THE REPLICATION OF CRIME MAPPING TECHNIQUES IN THE GLOBAL NORTH AS AN ALTERNATIVE CRIME PREVENTION TECHNIQUE FOR THE NIGERIAN POLICE FORCE

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Abstract
Crime Mapping is a crime prevention technology that utilizes Information and Communications Technology to detect, identify, trace and analyze crimes in different geographical locations. The sole purpose of this research is to ascertain the feasibility of replicating the use of crime mapping techniques in Nigeria. This article applied the social disorganization theory of crime and adopted secondary sources of data such as journal articles, policy briefs, newspapers, and police annual publications. Literature from the global north and global south were collated and concisely analyzed for a better understanding of the right channelling of resources in solving crimes such as theft, kidnapping, banditry, rape, and electoral violence. The researchers were keen on understanding why crime mapping is effectively working in some global north societies and has not been tried in Nigeria. The paper concludes that poor classification and record-keeping of crime data by the Nigerian police, culture, corruption, lack of technological sophistication, reluctance to progressive change, and the likes will make the replication of crime mapping technique in Nigeria somewhat difficult especially for use by the Nigerian Police departments. This study recommends that officers of the Nigeria Police Force and other relevant sister security agencies be trained on how to use crime mapping technologies. Furthermore, if the Police are to succeed in applying this technology in crime-fighting, they should carefully think about how, who, where, when, and what the system will be applied for, only then will it help in designing an edifice for the system.
Keywords: Crime Mapping, Crime, Geographic Profiling, Nigeria Police Force.

Introduction

Crime Mapping (CM) is an effective technology that has gained wide popularity in the global northern countries because of its utility in solving crime problems. It has over time produced successful results as means for crime prevention through the study of data and the understanding of the patterns and trends of criminal activities and acts (Boba, 2016). Thompson (2007) describes CM as a tool utilized to visually explore crimes within a geographic environment. In other words, the primary objective of crime mapping is to analyze crime statistics and patterns, plan for future policing initiatives, identify gaps in law enforcement coverage, enhance the use of intelligence in "hot spot" areas, communicate more effectively with other stakeholders in community safety issues, follow up to assess the efficacy of tactics used for improved ways for crime prevention and detection (Record finders,

2022). This sophisticated and effective tool for crime prevention has grown from simple and cumbersome techniques to a complex and compact repertoire.

As far back as the 1800s, there were many attempts to analyze and fight crime before the development of GIS technology that created what is known today as crime mapping. (Balogun, Okeke, and Chukwukere, 2014; Recordfiners, 2022). Law enforcement agencies and other organizations used hardcopy pin maps to chart criminal activity; but these maps were static and, as crime rates increased, difficult to maintain. In recent years, with advances in quick and user-friendly software, manual pin mapping has given way to computerized crime mapping (Office for Crime Victims, 2003).

One of the most commonly used tools in CM for

crime prevention is the Geographic Information System (GIS) software which is adopted by many criminal justice systems in Europe and North America (Thompson, 2007). GIS is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data (Martindale, 2013). The keyword to this technology is Geography – this means that some portion of the data is spatial. In other words, data that is in some way referenced to locations on the earth. This signifies that GIS can be used apart from crime mapping. However, this study focuses on its use for crime mapping. GIS enables the user (crime analyst) to run an analysis of crime in a particular geographic environment in numerous ways to enable the user to gain a better understanding of the crime(s) and to see how these crimes are distributed on a map. The GIS software has very powerful functionality packages that make it easier for the user to efficiently navigate the package and perform numerous forms of queries.

Theorists in environmental and administrative criminology have taken advantage of the GIS software to understand the key drivers or mechanisms that cause social disorder such as the causes of crime or what brings about crimes. Others include where these crimes occur and how environmental changes affect societal problems. These criminologists have utilized the study and understanding of maps to identify crime locations (Boba, 2016).

