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Design of A Technology Framework for Big Data to Improve Diseases Surveillance in Health Facilities in Nigeria

Godwin Ubong Akpan[1], Yazeed Al Moaiad[2]

Faculty of Computer & Information Technology,[1,2]
Al-Madinah International University,
Kuala Lumpur, Malaysia

[1]BP221@lms.mediu.edu.my

[2]yazeed.alsayed@mediu.edu.my

***Abstract*— The main objective of the study was to investigate the implementation of big data-driven health facilities in Nigeria. The study is targeted at the public and private health facilities enrolled in the WHO surveillance reporting network in Nigeria. The design collects data from the participating population and describes the societal phenomenon concerning technological advancements in healthcare. The first objective about the implementation of big data at health facilities in Nigeria was obtained with the help of conducting an extensive review of previous literature on big data. On the other hand, the second research objective of this study about designing a real-time technological interventions framework was obtained through surveying health workers of selected tertiaries in Nigeria. Lastly, the final research objective about the ways to improve geospatial reporting of disease from health facilities was addressed through both survey results and previous research. Based on this formula the total of 30 institutions were included in the study out of 36 tertiary health facilities. On the other hand, the researcher has used stratified sampling method to obtain relevant data. The use of SPSS software has been made to analyze the quantitative data. In this manner, the researcher has applied different statistical tests including regression analysis, correlation analysis. The p-value of the variable integration and interoperability has found as 0.000 which is lesser than the threshold of 0.05. This infers that there is a significant impact of integration and nteroperability on the adoption of big data analytics in the context of Nigerian Health care sector. Further, regarding the variable privacy and security, the sig value has been found as 0.000 which is nonetheless is also lower than the threshold of 0.05. This infers that the privacy and security also have a significant impact on the ICT adoption in terms of big data analytics in the concerned sector.**

***Keywords*— ICT adoption, Big Data, Nigeria Health Care**

I. INTRODUCTION

The advancement of modern technologies for the purpose of supporting healthcare objectives has been prevalent in the current era [1]. using modern and wireless technologies in gathering health data has been crucial in terms of ensuring accountability and efficiency in providing healthcare services all over the world [2]. however, the rapid advancements in the usage of data and its management influenced the adoption of innovative technologies into the health sector in order to encompass growing needs.

A. Research Problem

The African continent has experienced rapid technological improvement over the last few years where digital devices have flooded the market [3]. Various organizations and governments have formulated and implemented strategic decisions to escalate technological innovations in the continent

to match global advancements. Providing test results to patients is often challenging because they do not understand them [4]. Hence, communication tends to be placed in the hands of physicians, who act as communicators while patients are listeners most of the time. Most doctors are seen as authoritative figures in society, and with the popular belief, they treat and cure patients with any kind of health condition. As per the study of Deml et al. [5], over the past decades, doctors are usually criticized for not providing adequate consideration to patients' feelings or desires related to their illness or conditions.

B. Research Questions

1. What are the operational and economic implications of transitioning from third-party data servers to in-house data aggregation systems within Nigeria's health sector?
2. What standardized technical infrastructures and policy frameworks are necessary to implement an integrated national health information system across all Nigerian states?
3. How adoptable and scalable is the current ICT infrastructure in the Nigerian health sector across diverse regional contexts?
4. What are the accountability and data quality concerns associated with third-party data servers, and how do they compare to in-house data management solutions in supporting effective health surveillance?

C. Research Objectives

The main objective of the study was to investigate the implementation of big data-driven health facilities in Nigeria. Specifically, the main objectives are to collate data, maintain the privacy and security of big data from health facilities, and ensure the confidentiality of individual's health information. Another objective of the research study is to fasten the adoption of real-time technological interventions for ensuring quality data collection and analysis for the benefit of making effective health-related decisions. Informed decision-making processes in real-time help the populace to get quality health services due to integrated service-delivery processes. A final objective is to improve the geospatial reporting of diseases from communities and health facilities network, which will facilitate the reduction of cost of implementing interventions like vaccinations [6].

