

SPATIAL DISTRIBUTION OF UNIVERSITIES IN NIGERIA USING GEOGRAPHIC INFORMATION SYSTEM

BY

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Abstract

Geographic Information System (GIS) has become a powerful tool in the analysis of spatial patterns and offers potential applications to the analysis of university location. This research presents analyzes the spatial distribution of universities in Nigeria. The data for the universities were sourced from the website of the National University Commission (NUC) and the university coordinates were gotten from Google Earth. Data were analyzed using ArcMap 10.8 and Microsoft Excel. The study identified 50 federal (22.7%), 59 state (26.8%) and 111 private (50.5%) universities in Nigeria. The spatial distribution shows that universities are not distributed evenly across the country and are largely concentrated in the southern part of Nigeria. Kaduna State has the highest number of federal universities (3), Delta State has the highest number of state universities (4) and Ogun State has the highest number of private universities (13). The least number of universities were established in 1940-1950 and 1951-1960 while the highest was established in 2011-2020. This study has significant implications for the educational accessibility of Nigerians seeking to attend university and the findings can be used to inform the planning and policy decisions that are related to the location of universities in Nigeria.

Keywords: *Geographic Information System; spatial distribution; Google Earth; federal university; state university; private university*

Introduction

The history of education in Nigeria dates to the colonial era when the country was under British rule (Sulaiman, 2012). During this period, the British government introduced the formal system of education in Nigeria, which was largely focused on providing religious instruction (Imam, 2012). The first schools were established in the early 19th century and were largely funded by missionaries who were sent to spread Christianity in the country (Nwadiakor, 2013). The educational system in Nigeria changed dramatically after independence in 1960. In the 1970s, the government set up the Universal Primary Education (UPE) programme to provide free and compulsory primary education for all children (Ajayi, 2008). In addition to UPE, the government also established the National Policy on Education (NPE) in 1977 which provides guidelines for the development and management of education in Nigeria (Nigerian Educational Research and Development Council (NERDC), 2013). This policy has led to the establishment of several technical and vocational training institutions, as well as the National Open University of Nigeria (NOUN). Today, education in Nigeria is provided at all levels and is compulsory up to the age of 15. The Nigerian education system is divided into three tiers: the primary school system, the secondary school system, and the tertiary education system.

Nigeria is home to many universities that have been recognized by the National Universities Commission (NUC). These universities are distributed throughout the country, with some located in major cities, while others are in rural areas. The spatial distribution of universities in Nigeria is an important issue for the country's development (Adeyemi & Edeki, 2018). Nigeria is a large and diverse country, and the distribution of higher education institutions across its territory is an important indicator of the country's commitment to education and its ability to provide access to quality education for all its citizens. Furthermore, the spatial distribution of universities in Nigeria can be seen as a reflection of the nation's economic and political development over time. The distribution of universities in Nigeria is also an important factor in terms of the quality of education that students receive. A university's location can affect its ability to attract and retain

talented faculty, as well as its ability to provide resources such as libraries and laboratories (Wilkins & Huisman, 2012)

The spatial distribution of universities in Nigeria has been an area of research that has attracted a considerable amount of attention in recent years (Adeyemi & Edeki, 2018; Chukwu *et al.*, 2018). This is because the higher education system in Nigeria has been facing numerous challenges such as inadequate infrastructure, poor resource allocation, and a lack of access to quality education (Ogunbode *et al.*, 2019). This has led to the need to better understand the spatial patterns of universities in Nigeria to identify potential solutions to these challenges. Geographic Information System (GIS) technology has been identified as a useful tool for analyzing the spatial distribution of universities in Nigeria (Adeyemi & Edeki, 2018; Chukwu *et al.*, 2018). GIS technology enables the manipulation of spatial information to identify patterns of spatial distribution, as well as the evaluation of the effects of various factors such as population density, land use, and availability of resources on the spatial distribution of universities. This research, therefore, aims to analyze the spatial distribution of universities in Nigeria utilizing GIS technology. The findings of this study will provide useful information for policymakers in the education sector, as well as for the public. This research will also contribute to the existing literature on the spatial distribution of universities in Nigeria. Furthermore, it provides data on the number of universities, their geographical distribution, and the types of universities present in different areas.

