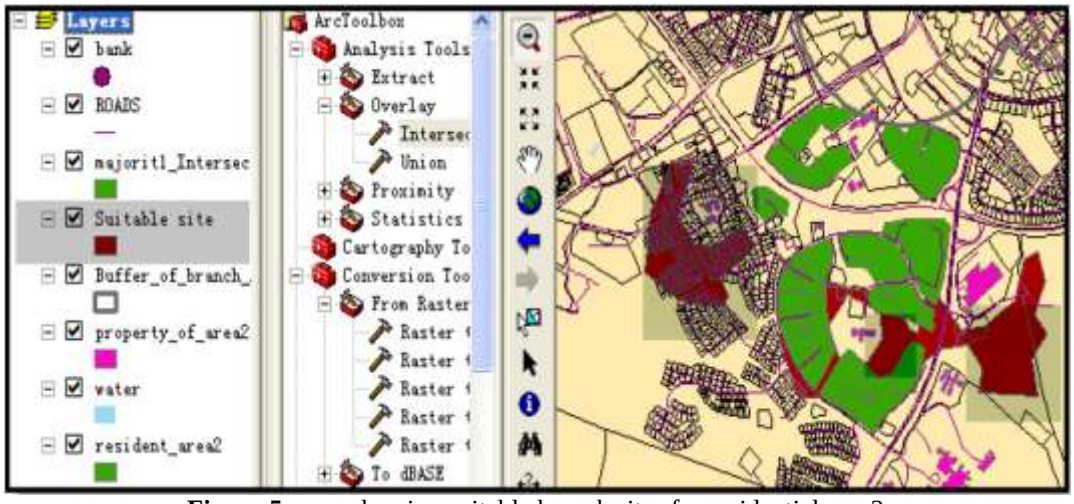


Figure 5: map showing suitable branch sites for residential area2

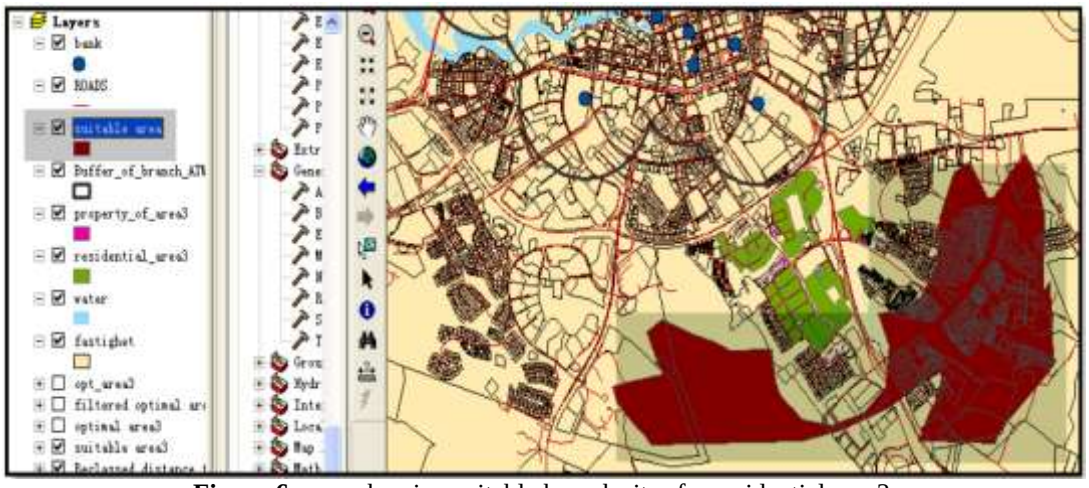


Figure 6: map showing suitable branch sites for residential area3

Figure 7: map showingsuitable branch sites for residential area4

2.4.2 Location Of Existing Bank Branches Or Atm Centres

Geospatial data help in the location of existing bank branches within an area. A geospatial data displaying: The locations or distribution of existing bank facilities, the distribution of ATMs, and the locations of major and minor roads leading to the banks within a particular metropolis, can be used by any client or customer of any bank visiting such an area for the very first time to locate the closest or nearest bank of interest. Geospatial data helps to avoid the wasting of money and fuel to get access to cash. It also aids quick banking transaction.

The maps shown below could also be used by any banking organization or company to locate and know the suitable areas where new bank branches can be established.