II. Literature Review

This section of the research is based on reviewing the literature where the data is extracted from secondary resources such as books, journals, articles, case studies, and online websites. This chapter mainly emphasizes the big data approach along with determining big data-driven health facilitation in Nigeria. It further highlights real-time technological interventions along with exploring the significance and effectiveness of the use of technology in data collection. Furthermore, the focus of the research is to determine the challenges faced during the implementation of big data technologies in health systems. In addition, a theoretical framework is integrated into this chapter in order to provide support and evidence to the literature.

A. Big Data Approach

Big data refers to the widespread stagger of data having distinct and complex structures that are unable to be managed through traditional methods of data handling and techniques. In today's world, the use of big data is more preferably used in firms that play a significant part in different fields [7]. Big data is usually based on larger yet more complicated sets of data, particularly from new data sources. However, these data sets are so voluminous that they are unmanageable by traditional data processing software. Such massive and large data volumes could be used for addressing business problems that were not able to be handled before. In this regard, there are 3Vs of big data which involve

volume, velocity, and variety [8]. However, with the passing time, 2Vs have also evolved that involve value and veracity. At present, big data has become capital. As per Al-Shiakhli [9], current technological breakthroughs have been minimized exponentially because the cost of data storage and compute led towards making it feasible and less expensive to store more data than before. Because of the larger volume of big data, it has become cheaper and more accessible through which it is easy to acquire more accurate and precise business decisions [10]. Organizations utilize big data in their systems because it helps in enhancing and improving operations that offer better and efficient customer service with the help of developing personalized marketing campaigns along with undertaking different actions that possess towards increasing revenue and profits. Thus, businesses that utilize big data efficiently uphold a potential competitive advantage that is capable of making rapid and more informed business decisions [11]. Big data helps firms to provide them with valuable insights into customers that could be used by the firms to refine their marketing, advertising, and promotion.

B. Big Data Driven Health Facilitation in Nigeria

The implementation of big data in the field of healthcare can help drive innovation and minimize the time it takes to bring a new product in terms of prescription meds to the market. However, with the help of big data healthcare analytics, it could help in comparing chronic diseases along with population growth in neighbourhoods to identify problem areas and work more towards planning additional services [12]. Although it is recognized that the rate at which health data analytic practices have enhanced to what it is in Nigeria today is impressive. However, data analysis solutions, for instance, artificial intelligence (AI), databases, statistics, and visualization, among other unlimited applications, could be seen today in varied health and medical specializations. Thus, the following technologies shed light on the importance of health data across various health magnitudes by launching new ways to deal with data analytics where it could be recognized that there is room for growth [13]. In this regard, there are numerous benefits of big data as well as big data analytics in healthcare, which involve minimizing medical errors, preventing mass diseases, preventative care, more accurate treatment, real-time alerting, and providing personalization care to patients. In addition, it aids in identifying and assisting high-risk patients along with forecasting the risks of treatment. Besides, it helps in improving staff management and enhanced customer service.

C. Real-time Technological Interventions

Technological Interventions in the healthcare sector have been proved to be more beneficial and advantageous because it provides a better platform for efficient and effective delivery of quality healthcare services to patients. In this regard, it has been seen that most technological interventions have been able to target a wide range of health conditions and problems. However, there are few technological interventions that have been successful in providing real-time data for decision-making [8]. In this context, real-time data is defined as the data that is available at the time it is needed to make a decision. The advantage of real-time data is that it can be used to make decisions quickly and efficiently. In addition, real-time data can also be used to monitor the progress of a project or process. While real-time technological interventions have been able to provide a lot of advantages and benefits, there are still some challenges that need to be addressed. One of the challenges is that real-time data is often difficult to obtain. This is because real-time data is often scattered across different sources. Another challenge is that real-time data is often inaccurate [12]. This is because real-time data is often based on estimates. Finally, real-time data is often volatile. This is because real-time data can change quickly and unexpectedly. Despite the challenges, real-time data is still a valuable asset for decision-making. In order to make use of real-time

data, a technology framework is needed. The technology framework should be able to collect, process, and analyze real-time data. In addition, the technology framework should be able to provide the necessary tools and infrastructure for decision-making [11]. The technology framework should be designed in such a way that it can be used by different stakeholders in the healthcare sector.

