**CHAPTER TWO**

**LITERATURE REVIEW**

* 1. **Introduction**

The part of the Nigeria economy that is literally controlled by the government is termed Public Sector, they are primarily assigned to provide basic government service to the citizen. Due to the large number of people within the country, the governmental service that is required by the government are so enormous. In respect to the saying of an economist ‘*the want of humans is unlimited, but the means to satisfy those want are limited*’. Hence its essential to invent an efficient management tool to maximize the utilization of limited resources. However, the Nigeria government use budget as a machinery to maximize limited resources usage. The process of identifying public want or need and specifying the quality of goods and services include budget making and implementation, this process enable satisfaction of needs via political process, analysis of economics and development plan objectives (Obara, 2013). Furthermore, the government budget is prepared in form of public policy, this stands as path in which the intended budget can be accomplished. Budget accomplishment is far from reality and the gap or difference between budget and budget accomplishment is large and this continuously increase over the years. The key element of any financial system is privacy and trust, to trust in term of record or auditing of financial transaction, bodies managing the financial funds and other related personal (Dogo et al., 2018). However, based on digital storage of financial information, which is centralized on the internet bring another issue of data vulnerability to cyber-attacks. In consequence, researcher attention is diverted to blockchain technology for disturbing ledger as an option.

* 1. **Budget**

the term budgeting originated from the central government of Great Britain as its understood now. Gradually it was later adopted or developed as a governmental tool to gain control over the finance of the crown. In Magna Charta in the year 1217, it was declared that ‘No cottage or aid shall be imposed in the kingdom unless by the common council of the realm’. The blockchain technology is the first developed peer-to-peer ledger system for saving historical transactions records of bitcoin currency (Bhaskar, 2020). The public ledger of a blockchain transaction contain records that are easily verifiable, and once information is recorded it cannot be modify, or deleted in the future. A budget is a framework use in outlaying expenditure and revenue over a giving period of time usually a year, it can also be view as a political instrument and programs targeted in realizing the government objectives for economic development (Obara, 2013). The term capital budget indicates the section of the entire national budget that specify the finance capital project allocation and infrastructure that are critical, such as the construction or development of.

1. Bridges and good roads
2. School and education centers
3. hospital, medical lab, and health centers
4. prisons
5. highways
6. Educational facilities
7. Supply of clean waters
8. Dams and irrigation system
9. Machineries and equipment
10. Electricity and transportation

Unlike the recurrent budget, the capital budget is primary aimed to generate funds for capital expenditure financing, such as the constructing durable assets. Recurrent government expenditure is finance and funded based on the recurrent budget (Ogujiuba & Ehigiamusoe, 2014).

* 1. **Budget in Nigeria**

The government budget in Nigeria is simply a financial statement of expenditure and expected revenue been proposed by the government for a given range of time, mostly a yearly. Budget in Nigeria is one of the most essential political economic tools used by the government to improve the economy. However, the government adopt the process of budget to appropriately allocate or assign resources, microeconomy stability and managerial efficiency. Within a fiscal year, the government has to realize the vision and goals lay down by them using the basic instrument of resource mobilization and allocation. Hence, the government uses the budget to facilitate the visions and goals. The allocation of resources used in financing recurrent and capital expenditure is determined by the public budget (Ogujiuba & Ehigiamusoe, 2014). The Nigeria federal government has an obligation every fiscal year to developed a budget. The budget simple contains statement of financial income and expenditure which showcase the government expenditures based on priorities for that year. However, it’s essential for a budget to be well functioned in other to formulate an efficient fiscal policy and improve the economic growth. The procedure of Nigeria budget passes through four stage this includes budget formation, in which the budget plan is establish by the government executive arm. Enactment involve debating on the budget plans. Altered stage include approval by the legislative arm and finally execution, during which the main budget expenditures are been effectively assessed and accounted for.