Using the Map of Gusau, the Capital Town of Zamfara as a Case Study

With the help of geospatial data displayed below, if provided to the public, the residents and non-residents of Gusau metropolis will be able to locate the nearest banks or ATM centres to their residential centres using the shortest route shown on the maps.

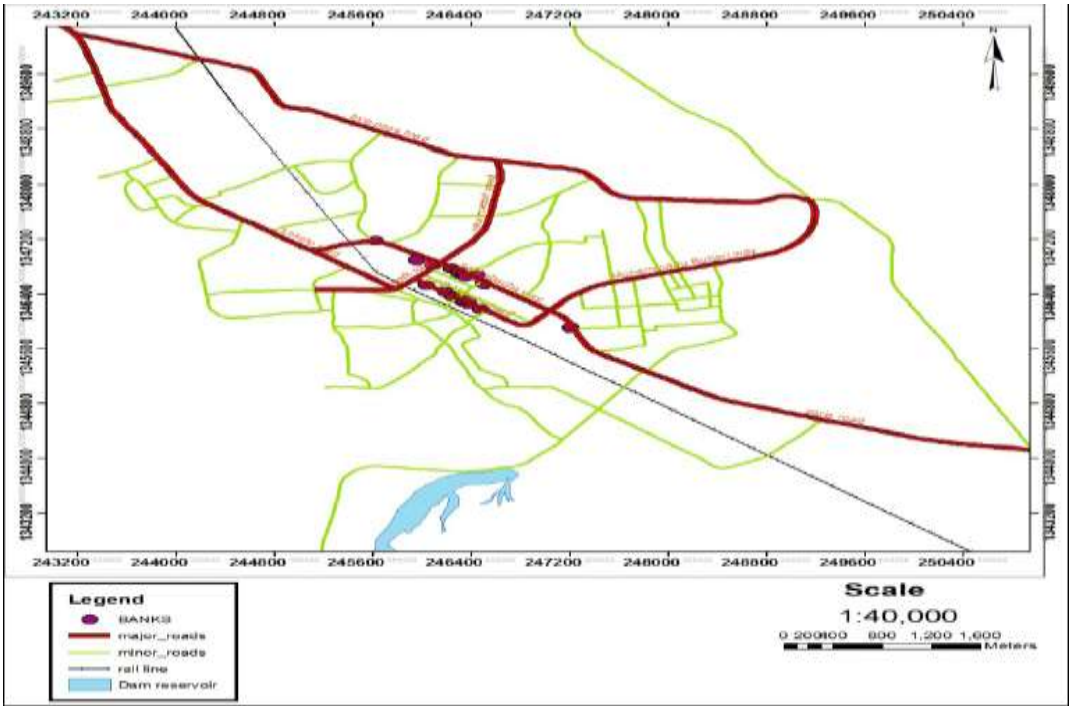
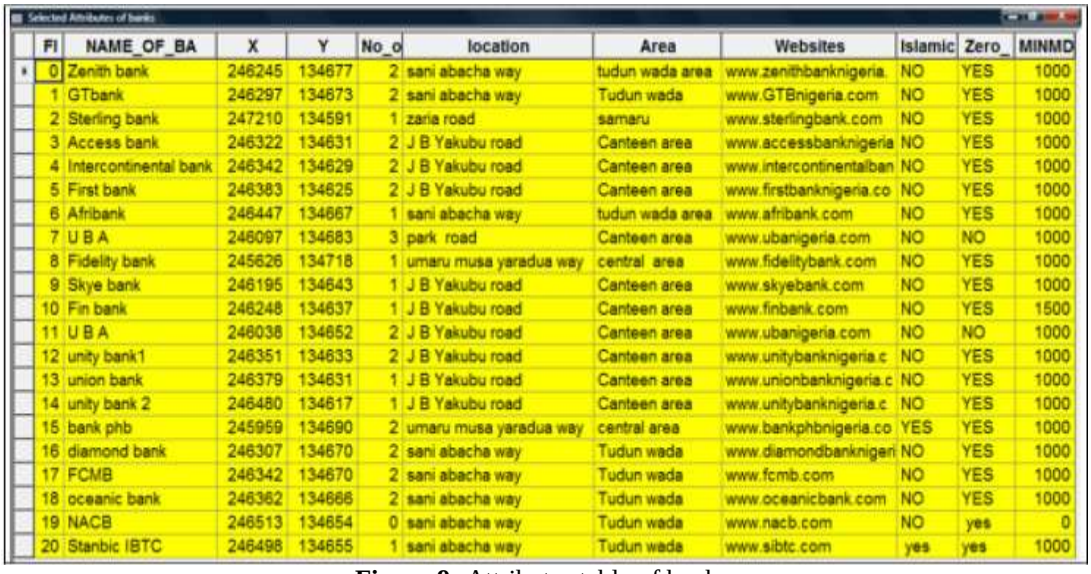