D. Use of Technology in Data Collection

Technology has been a major support in this quick and rapid world. With the passing time, the world has become increasingly digital, where technology has pervaded our daily lives [14]. Technology has made it easier to collect larger data where technology plays a key role in several areas such as risk monitoring, data collection, and other prevention of conflicts. However, technologies such as mobile phones, tablets, computers, and laptops through which mobile data could be easily obtained for data collection. In addition, crowdsourcing and crowd-seeding, which are known as real-time data gathering methods, involve various different technologies. Information could be directly attained from the users of technology who volunteer their own data (crowdsourcing) or from trained informants in the respective field (crowd-seeding) [15]. On the other hand, data could further be extracted from social media monitoring where information is extracted from social media networks, for instance, Twitter, Facebook, Google Plus, and others. In this regard, information regarding chronic diseases is used via virtual websites such as Health Tracking Network and Patients Like Me [16]. Likewise, other technologies such as geospatial technology are referred to as worldwide positioning systems (GPS), geographical information systems (GIS), and remote sensing (RS), where these tools are used for geo-located mapping of different incidents [17]. It is estimated through the study that around 80% of the information is carried out in electronic health records (EHR), for instance, physician's notes or scanned documents, which is raw or unstructured data [18]. With the help of enhancing and making improvements in data mining tools, the information in EHR has increased its accessibility.

E. Challenges facing the implementation of Big Data technologies in health systems

Although there are several benefits of using Big Data technologies in health systems, there are several challenges that have been identified which may impede its successful implementation. These challenges can be broadly classified into technological, organizational, and societal challenges. Technological challenges include the high cost of hardware and software, data storage challenges, data security and privacy challenges, and data quality issues [19]. Organizational challenges include the lack of skilled personnel, resistance to change, and organizational silos. Societal challenges include the need for awareness-raising and capacity building and ethical and legal issues. In addition, there are several generic challenges that need to be addressed in order to make use of Big Data technologies in health systems. One challenge is that the data is often inaccurate. This is because the data is often based on estimates. Another challenge is that the data is often volatile. This is because the data can change quickly and unexpectedly [20]. Moreover, the data is often unstructured. This makes it difficult to process and analyze the data. While data is often distributed across different sources. This makes it difficult to aggregate and analyze the data. Finally, the data is often difficult to obtain. This is because the data is often scattered across different sources. In addition to that, there are some structural challenges in the health sector that need to be addressed in order to make use of Big Data technologies. One challenge is that the health sector is often fragmented. This is because the health sector is often divided into different parts. Another challenge is that the health sector is often siloed. This is because the health sector is often divided into different silos. Finally, the health sector is often complex [21]. This makes it difficult to process and analyze the data. Despite the challenges, Big Data

technologies are still a valuable asset for health systems. Big Data technologies can help health systems to improve diseases surveillance. In addition, Big Data technologies can help health systems to make better decisions.

F. Theoretical Framework

The theoretical framework is based on the assumption that Big Data can be used to improve diseases surveillance in health facilities in Nigeria. There are several theories that can be used to explain how Big Data can be used to improve diseases surveillance. One theory is the concept of network theory. Network theory states that nodes in a network are connected to each other. This means that information can flow from one node to another [22]. This theory can be used to explain how information can flow from health facilities to the Nigeria Centre for Disease Control. Another theory is the concept of social network analysis. Social network analysis states that individuals in a social network are connected to each other. This means that information can flow from one individual to another. This theory can be used to explain how information can flow from health facilities to the Nigeria Centre for Disease Control. Moreover, the theoretical framework is based on the assumption that Big Data can be used to improve diseases surveillance in health facilities in Nigeria. This means that the use of Big Data can help to improve the efficiency of diseases surveillance in health facilities in Nigeria.