* + 1. **Budget Process**

The process of public budget is a network of interconnected activities that enables the allocation and deliver of budget plan within a country. Budget system in Nigeria start with the legislative and executive arms of the government to prepare and approve the 3-year Medium Term Expenditure Framework (MTEF) or Fiscal Strategy Paper (FSP) (Ogujiuba & Ehigiamusoe, 2014). However, the primary stages of the Nigeria annual budget process include;

1. Fiscal policy framework.
2. Budget Preparation.
3. Budget Approval.
4. Budget Implementation.
5. Budget appraisal.
   * + 1. **The MTEF/FSP**

The medium-term expenditure framework (MTEF) and Fiscal Strategy Paper (FSP), are both the fiscal policy framework in Nigeria which is envisaged by the Fiscal Policy Act (FRA) 2007. The policy ensures efficient management of Nigeria resource, stability of microeconomic, and enhance long-term growth path sustainability for the economy. Fiscal Responsibility Act requires the Federal Government to design a Fiscal Strategic Paper (FSP) within a Medium-Term Expenditure Framework within the range of three years, this serve as the basic for preparing estimated revenue, and Nigeria expenditure (which include the fiscal obligation of the government and the medium-term obligations). Basic for sectoral and compositional distribution of estimated public expenditure are also provide by the MTEF and FSP. In addition, the MTEF and FST also outline the macroeconomic framework which denote the fiscal target, revenue and expenditure been estimated. Annual budget are prepared based on the assumption and projection that is underlined in the MTEF and FSP document (Ogujiuba & Ehigiamusoe, 2014).

* + - 1. **Budget Preparation**

Budget preparation begins when after the MTEF and FSP document is approved by the government legislature. The preparation of budget process commence base on previous year’s budget performance. However, it’s essential to account for economic, political and social constraints by collecting or gathering data for review. Proposal expenditures and the expected revenue is presented by the Ministries, Department and Agencies (MDAs) of the government at the budget preparation stage (Ogujiuba & Ehigiamusoe, 2014).

* + - 1. **Budget Approval**

Budget approval commence immediately after the budget preparation stage, the budget been drafted also known as the appropriate bill will now be formally presented to the legislature by the president for approval based on Nigeria Law. Furthermore, the Appropriation Bill will be scrutinized through the fist and the second hearing by the National assembly. Short title of the bill is read at the first hearing, while the second reading or hearing entails debating on the general principle of the bill by the legislator in both house of the National Assembly. In addition, further legislative work is carry out by another appropriate committee. It’s essential to pass the bill through both houses (the senate and the house of representatives) in the National Assembly before presidential assent (Ogujiuba & Ehigiamusoe, 2014).

* + - 1. **Budget Implementation**

The effective and efficient implementation of a country’s budget is determined by is performance in meeting the needs and requirement of the citizen of that country. Budget that is well implemented helps in translating the policies and programs of the government into result that has positive, good and direct impact on people. The impact includes development of critical infrastructures such as good roads, stable electricity supply, water, schools and hospitals. In addition, good budget reduces the rate of poverty, employment opportunity, transportation, health and education facilities. Immediately after budget approval the federal ministry of finance will instruct the federal Accountant General of the federation to release he national fund in other to meet the budgeted service that has been approved (Ogujiuba & Ehigiamusoe, 2014).

* + - 1. **Budget Appraisal**

the budget appraisal stage adopts a mechanism to control and ensure that the funds release are effectively and efficiently used for the intendent purpose. This stage also includes monitoring of budget to ensure funds been release are utilized economically, efficiently and approved amount are not exceeded by the expenditure and financial commitments. In addition, this stage ensures that project which the government have not yet approved are not prosecuted or pursued. Executed program are examined during the budget appraisal to enforce maximum compliance with policy targets and objectives (Ogujiuba & Ehigiamusoe, 2014).

* 1. **Blockchain**

Blockchain technology can be best described as a ledger that is distributed digitally used in keeping records and information shared amount consensus within a peer-to-peer network. Copies that are identical are collectively validated and maintain by the members of the network, which accept valid transaction and aggregate it into a block. The block is chained in a chronological order, thus previous validated block is digitally signed using cryptography and chain to the next block (Antipova, 2018). The blockchain technology is also simply a distributed public ledger or database of records containing all transaction or digital activities that have been processed and executed and distributed among participating parties. Individual transaction stored in the public ledger are been authenticated and shared by the participating parties. Consensus of the majority participating in the system authenticate the public ledger holding each transaction. However, the information that is recorded or entered can’t be modify or erased. The blockchain system is designed to hold unmodified, trackable information of every single transaction recorded (Bitcoin, 2015). The bitcoin is the most popular implementation of blockchain technology. With blockchain transaction can be carry out anonymously without the control of a central body or government. In consequences, the bitcoin market has to deal with a lot of national government and financial institutions regulations. Bitcoin is describe in the book of Melanie Swan as a template or blueprint for a new economy (*Devine & Peter*, 2015)