Research Objectives

The research objectives of the study are to:

1. identify the existing universities in Nigeria based on ownership
2. analyze the geographical distribution of existing universities in Nigeria
3. produce maps showing the spatial distributions of universities in Nigeria
4. determine the distribution of universities across the different geopolitical zones in Nigeria

Research Questions

1. What are the existing universities in Nigeria?
2. What are the geographical and spatial distribution of existing universities in Nigeria?
3. What is the distribution of universities based on ownership and year of establishment in the different states and geopolitical zones in Nigeria?

Methodology

Nigeria is officially known as the Federal Republic of Nigeria. It is an African country on the Gulf of Guinea with 36 states and a Federal Capital Territory (Abuja) which is the seat of government. Nigeria covers an area of about 923, 768 km² and has an estimated population of over 200 million in 2022 (Statistica, 2022). Nigeria borders Benin in the west, Cameroon in the east, Niger in the north, and Chad in the northeast. Nigeria is a multinational state with over 250 ethnic groups with three major languages: Hausa, Igbo, and Yoruba (Ayenbi, 2014). It lies geographically between latitudes 4° and 14°N, and longitudes 3° and 15°E (Figure 1). There are six geopolitical zones in Nigeria (North Central, North East, North West, South West, South East, and South-South), and consist of 774 local governments.

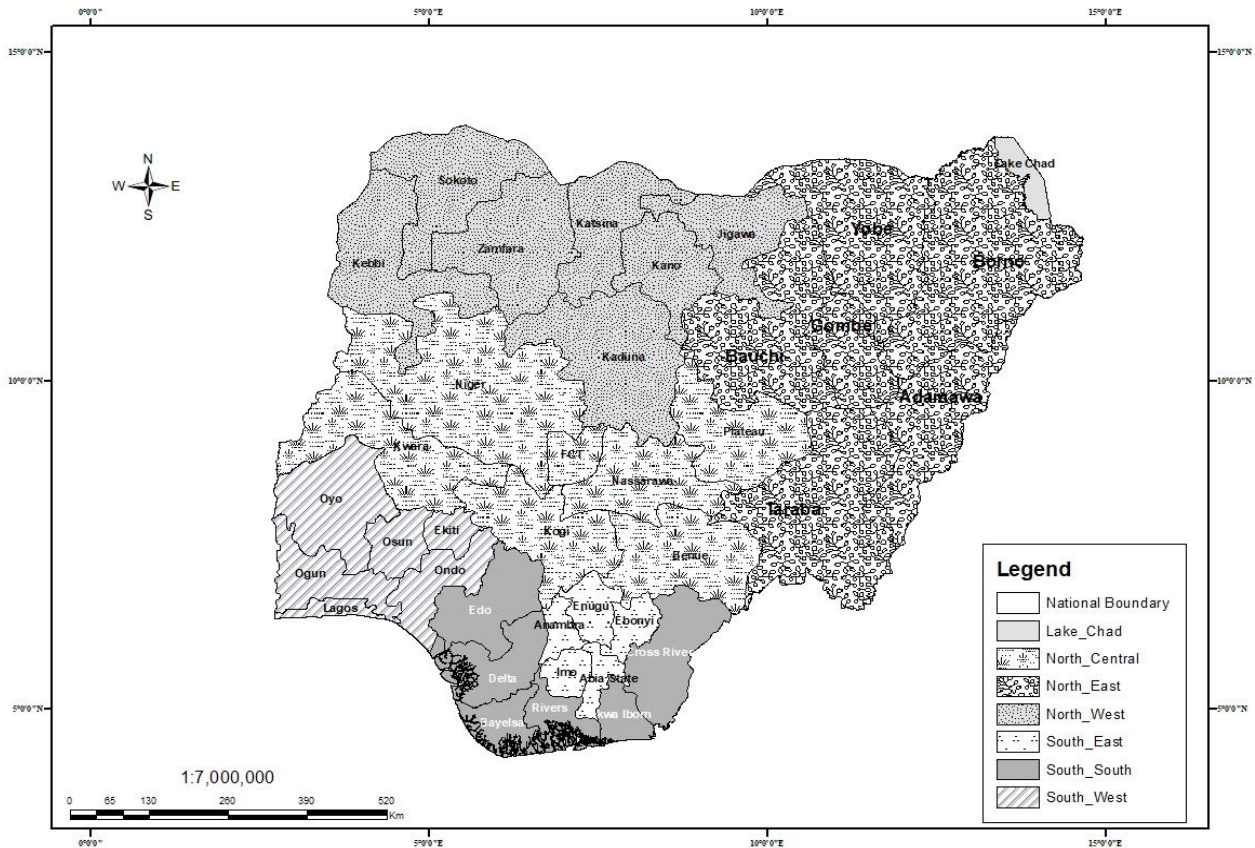


Figure 1: Map of Nigeria showing the distribution of states across the geopolitical zones