G. Summary

The literature on the use of Big Data technologies in health systems. The literature review showed that there are several benefits of using Big Data technologies in health systems. However, there are also several challenges that have been identified which may impede its use in health systems. In addition, the literature review also identified some structural challenges in the health sector which need to be addressed. Despite the challenges, Big Data technologies are still a valuable asset for health systems.

III. Research Methodology

In the preceding section, an extensive review of the previous literature has been conducted. The following section is dedicated to presenting the key research methods and procedures that have been followed in this study. Also, the following section aims to provide the proper justification for using selected research methods in the study.

A. Research Philosophy

As per the commonly accepted view, research philosophy refers to the beliefs and phenomena under which the investigation about a particular study is conducted. According to Ryan [23], researcher philosophy involves the set of ideas that depicts the research intent towards determining the outcomes of the research. Positivism and interpretivism are regarded as the two main types of research philosophies that are normally used by researchers. Positivism view of research considers scientific means as the most valid and effective way to determine the research findings. On the other hand, the interpretivism view deals with investigating the research from human perspectives, opinions, and concepts [24]. Based on the nature of the study, the following study is based on positivism research philosophy. Since the nature of this study demands scientific investigation with the incorporation of statistical measures and factual data to answer the key research questions, therefore the use of positivism research philosophy was identified as the most approach for this study.

B. Research Design

Research design is regarded as another important component of the study that helps to express the framework adopted by the researcher to address the research questions [25]. The two types of research designs that are commonly used in studies are quantitative and qualitative. Quantitative research deals with factual or statistical data to answer the key research questions, whereas qualitative research

deals with obtaining data through conversational communication and open-ended questions. In this study, the use of quantitative research design to accomplish the key objectives of the research. The key rationale of using a quantitative research design was associated with the nature of this study, as it required statistical information to examine the association between big data and disease surveillance in health facilities. Therefore, quantitative research design was identified as the most suitable method for this study.

C. Research Approach

The research approach explains the detailed method from a broader perspective as it illustrates the procedure and plans followed in a study [26]. Inductive and deductive are the two common types of research approaches. The common difference between the two approaches is that deductive research deals with testing existing theories, whereas the inductive approach deals with generating new theories from the findings. In this study, the researcher has made use of the deductive research approach as it helps in gaining a better understanding of the association between the variables. Moreover, since the key purpose of this research was to test the existing theory or assumptions concerning the role of big data in diseases surveillance in healthcare facilities, therefore the use of deductive research approach has been made in the study.

D. Data Collection Method

In a research study, data can be collected through primary and secondary sources. The following study is based on the primary data collection method because the key rationale of this study was to make a valuable contribution to the existing literature. The method of data collection also depends on the type of data that needs to be collected as there are different methods used for both quantitative and qualitative data. Since this study was based on quantitative research design, therefore the use of survey and questionnaire has been made by the researcher. In terms of the scale, the 5-point Likert scale was used which included the options from strongly disagree to strongly agree. The study is targeted at the public and private health facilities enrolled in the WHO surveillance reporting network in Nigeria. The design collects data from the participating population and describes the societal phenomenon concerning technological advancements in healthcare. The first objective about the implementation of big data at health facilities in Nigeria was obtained with the help of conducting an extensive review of previous literature on big data. On the other hand, the second research objective of this study about designing a real-time technological interventions framework was obtained through surveying health workers of selected tertiaries in Nigeria. Lastly, the final research objective about the ways to improve geospatial reporting of disease from health facilities was addressed through both survey results and previous research.

E. Sample Design

In Nigeria, there are a total of 36 states, and in order to properly sample the high-priority tertiary facilities, the researcher has used a sample of 30 health facilities in 30 different states to ensure that research findings can be generalized to the wider regions of the country. The sample in this study was determined through Yamane's formulation, the formula of which is given below:

$$n = N / (1 + N(e)^2)$$

Where: N is the total number of households e is the margin of error (assumed to be 10% for this study)

Hence, based on this formula, a total of 30 institutions were included in the study out of 36 tertiary health facilities. On the other hand, the researcher has used a stratified sampling method to obtain relevant data.