Furthermore, the blockchain technology as the popularly adopted in both financial and non-financial application. Since the development of the internet, blockchain is the most important innovation or invention by man. Currently the digital economy depends on trusting certain authorities before digital transactional activities can be carryout, this includes; online transaction, email delivery, digital certification, social media posting and lot more. The masses depend on this central authorities or group or bodies for ascertaining the truth. In addition, relying on third party for are day to day transaction in the digital word for providing data security, and privacy of digital assets can result to the source of this third party been hack, compromised or manipulated (Bitcoin, 2015). The existential of digital currency such as bitcoin using blockchain as the underlying technology comes to existence through a process call mining, the operation or process of mining coins or any form of digital traction using blockchain adopt an online peer-to-peer process. Miners has to download the mining software on their computer for perfuming mining operation (which usually require high computational power) (*Devine & Peter*, 2015).

* 1. **Related work**

In Indian higher educational institution, an estimation of 26.3 million of students enrolled and about 9 million students graduated annually in the year 2018-2019. This statistical information was research by (Lamkoti et al., 2021) in the paper work titled ‘*certificate verification using block chain and generation of transcripts’* . the institutional student includes undergraduate, and postgraduate student. However, the generation of certificate (final result, diplomas or even transcripts) for all student, tracking of this certificate and manually authentication of this certificate is a very tedious task. The researcher specifies that in the absent of effective anti-forgery system result to forgery of certificate, diplomas or transcripts by students. A save and secure data management system is required to be digitalize based on Confidentiality, Reliability and Availability. Hence, all this functionality can be achieved using Blockchain technology. The flow of the proposed system will contain a Certificated Issuer that will automatically generate certificate and the certificate generate will be authenticated or validate within the organization by the panel, before its sent to a student. The issued certificate will have a hash key unique to the certificate and this key can be used to authenticate the certificate by any organization via a portal. This system ensure student facing minimal risk of losing a certificate, of demanding new certificate, and certificate validation.

However, the research work of (Chaieb et al., 2018) titled ‘*Verify you vote: a verifiable blockchain based online voting protocol’*. In this research, it’s know that blockchain can be modify to develop an entirely new system which enable the users of this system to store and access data in a secure and transparent manner. A fully functioning online electronic voting system based on blockchain protocol is designed in this research work. The proposed Electronic voting system developed in this research work is called the Verity-Your-Vote (VYV). This system includes a primitive’s cryptography that is based on Elliptic Curve Cryptography (ECC), pairings and the Identity Based Encryption (IBE). Hence, this ensure the following security and privacy properties in term of eligible voters can only vote, authentication of voters, privacy of voters, receipt-freeness, individual and collective verification. And finally, the prove of security adopted in this research work is ProVerif tool.

Based on the research work (Ahmed et al., 2020), titled ‘*the feature of electronic voting system using block chain technology’* . The research stated that the blockchain technology is the cutting-edge technology which as gain tremendous popularity in the field of cryptocurrency and financial sector. Blockchain technology is use to manage, maintain, verity the reliability of the transactional contract. The primary objective of this sturdy is the integration of blockchain technology in electronic voting (e-voting) system. the researcher identify that the traditional electronic voting system as numerous limitation attached to it. However, in this paper the researchers have proposed a blockchain based distributed system for building a secure, fairness, transparent and flexible electronic voting (e-voting) system. In addition, the researcher presentation of secure novel distributed block-chain based application, which allow privacy, transparency, reliability, security and reduction of expenditure for hosting countrywide election.

(Bhaskar, 2020) aim to provide a comprehensive review on blockchain technology in the field of education in other to get detail insight and benefits, barriers, blockchain present application area and the future application or implementation of blockchain in education and other fields. The researcher adopted a bibliometric analysis that is been carryout on published journals, and paperwork. An examination is carryout on this data using bibliometric measures, and data was retrieved using the SCOPUS database that is on top the blockchain technology. The adopted approach defines uses a research question that is guided by the systematic literature review. The result of this findings provides a benchmark for the education institute, for various application of blockchain technology in the educational system.