The list of all the universities in Nigeria, their location, and the year of establishment was obtained from the official website of the National University Commission (NUC) (<https://www.nuc.edu.ng/>). The shape files used in this study were downloaded from the DIVA-GIS website (<https://www.diva-gis.org/gdata>). The maps in the study were produced using the administrative boundary shape file for Nigeria while the coordinates of all the universities were obtained from Google Earth. The coordinates were then entered into an excel sheet, saved as a comma-separated values (CSV) file, and analyzed on ArcMap version 10.8. The classification of the universities based on geo-political zones, ownership type (private, federal and government), domicile states, and the year of establishment was done on Microsoft Excel. In this study, federal universities are regarded as the universities that are established and managed by the Federal Government of Nigeria. State universities are established and managed by state governments while private universities are established and managed by individuals or other non-governmental bodies/organizations.

Results

Research Question 1: What are the existing universities in Nigeria?

There are a total of 220 universities recognized by NUC in Nigeria. A total of 50 federal universities are available in Nigeria with the University of Ibadan, Ibadan, Oyo State being the oldest (established in 1948) while David Nweze Umahi Federal University of Medical Sciences, Uburu, Ebonyi State was established in 2022. A total of 59 state universities are available in Nigeria with Rivers State University, Rivers being the oldest (est. 1979) while the Lagos State University of Education, Ijanikin, Lagos State University of Science and Technology, Ikorodu, Shehu Shagari University of Education, Sokoto, Enugu State University of Medical and Applied Sciences, Igbo-Eno and University of Ilesa are the youngest (est. 2022). There are 111 private universities in Nigeria. Babcock University, Ilishan-Remo, Igbinedion University Okada, and Madonna University, Okija, which were established in 1999 are the oldest while PEN Resource University,

Al-Ansar University, Maiduguri, Margaret Lawrence University, Umunede, Khalifa Isiyaku Rabi University, Sports University, Idumuje, Ugboko, Baba Ahmed University, Saisa University of Medical Sciences and Technology, Nigerian British University, Asa, Peter University, Achina-Onneh, Newgate University, Minna, European University of Nigeria, Duboyi and NorthWest University which were established in 2022 are the youngest.

Research Question 2: What are the geographical and spatial distribution of the existing universities in Nigeria?

The maps of the spatial distribution of universities are shown in Figures 2-5. Figures 2-4 show the spatial distribution of federal, state, and private universities, respectively in Nigeria. Figure 5, however, shows the distribution of all the universities in Nigeria.