F. Data Analysis Technique

In this study, the use of SPSS software has been made to analyze the quantitative data. In this

manner, the researcher has applied different statistical tests including regression analysis, correlation analysis. The use of these statistical tests has enabled the researcher to examine the association between independent and dependent variables, which also helped in answering the key research questions of this study.

IV. Results

The following is the results section which primarily aims to shed light on the results that have been generated against the obtained results. As discussed in the prior section, statistical analysis was required to perform in order to lead toward the construction of findings. The following is thus the demonstration of the two essential statistical techniques that are primarily used for determining the statistical relationship between the variables. The following results section is the application of two of the statistical techniques such as correlation and regression analysis.

A. Correlation Analysis

As discussed, correlation analysis is considered to be one of the fundamental techniques for determining the association between the variables. Here it becomes essential to mention that different statistical measures are referred to while determining the correlation between the quantifiable variables; however, one of the most widely referred to statistical measures is considered to be the Pearson Correlation Coefficient. In light of the findings of Benesty [27], a Pearson Correlation Coefficient can be defined as a measure for the strength and direction of the statistical variables. It mainly shows the linear association of the two statistical variables. Furthermore, while referring to the findings of Ahlgren, Jarneving, and Rousseau [28], the value for the Pearson Correlation Coefficient ranges between 0-1. More specifically, when the value falls in the range 0.1 to 0.3, it is suggested that a weak association exists between the variables. Moreover, when this value falls in the range 0.3 to 0.7, it is said that a moderate association exists between the variables; however, when the value falls in the range 0.7 to 1, it is said that a strong association exists between the variables. Further, the significant (p-value) whose threshold is considered to be 0.05 helps in suggesting whether the association is significant enough to claim a correlation between the variables.

TABLE 1
CORRELATION ANALYSIS

Item	integration and interoperability	Privacy and Security	adoption
integration and interoperability	Pearson Correlation	1	.763**
	Sig. (2-tailed)		0.000
	N	36	36
Privacy and Security	Pearson Correlation	.763**	1
	Sig. (2-tailed)	0.000	
	N	36	36
adoption	Pearson Correlation	.783**	0.195
	Sig. (2-tailed)	0.000	0.256
	N	36	36

**. Correlation is significant at the 0.01 level (2-tailed).*

The aforementioned table (Table 1) is the correlation analysis that shows the association between the three statistical variables involved in the present research. With the Pearson Correlation of .783, it can be inferred that there is a strong association between integration & interoperability and adoption of Big Data analytics. Further, this association was also found to be significant because of the sig value of 0.000 < 0.05. Further, the variable that is privacy and security was found to have a weak and insignificant association on the basis of the obtained correlation and sig value of 0.195 and 0.256 respectively.

B. Regression Analysis

Further, the present section is related to the regression analysis which is deemed as one of the essential statistical techniques for determining the relationship in terms of the impact of an independent variable on the dependent variable. In

light of the findings of Faraway [29], a regression analysis comprises three main sections that are identified as model summary, ANOVA, and table of coefficient.

TABLE 2
MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000a	1.000	1.000	0.000

a. Predictors: (Constant), Privacy and Security, integration and interoperability

The aforementioned table (Table 2) is the model summary which indicates the key statistical values for the developed regression model. Specifically, while referring to the R-value, it can be suggested that it defines the fitness of the developed regression model. Based on the aforementioned R-value, it can be stated that the developed model is barely fit for the purpose of analysis. Also, in light of the findings of Ranjith [30], the R-square value can be defined to be the extent an independent variable predicts the dependent variable. Further, based on the aforementioned value of R-square, it can be said that predictors predict the independent variables but at a considerably lower extent than usual.

TABLE 3
ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	90.222	2	45.111	7822041458064530.000	.000b
Residual	0.000	33	0.000		
Total	90.222	35			

a. Dependent Variable: adoption b. Predictors: (Constant), Privacy and Security, integration and interoperability

Further, the second aspect of the regression analysis is identified as ANOVA, which is mainly the analysis of variation. It primarily focuses on describing the variation that can be observed within the regression. Preferably, an error of 5% is accepted while claiming the model is fit, and this accounts for 0.05. In this case, the obtained sig-value of 0.05 infers that the regression model is adequately fit because of the obtained sig value of $0.000 < 0.05$.