Criminologists generally agree that most crimes occur in space and in time, and could easily be attributed to geographic location (Chainey & Ratcliffe, 2005). Environmental factors enhance the understanding of how crimes and environmental features of crimes interrelate and how they can be prevented from developing into more complex crimes. Given this, the field of crime mapping and analysis has attracted wide attention and scholarship by practitioners such as law enforcement agencies and researchers especially in Europe and North America to understand crime patterns, trends, and types that occur within a specific location.

The police in the global north, for example, has employed the use of GIS to identify crime hotspots, understand crimes within and outside their areas of jurisdiction, and understand the causes and spatial distribution of crimes (Chainey & Ratcliffe, 2005). This step has helped police officers by enabling them to act in different intelligent manners in curbing crime and has also been used to determine or ensure police transparency and accountability in reducing crimes in societies.

Interestingly, the important roles maps have played in policing and law enforcement cannot be overemphasized. Maps have helped them in operational, tactical, and strategic planning and have also helped in organizing police officers to reach decisions on how to deploy resources to areas with more needs to curb these crimes (Bowers, Johnson, and Pease, 2004). The use of maps can be said to be the very first important step that brings other factors into place in the study of modern crimes clustering in society as it opens and guides the user to what is expected of them. In essence, the use of maps otherwise known as map reading provides the first step direction in understanding crime (Thompson, 2007).

From the foregoing, applications of GIS to crime mapping and management have been successful in curbing crime in many developed countries. Unfortunately, most developing nations, including Nigeria, have not migrated from the "pin on maps" to the use of computer GIS. In most cases, police operations are carried out based on intuition, tip-off information, and the simple "trial-and-error" method (Balogun, Okeke, and Chukwukere, 2014). This anomaly and ineffective technique of policing continues to be in existence despite the high rate of security in this region. In West African countries like Nigeria, there has been the existence of a barrage of criminal activities ranging from organized crimes to horrendous crimes such as rape, kidnapping, murder, burglary, robbery, cyber-crimes, bribery, corruption, and the likes (Gongs, Famave, Maxwell and Annagu, 2021; Oguntunde, Ojo, Okagbue and Oguntunde, 2018). In more specific terms, the Global Terrorism Index (as cited in

Oguntunde, et al, 2018) ranked Nigeria as the third-most terrorized country in the world. The dreaded terrorist organization, Boko Haram, has carried out ravaging acts that have negatively affected national development. They have launched their terror attacks on both soft civilian targets and hard security targets (Bewul, 2018). This act of terrorism could be easily averted through the use of crime mapping techniques.

Sadly, these crimes such as kidnapping and banditry have had security practitioners on their toes in a bid to proffer as many solutions to these crimes as possible, yet, these crimes strive higher virtually daily (Nigerian Police Watch, 2015). This has had the Nigerian government channel more resources in trying to solve these crimes especially because of the negative image these crimes have drawn to the country (Eterno & Das, 2011).This problem has been faced and surmounted by the global north due to their adoption of sophisticated surveillance techniques such as crime mapping.

In their study Balogun, et al, (2014) found out that one of the reasons for the abysmal performance of the Nigeria Police in curbing crimes is due to its inability to outgrow the old pin maps which were useful for showing where crimes occurred, but had serious limitations because as they were updated, the prior crime patterns were lost. In addition, pin-maps could be quite difficult to read when several types of crimes, usually represented by pins of different colours, are mixed.

Similarly, Soneye (as cited in Ayuba, 2015) established that a large proportion of the men of the Nigerian Police Force can hardly ascertain the areas under the jurisdiction of their stations or define the shortest route from their station to specific crime areas. This in other words means that the traditional and outdated system of intelligence and criminal record maintenance has failed to live up to the requirements of the existing crime scenario. Manual processes neither provide accurate, reliable, and comprehensive data round the clock nor does it help in trend prediction and decision support (Ayuba, 2015). Upon this void, this research seeks to see how the replication of the crime mapping technique can be used to curb the social malady of crime in society by the Nigerian police.