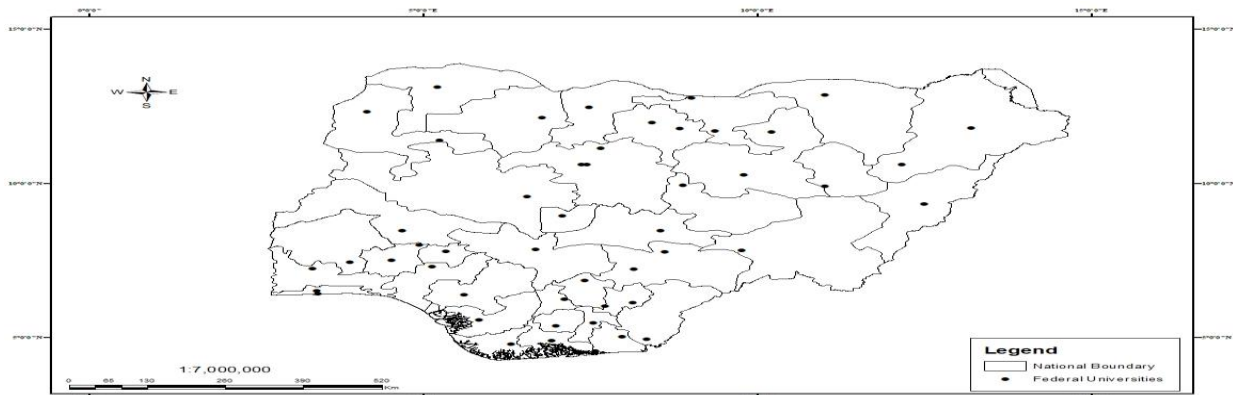


Figure 2: Map showing the distribution of federal universities in Nigeria

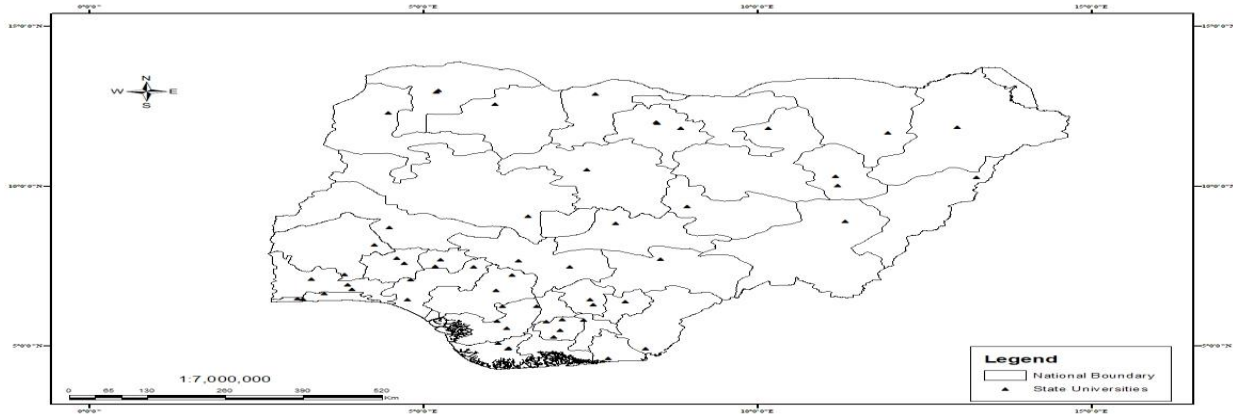


Figure 3: Map showing the distribution of state universities in Nigeria

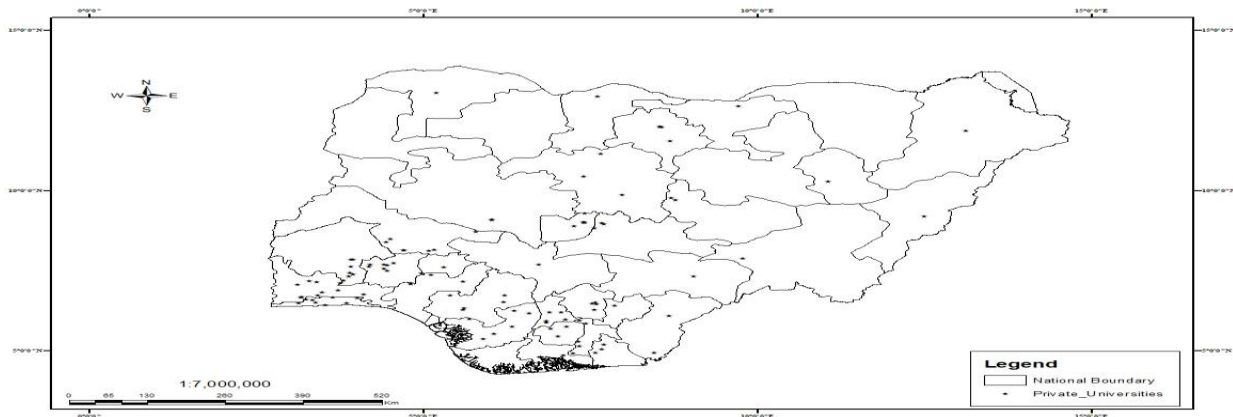


Figure 4: Map showing the distribution of private universities in Nigeria

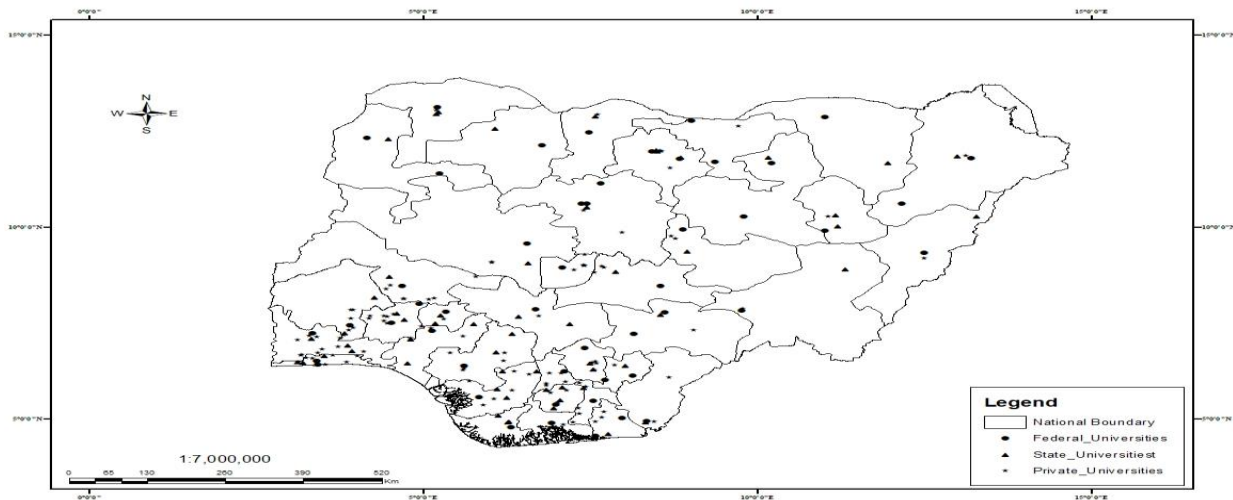


Figure 5: Map showing the distribution of federal, state and private universities in Nigeria

Research Question 3: What is the distribution of universities based on ownership and year of establishment in the different states and geopolitical zones in Nigeria?