TABLE 4
TABLE OF COEFFICIENT

Model	Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1 (Constant)	7.105E-15	0.000		0.000	1.000
integration and interoperability	2.000	0.000	1.517	122687254.309	0.000
Privacy and Security	-1.000	0.000	-0.962	77843065.723	0.000

a. Dependent Variable: adoption

Furthermore, the aforementioned table (Table 4) illustrates the impact of independent variables on the dependent variables. The same significant (p-value) of 0.05 is considered while determining whether there is a significant or insignificant impact of the independent variable on the dependent variable. The p-value of the variable integration and interoperability has found as 0.000 which is lesser than the threshold of 0.05. This infers that there is a significant impact of integration and interoperability on the adoption of big data analytics in the context of the Nigerian Health care sector. Further, regarding the variable privacy and security, the sig value has been found as 0.000 which is nonetheless is also lower than the threshold of 0.05. This infers that the privacy and security also have a significant impact on the ICT adoption in terms of big data analytics in the concerned sector.

V. Discussion

The purpose of conducting the present research was to discuss the significance of designing a technological framework for big data to improve diseases surveillance in health facilities in Nigeria. One of the fundamental questions the study sought to answer was to examine the impact of staggered phase processes in transitioning from third-party servers to in-house data aggregation. With no exception, it is justified to say that irrespective of the healthcare sector, the issues pertaining to data management, especially during times of frequently observed data breach incidents, it has become essential to prefer such processes and frameworks where transferring or transitioning of data is done in a safe and secure channel [19]. Also, in the present research, it was found that aspects such as integration & interoperability, Privacy & Security have a significant impact on ICT adoption such as big data analytics. Therefore, from this perspective, it is justified to say that any such process which is meant to be secured and safe for data transference and transition from one end to another, for instance, the process like staggered phase, can be beneficial in the course of transferring data from third party to the in-house data aggregation servers. Further, regarding the technical infrastructure which is considered acceptable for the integrated health information system is also being frequently discussed in the context of the Nigerian healthcare sector because of being less focused on developing an integrated health information system [13]. Also, the present study discusses that the standard technical infrastructure lacks considerably in the Nigerian state because of its low focus towards advanced technological trends and practices which thereby raises concerns such as security and privacy at the same time as well. The study thus further suggests that the current ICT integration in the health sectors is not adoptable in all the Nigerian states which thus requires uniformity and development of an integral system to ease and improve diseases surveillance in health facilities in Nigeria. Based on the findings of the present research, there are considerable accountability issues that are associated with third-party services and thus require varied processes such as staggered process to combat this. However, in the context of ICT adoption such as big data adoption, the issues pertaining to integration & interoperability, Privacy & Security have been found to have a significant impact on the adoption of ICT like Big data adoption [21]. However, it can be noticed that in-house data management can considerably improve the effectiveness of surveillance and quality of information received within the healthcare sector of Nigeria. However, in terms of cost-effectiveness, it can be said that the transition from third-party technological infrastructure to in-house information health systems that can be centralized for all the Nigerian states requires significant investment in terms of the development of infrastructure within and outside the hospital settings [20]. Though this investment would be high in the initial phase, while considering the long-term benefits, especially in terms of security and integration, this approach would be highly beneficial in terms of improving diseases surveillance in health facilities in Nigeria.

VI. Conclusion And Recommendations

The study set out to understand the association between big data and diseases surveillance in healthcare facilities in Nigeria with a view to design a technology framework that will improve such surveillance. The study was guided by three objectives which were; to determine the level of implementation of big data in diseases surveillance in healthcare facilities in Nigeria, to design a real-time technological interventions framework for big data in diseases surveillance, and to suggest ways of improving geospatial reporting of disease from healthcare facilities. This chapter of the dissertation is aimed to conclude all the findings of the research study and present recommendations.