Figure 8: Map showing the distribution of banks within Gusau metropolis



Selected Attributes of banks

FI	NAME_OF_BA	X	Y	No_o	location	Area	Websites	Islamic	Zero_	MINMD
0	Zenith bank	246245	134677	2	sani abacha way	tudun wada area	www.zenithbanknigeria.	NO	YES	1000
1	GTbank	246297	134673	2	sani abacha way	Tudun wada	www.GTBnigeria.com	NO	YES	1000
2	Sterling bank	247210	134591	1	zaria road	samaru	www.sterlingbank.com	NO	YES	1000
3	Access bank	246322	134631	2	J B Yakubu road	Canteen area	www.accessbanknigeria	NO	YES	1000
4	Intercontinental bank	246342	134629	2	J B Yakubu road	Canteen area	www.intercontinentalban	NO	YES	1000
5	First bank	246383	134625	2	J B Yakubu road	Canteen area	www.firstbanknigeria.co	NO	YES	1000
6	Afribank	246447	134667	1	sani abacha way	tudun wada area	www.afribank.com	NO	YES	1000
7	U B A	246097	134683	3	park road	Canteen area	www.ubanigeria.com	NO	NO	1000
8	Fidelity bank	245626	134718	1	umaru musa yaradua way	central area	www.fidelitybank.com	NO	YES	1000
9	Skye bank	246195	134643	1	J B Yakubu road	Canteen area	www.skyebank.com	NO	YES	1000
10	Fin bank	246248	134637	1	J B Yakubu road	Canteen area	www.finbank.com	NO	YES	1500
11	U B A	246038	134652	2	J B Yakubu road	Canteen area	www.ubanigeria.com	NO	NO	1000
12	unity bank1	246351	134633	2	J B Yakubu road	Canteen area	www.unitybanknigeria.c	NO	YES	1000
13	union bank	246379	134631	1	J B Yakubu road	Canteen area	www.unionbanknigeria.c	NO	YES	1000
14	unity bank 2	246480	134617	1	J B Yakubu road	Canteen area	www.unitybanknigeria.c	NO	YES	1000
15	bank phb	245959	134690	2	umaru musa yaradua way	central area	www.bankphbnigeria.co	YES	YES	1000
16	diamond bank	246307	134670	2	sani abacha way	Tudun wada	www.diamondbanknigeri	NO	YES	1000
17	FCMB	246342	134670	2	sani abacha way	Tudun wada	www.fcmb.com	NO	YES	1000
18	oceanic bank	246362	134666	2	sani abacha way	Tudun wada	www.oceanicbank.com	NO	YES	1000
19	NACB	246513	134654	0	sani abacha way	Tudun wada	www.nacb.com	NO	yes	0
20	Stanbic IBTC	246498	134655	1	sani abacha way	Tudun wada	www.sibtc.com	yes	yes	1000

Figure 9: Attributes table of banks

CHAPTER THREE

3.0 Summary

Retail banking, services offered by retail banks, world retail bank, significance of retail banking, geospatial data, types of geospatial data, the sources of geospatial data, and the applications of geospatial data in retail banking were discussed using Gusau as case studies.

3.1 Conclusion

This seminar report shows evidently the extent to which geospatial data aids in providing the locations of existing banking facilities to customers or clients visiting an area for the first time. This seminar report also explains how geospatial data is applied in the location of existing banks or ATMs for selection of sites for new bank branches and ATM centres.

Using geospatial data, we could find answers to more complex questions, such as "Where is the best location for a new retail banking facility / ATM centre?" and "where is the location of an existing bank branch/ATM centre?"

3.2 Recommendation

I humbly recommend that lecturers in Surveying and Geoinformatics should do more research on other ways in which geospatial data can be applied in retail banking other than those explained in this report.

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