The result shows that 22.7% of the universities in Nigeria are federal, 26.8% are state and 50.5% are private (Figure 6).

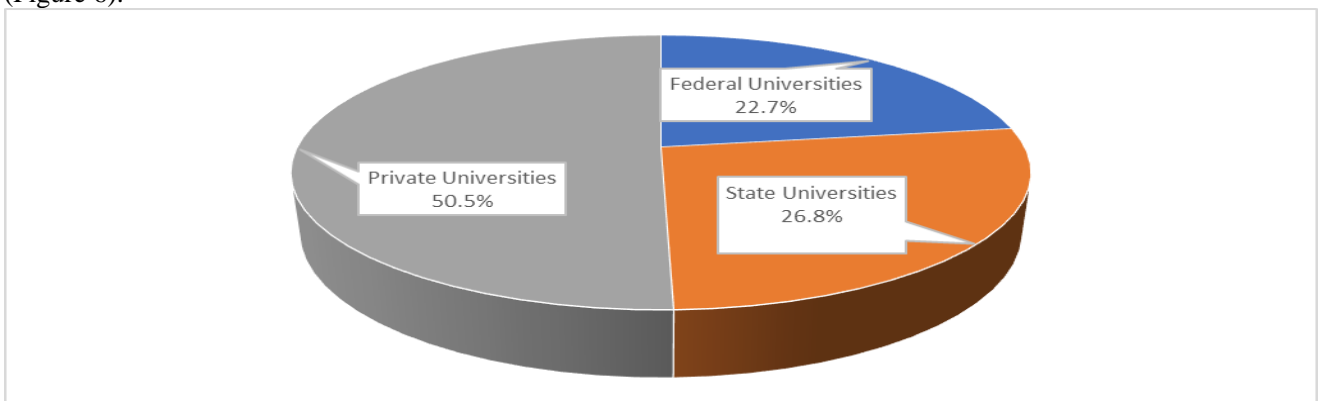


Figure 6: Percentage distribution of universities by ownership in Nigeria

Geopolitically, the North Central, North East, South West, and South-South geo-political zones all have 8 federal universities each, the North West has 12 and the South East has 6 (Figure 7). North Central and North

East have 7 state universities each, South East has 8, North West has 9, South-South has 13 and South West has 15 (Figure 7). The North East has 4 private universities, North West has 12, South East has 15, South-South has 20, North Central has 22 and South West has 38 (Figure 7).