In the same vein, some notable studies have been done in different parts of the world on the use of GIS in Crime mapping and analysis, (Haidong, Jianping, Shenjun, Zhanhong, Zhenhua, and Bailang, 2011; Johnson, 2000; Harries, 1999; Murray, McGuffog, Western, and Mullins, 2001;). In Nigeria, little efforthas been made in this direction. The following are some of the studies done in Nigeria with a focus on Crime Mapping: A GIS Approach to Crime Mapping and Management in Nigeria: A Case Study of Victoria Island Lagos (Francis, et al 2006; Crime Mapping and Analysis in Kaduna Metropolis, Kaduna State Nigeria(Ayuba, 2015). None of these studies to the best of the researchers' knowledge has holistically addressed crime mapping and its replication by the Nigerian police force for crime prevention.

Therefore, this research will be carried out to put forward a more encompassing crime prevention technique, that will allow for blue-collar crimes to be studied exclusively and at the same time get the correct personnel and resources to be placed at the right place, at the right time and most importantly, promptly when needed. The study puts forward crime mapping as a better preventive technique to be used by the Nigerian Police force and other sister law enforcement agencies that have relied solely on older traditional crime-fighting mechanisms in solving evolving, modern trends and patterns to these crimes.

A Brief History of Crime Mapping
Even though crime mapping has a long history most scholars agree that it started in the 19th century (Anselin, Cohen, Cook, Gorr and Tita, 2000; Braga, 2006; Boba, 2005). In the 1800s, European researchers who adhered to the school of thought known as the cartographic school of criminology examined the levels of crime within different areas (regions) and the relationship of these levels to sociological factors, such as socioeconomic status (Boba, 2005). For example, in 1829, Adriano Balbi, an ethnographer and

geographer, and André-Michel Guerry, a lawyer, created the first maps of crime using criminal statistics for the years 1825 to 1827 and demographic data from the census. They examined crimes against property, crimes against persons, and levels of education in France and found that areas with high levels of crimes against property had a low incidence of crimes against people and that higher numbers of educated people lived in areas with more property crime (Criminal Justice, 2022).

In the United States, Shaw and McKay's (1942) seminal study of juvenile delinquency in Chicago made extensive use of crime maps. Shaw and McKay borrowed Park and Burgess's (1924) ecological model and divided the city into five different zones. They found that the zone adjacent to the central business district, the zone of transition, perpetually suffered from the highest rates of juvenile delinquency and other social problems regardless of the specific ethnic group occupying the zone at the time (Igbo, 2008). This research was instrumental in popularizing social disorganization theory and inspired several similar mapping projects in Chicago; Philadelphia; Richmond, Virginia; Cleveland, Ohio; Birmingham, Alabama; Denver, Colorado; Seattle, Washington; and other cities (Criminal Justice, 2022).

The late 1960s and early 1970s were critical for the development of crime mapping. In 1966, the Harvard Lab for Computer Graphics and Spatial Analysis developed SYMAP (Synagraphic Mapping System), one of the first widely distributed computerized mapping software programs (Boba, 2005). The Environmental Science and Research Institute was founded in 1969 and the subsequent decades emerged as one of the top distributors of GIS software, including the current ArcView and ArcGIS software packages. Also, around this time, the U.S. Census Bureau began the ambitious GBF-DIME (Geographic Base Files and Dual Independent Map Encoding) project, which was used to create digitized street maps for all cities in the United States during the 1970 census (Mark, Chrisman, Frank, McHaffie, & Pickles, 1997). These

advances were necessary for the development of GIS programs used in crime mapping.

The use of -GIS programs for mapping has been the most important advance in the field of crime mapping. There are several important advantages to using virtual maps instead of physical maps. First, computers have dramatically reduced the time and effort required to produce crime maps. Given the relatively low cost and user-friendliness of many of these software programs, it no longer requires a substantial investment for agencies that wish to engage in crime mapping. Second, these GIS programs reduce the amount of error associated with assigning geographic coordinates to crime events. Third, virtual maps are much more flexible than physical maps, allowing researchers and crime analysts to compare the geographic distribution of crimes against other characteristics of the area under investigation (e.g., census bureau information, city planning, and zoning maps, and maps produced by other agencies). Finally, GIS and other spatial analysis software provide powerful statistical tools for analyzing and detecting patterns of criminal activity that cannot be detected through simple visual inspection.