A. Conclusions

The study concludes that big data has the potential to improve diseases surveillance in healthcare facilities in Nigeria. However, such potential can

only be actualized if there is a well-designed technology framework in place. While the level of implementation of big data in these facilities is still low. The study also concludes that there is a need to design a real-time technological interventions framework for big data in diseases surveillance. While it has also been found that the way of improving geospatial reporting of disease from healthcare facilities is by developing a portal where all these facilities can log into and update their data. Moreover, suggestions for improving geospatial reporting of disease from healthcare facilities have also been put forward.

B. Recommendations

The study recommends that the government of Nigeria should invest in big data and develop a technology framework that will enable healthcare facilities to improve their diseases surveillance. Furthermore, the government should also support the development of a portal where all healthcare facilities can log into and update their data [31]. In addition, the government should provide training to healthcare workers on how to use big data for diseases surveillance. In addition, the study recommends that healthcare facilities should invest in big data and use it to improve their diseases surveillance. Furthermore, healthcare facilities should also update their data regularly and use the portal developed by the government to improve their geospatial reporting of disease [32]. It is also recommended that future studies should be conducted to examine the association between big data and diseases surveillance in other healthcare facilities such as primary healthcare centers and district hospitals. Moreover:

The study recommends that healthcare workers should be trained on how to use big data for diseases surveillance. Furthermore, they should use the portal developed by the government to improve their geospatial reporting of disease. Moreover, they should also update their data regularly.

Moreover, it is also recommended that the government should provide more resources to health facilities so that they can improve their data collection and analysis processes.

The government should also make sure that the data collected by health facilities are of high quality so that they can be used effectively for diseases surveillance [21].

The study also recommends that the government should develop a national big data platform for diseases surveillance. This platform should be able to collect, store, and analyze data from all health facilities in Nigeria. Furthermore, the government should make sure that this platform is accessible to all stakeholders, including healthcare workers, policymakers, and the general public.

The study also recommends that the government should develop a national policy on big data for diseases surveillance [33]. This policy should include guidelines on how to collect, store, and use data for diseases surveillance. Furthermore, the policy should also include measures to protect the privacy of patients and health workers.

The study also recommends that the government should invest in research on big data for diseases surveillance. This research should focus on developing methods to improve the quality of data collected, as well as on developing new ways to use big data for diseases surveillance.

C. Suggestions for Further Research

The Design of a Technology Framework for Big Data to Improve Diseases Surveillance in Health Facilities in Nigeria project is still in its early stages. As such, there are a number of ways in which the project could be improved or expanded.

1. First, the project could be expanded to include other types of healthcare facilities, such as primary healthcare centers and district hospitals. This would provide a more comprehensive picture of how big data is being used for diseases surveillance in Nigeria.

2. Second, the project could be expanded to include other applications of big data in healthcare, such as for patient care or health system management [34]. This would provide a more complete picture of how big data is being used in the Nigerian healthcare system.
3. Third, the project could be expanded to include other countries in Africa. This would allow for comparisons to be made between different countries in terms of how they are using big data for diseases surveillance.
4. Finally, the project could be expanded to include a cost-benefit analysis of the use of big data for diseases surveillance [35]. This would provide valuable information on whether the use of big data is cost-effective in terms of improving diseases surveillance in Nigeria.

VII. Limitation Of Study

The study has a number of limitations. First, the study was only conducted in healthcare facilities in Nigeria. Thus, the findings of the study may not be generalizable to other contexts. Second, the study relied on self-reported data from healthcare workers. This may have led to some bias in the findings. Third, the study did not include primary healthcare facilities or district hospitals. Thus, the findings may not be applicable to these types of healthcare facilities. Finally, the study only looked at the use of big data for diseases surveillance. Other applications of big data in healthcare, such as for patient care or health system management, were not included in the study. The aim of this study was to design a technology framework for big data to improve diseases surveillance in health facilities in Nigeria. The study found that big data has the potential to improve diseases surveillance in Nigeria. However, there are a number of challenges that need to be addressed in order for this to happen. These challenges include the lack of skilled personnel, infrastructure, and data. The study recommends that the Nigerian government invest in training personnel, developing infrastructure, and collecting data in order to improve diseases surveillance in Nigeria.

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