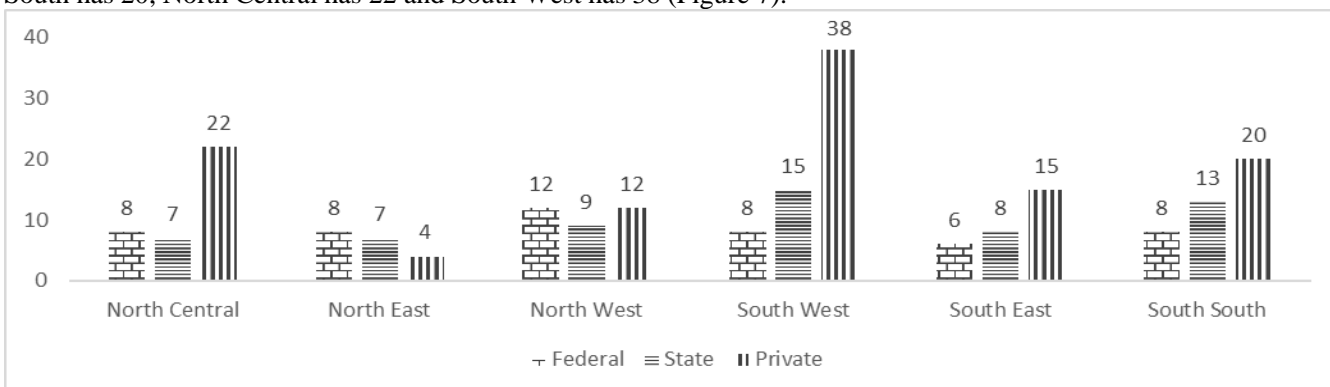


Figure 7: Distribution of universities across the different geopolitical zones in Nigeria

The distribution of federal, state, and private universities across different states in Nigeria are shown in Figures 8-10. Figure 8 shows that all the states in Nigeria have one or two federal universities while only Kaduna state has 3 federal universities. Figure 9 shows that the majority of the states have one or two state universities each, while Bayelsa, Imo, Lagos, Ogun, and Ondo State have 3 each. Delta state has the highest number of state universities in Nigeria (4), while Abuja has no state university probably because it is not regarded as a state, but rather the Federal Capital Territory. Figure 10 revealed that private universities are widely distributed across the different states in Nigeria. There are no private universities in Bauchi, Bayelsa, Kebbi, Yobe, and Zamfara State. Delta, Kwara, and Oyo States have 7 private universities each while Ogun State has the highest number of private universities in Nigeria (13).

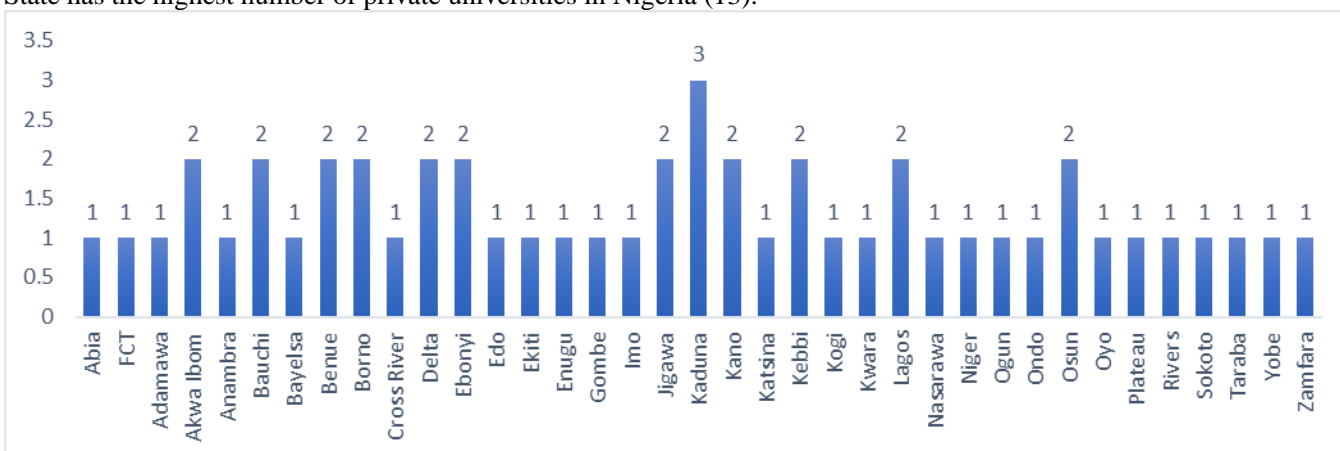


Figure 8: Distribution of federal universities across different states in Nigeria