Theoretical Framework
The study utilized social disorganization theory to explain CM techniques as an alternative crime prevention technique for the Nigeria Police Force as obtained in the global north. Social disorganization theory was developed by Shaw and McKay (1942). The theory holds that the environment influences delinquency and crime commission.

The social disorganization theory postulates that there are factors in the environment that engender crime. Some of these factors are residential instability, social structure, poverty, and even physical appearance. These factors create an atmosphere that brings a motivated offender to find suitable targets or victims as a result of a lack of guardianship in some areas of a city. In other words, areas that produce higher crime rates are normally socially disorganized neighbourhoods. Shaw and McKay (1942) observed that socially

disorganized societies are more likely to suffer higher crime rates irrespective of who lives within them, be they Nigerians, Mexicans, Swedes, or Iranians; as long as it is socially disorganized, such a neighbourhood will suffer more crimes. Put in another way, this theory argues that it is not the individuals that are criminogenic, but rather their environment.

A cue from this proposition gives light on the disparity in the occurrence of crime in different parts of society. Jegede, Adejowon, Olowookere, and Elegbele (2016) corroborate Shaw and McKay's position by maintaining that cities in Nigeria have sundry crimes due to heterogeneity caused by urbanization than the rural areas. With this understanding that the pattern and trend of crimes could be understood by looking at the geographical environment, Bursik (1988) carefully built on empirical observation of how victims, offenders, and environments lead to the prediction of criminal events thereby, proffering solutions to these crimes.

In sum, the socially disorganized proposition has explanatory value for understanding crime disparity in the environment. This hinges on the researchers' investigation of understanding the spatial uneven distribution of crimes in Nigeria and how the Nigerian police will apply CM in curbing them. Moreso, the theory lays more emphasis on only street crimes/ blue collar crimes and not just all crimes. Therefore, the theory is adopted as the guide for the study.

The Replication of Crime Mapping in Nigeria
CM has enabled police departments in western societies to study intelligent information about the spatial distribution of crimes in their societies (Paynich, Cooke, & Mathews, 2007). This has gone a long way to the development of devices to enable officers to generate intelligent information. Such devices have helped make work easier for the police, such as ICAM used by the Chicago police department (Green, 2013; Paynich & Hill, 2010). The Nigerian police on the other hand only recently introduced the use of Close Circuit Television (CCTV) for the generation of the intelligent gathering of

information to the understanding of crimes (Ogunleye, Adewale, Alese & Ogunde, 2011). This is used even more because CM is not in use by the NPF.

However, contrary to the use of GIS technologies in the global north, similar technologies are used in Nigeria and some African countries that the researcher put forward for use by the Nigerian police. This is so because how such technologies have provided great results within the continent. No available research data on the use of CM in solving electoral violence or manipulation can be found in global North-Western societies today, as most African countries are engulfed with this menace in their society. CM can be said to be limited in these areas as it doesn't address such African issues in its development for use in crime prevention in western societies. However, some NGOs in Africa have developed mapping strategies that help in the study of election violence within the continent thereby proffering solutions to these crimes. One of such companies mapping election violence in Nigeria is Frontline SMS which gets people to send in reports of election violence occurring around every polling unit in the country (Livingstone, 2013; NDI, 2014). The software graphically displays where these messages are coming from, indicating where the violence is occurring. Frontline SMS is a Nigerian open-source GIS technology, which has been used in generating intelligence leading to a good analysis of crimes in societies by Non-Governmental Organizations (NGOs) in Nigeria (Livingstone, 2013). This GIS technology was put to test in understanding election rigging and manipulation during the 2007 Nigerian general elections. The use of this technology was very beneficial in dealing with election controversies, where Frontline SMS was able to advise security officers to go to certain areas with high rates of election violence. This helped the NPF in directing the right number of resources at the right moment.