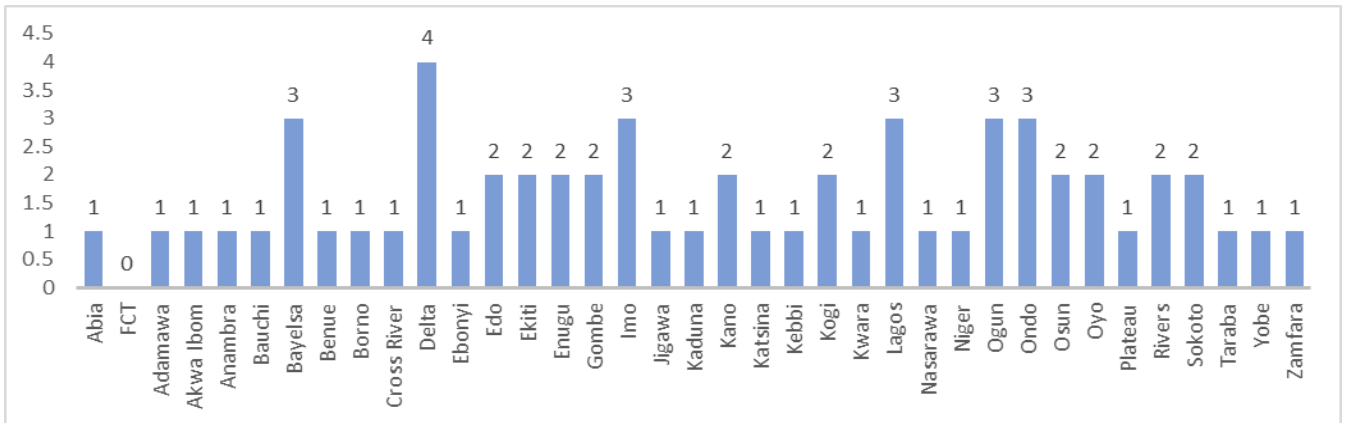


Figure 9: Distribution of state universities across different states in Nigeria

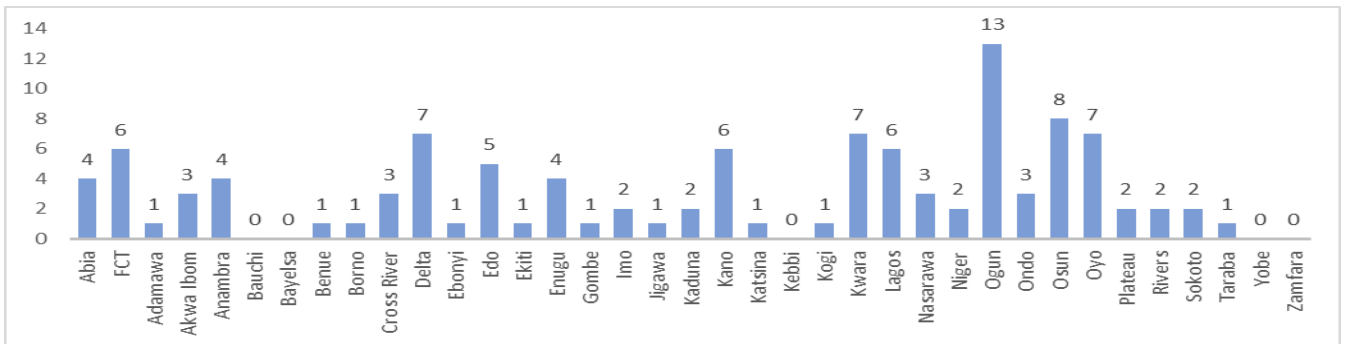


Figure 10: Distribution of private universities across different states in Nigeria

The distribution of universities in Nigeria based on the year of establishment is shown in Figure 11. The years were classified between 1940 and 2022. In 1940-1950 and 1951-1960, there was only 1 federal university in Nigeria. The oldest state universities were established in 1970-1980 while the first private universities were established in 1991-2000. The highest number of universities in Nigeria was established in 2011-2020 (18 federal universities, 16 state universities, and 39 private universities).