Similarly, crowd sourcing is another electronic scheme that has helped many African countries in understanding and responding to election manipulation and violence (NDI, 2014). Crowd

sourcing works similarly to Frontline SMS. However, crowd sourcing has been used more in Africa and other countries suffering from election manipulation around the world (NDI, 2014). The crowd sourced data can then be compared with the critical analysis of government official data of certain crimes. For instance, Ushahidi is a GIS and mobile software founded in Kenya with the sole aim of understanding election violence in Kenya. This was tested in the Kenyan 2011 general elections (Livingstone, 2011) and has helped in detecting crime problems as well as providing solutions to reducing such crimes in such regions (NCI, 2014).

However, despite being beneficial to monitoring and reducing election violence, its use is very limited in other areas of crime. The data from this system cannot be said to be a true representation of societal ills. Its medium of generating data results can be questionable because results are sent in by a few individuals from the general public. These few members that send in details of crime events can be sent in with a bias towards an incident, which could give a wrong representation of events of data provided (NCI, 2014).

The Use of Crime Mapping in Carrying out Tactical Analysis in Nigeria
As previously discussed with regards to the adoption of CM by police departments in carrying out technical analysis, Boba (2013) argued that CM involves the study of recent crimes, which is achieved through the study of crime patterns and cross-examination of the activities of criminals. This, in turn, helps officers analyze crimes, thereby leading them to an understanding of the spatial distribution of crimes using maps. Boba (2013) further argued that this analysis is achievable through the study of recent modus operandi of crimes.

Hence, the NPF has not applied CM in carrying out technical analysis using GIS technology in the country. However, the use of geographic profiling, and whether it could be transferred to Nigeria, will be examined using Rossmo's (2000) analysis, particularly considering the increasing rate of serial crimes in Nigeria. Rossmo (2000)

argued that for GP analysis to work effectively when considering serial crimes, they must have been committed by the same offender five or more times. Rossmo (2000) further demonstrated that for GP to work properly, the offender must use the same methods in executing all crimes. However, Rossmo maintains that a particular offender would maintain the same methods in carrying out all similar crimes. Looking critically at the argument put forward by Rossmo (2009) for using GP for carrying out an analysis of serial crimes in Nigeria by the NPF, this might seem impossible to use. This is because of the level of analysis required by GP. It might appear more theoretical than practical in its application if it will be applied by the NPF, the reason being that GP analysis requires very heavy data in carrying out analysis. Moreover, crime data within police departments is not comprehensive (Eterno & Das, 2011) and would not allow GP software to provide results immediately if introduced. For example, if one is to consider the rape incidents in Bath, England, the consistency of reporting of all rape incidents in the Bath investigation, enabled the researchers in carrying out the final analysis and apprehend the culprit (Danielle, 2008). This is in contrast to African countries, especially Nigeria, where reporting serial crimes to the police is uncommon, especially rapes which generally has a low reporting to the police due to the culture and stigmatization attached to it (CLEEN, 2008; Hirschfield, 2011; Muram, Hellam & Cassinello, 1995) possible.

Conclusion
The use of GP within the Nigerian police, if introduced will encounter many challenges and will develop slowly, this is because, in practice, the GP software requires serious and intensive training to use. What's more, users of GP will need to be specialized in using different GP software, since different serial crimes will require different GP software as discussed by Rossmo. Thus, if a GIS or GP system for collecting data is not resolved within the NPF, it will be hard to stick to the rules introduced by Rossmo for using GP applications in any country, especially with Nigeria's lack of data (Rich and Shilvely, 2004). Sequentially, countries with good data, still do not

enjoy 100% apprehension of criminals using GP, as the software only points out possible directions where criminals might be residing or carrying out/their next crime move as in the case of the Bath Friday night serial rapist incidence indicates (Danielle, 2008). Given this, GP development in Nigeria will encounter slow progress but will develop over a long period to get it working in the NPF operational department.

Recommendations
Having seen that the use of crime mapping as an alternative technique by the Nigeria Police Force is hamstrung by the lack of technological sophistication, reluctance to progressive change, and the likes, the study, therefore, recommended that officers of the Nigeria Police Force should be trained on GIS and on adhering to their work ethics. Also, the government should set up GIS departments in police stations to provide spatial analysis resources for better and strategic planning.

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