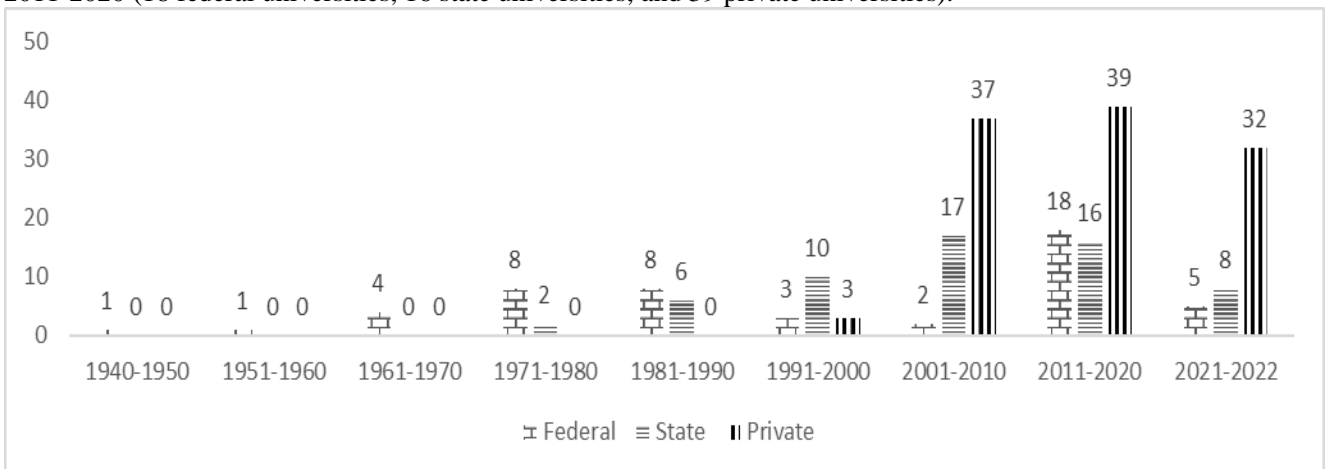


Figure 11: Distribution of universities in Nigeria based on ownership type and year of establishment

Discussion

The larger concentration of universities is in the southern part of the country. For instance, Ogun State has 13 private universities compared to Bauchi, Kebbi, Yobe, and Zamfara with no private universities. According

to Ige (2013), the issues of educational imbalance between the northern and southern parts of Nigeria (which favours the south) should be a major concern to the government. The implication of the disparity in the location of universities in Nigeria would continue to widen due to the establishment of private universities (Ige, 2013). This has a direct impact on student access to higher education and has implications for the equitable provision of higher education in Nigeria, as students from rural areas may not be able to access higher education due to the cost of transportation and accommodation (Nwogu, 2015). Nyewusira (2014) attributed the distribution of universities in Nigeria to political interests. He stressed that while the Federal Government was to balance the Federal Universities in the geopolitical zones, the state governments were bent on creating state universities which led to the proliferation of low-quality universities. Ige (2013) opined that issues such as demand for admission, incessant strike, cultism, and moral decadence necessitated the establishment of private universities.

The distribution of universities in Nigeria has far-reaching implications for the country's future. It has the potential to enhance access to education, providing more Nigerians with the opportunity to pursue higher education (Aluede *et al.*, 2012). Additionally, the presence of universities in different regions can help to promote economic growth and diversification in those areas (Wolfe, 2005). It is therefore essential that the Nigerian government ensure that its educational resources are distributed in a way that maximizes access and equity across the country. This can be achieved through policies such as financial support for students, improved infrastructure, and better facilities. Ultimately, the distribution of universities in Nigeria can make a significant contribution to the country's economic and social development.

Conclusion

This paper has demonstrated the use of GIS in the analysis of the spatial distribution of universities in Nigeria. The study shows that the spatial pattern of universities in Nigeria varies significantly from one region to another. It is evident from the study that most universities are concentrated in the southern part of the country which indicates that university education is more accessible in the southern part of Nigeria than in the northern part of the country. The study also revealed that private universities are the most abundant in the country while federal universities are the least abundant. It is also established that the highest number of universities were established between 2011-2020 while the least were established between 1940-1950 and 1951-1960. The findings of this paper can be used to inform the planning and policy decisions that are related to the location of universities in Nigeria.

Recommendations

The following recommendations are made based on the findings of the work:

1. A GIS framework should be established for mapping the spatial distribution of universities in Nigeria, using data from public sources such as census and land use information.
2. The socio-economic, political, and cultural factors that influence the spatial location of universities in Nigeria should be investigated.
3. An interactive web-based platform to visualize the spatial distribution of universities in Nigeria should be developed.
4. GIS analysis should be used to make recommendations for improving access to higher education in Nigeria.

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