The paper ‘*application of blockchain technology in Higher education’* is critically analyzed by the (Fedorova et al., 2020). Its introduced that the emergence and development of the blockchain technology has drastically transformed into a disruptive innovation. However, in recent time the blockchain technology as prove to be efficient in solving the challenges faced in higher education and the society as a whole. Critically analysis is carryout on the application of blockchain by considering the applicability restriction and opportunity in educational sector. The blockchain impact on the educational development are also considered in this research work. The research work analysis the massachussetts institute of technology (MIT) based on the adoption of blockchain in protecting and validating their issued certificate, in addition the Sony Global Education, and the University of Nicosia which adopt the smart contract techniques and cryptocurrency as form of payment. The researchers also review literature that adopt block chain technology in education system. the research work concluded that blockchain technology enable education system more secure, transparent and accessible.

In consequence of this disruptive era, emphasis has been made on sophisticated technology such as blockchain in the research work of (Aini et al., 2020) titled ’*embedding a blockchain technology pattern into the QR code for and authentication certificate*’. Its introduced that the blockchain technology as drastically influence the life of humans in general and specifically in the area of education. One of the most critical pressing issue in education is increate in forgery rate of diplomas, blockchain technology can be apply in testing the validating this document. The primary objective of this paper work is to adopt blockchain creating easy environment for user to authenticate their diploma certificate. SWOT analysis is applied in the research work to keep track of all possibility on the blockchain technology. As a result, a physical certificate in the form of paper is printed by the system and a QR code printed on it certificate. However, the verification of the numeric code embedded in the QR code is carryout using a smartphone QR code scanner or reader. Finally, the researcher hopes that the technology of blockchain used in digital assets can drastically minimize the case of diploma forgery or other essential documents.

Its introduce in this article (‘*the block chain technology as a catalyst for digital transformation of education*) that the basic idea about blockchain technology includes chains of blocks, distributed databased, distributed registry technology, absent of central regulator. (Yakovenko, 2019.) the features of block chain technology as drastically reduce the time cost required in processing information. The transitional issue of digital media in educational institutions. However, based on this current situation the used of blockchain is considered in this research paper. The blockchain technology risk analysis approach in education and the application mechanisms are presented. Finally, numerous educational development direction based on blockchain technology are showcase.

Blockchain 3.0 : towards a secure ballot coin Democracy through a digitized public ledger in developing countries, was the titled of the research work of (Dogo et al., 2018). It was introduced in the paper that researchers review papers or articles that are related to blockchain application in secure electronic voting (e-voting) system. however, feasibility study is carryout based on blockchain technology replacing the traditional or semi digitized voting system in developing regions including Nigeria as a case study. The researchers adopt the quantitative Strengths, Weaknesses, Opportunities and Threats (SWOT) and Political Economic Social and Technology (PEST) analysis approach. The result obtain after intensive evaluation helps in identifying the internal, external factor and the strategic direction in adopting BEEV in Nigeria. however, the suggested approach could be modifying to evaluate situation identify in other developing countries.

The development of information technology are resulted to the exponential growth of information generated in recent years, this was introduced in the research work of (Lu et al., 2022) titled ‘*Design of enterprise financial information management system based on blockchain technology’.* The easy accessibility to data as lead to numerous fraud act, and it’s quite impossible sometimes to keep track of data source belonging to an individual or financial enterprise. Due to the inadequate and key information to financial statement, as result information management become complex for businesses. However, due to the rich qualities such as anonymity, decentralization, trustworthiness, and willfulness of blockchain technology. Based on the attribute of information storage security and the speed of information transmission require by the financial enterprise information management. Hence, blockchain technology is incorporated in the financial management system in other to secure transaction and transmission of those information. The blockchain technology adopt the public key cryptography in securing data access.

Its introduced in the research work of (Wang et al., 2021) titled ‘*the application of blockchain in artificial intelligent’,* that artificial intelligent are increasingly become are of interest in various setting to make decision making and enhance predictive analytics. Recently artificial intelligent application has been facilitated by utilizing the blockchain (peer to peer system of distribution), the securing of data been shared (model training), data privacy preservation, and Artificial intelligent decision with decentralize AI are the most common application of blockchain in AI. In this research work a comprehensive review was perform on how the blockchain technology can benefit from the four applications mention earlier. However, the researcher analyzed 27 English language articles that are been published between the year 2018-2021. The paper explained how different attribute of blockchain can be utilized to support data sharing, privacy and trusted artificial intelligent with a decentralize intelligence.

(Abayomi-zannu et al., 2019) introduce that the voting system in Nigeria as a country is attached with various form of manipulations. this result to the introduction of mobile voting system, but this also come along with limitation and issues, one of the major problem include securing of the stored casted vote. Furthermore, the researcher proposed the blockchain technology to mitigate the issue and adopt the two-factor authentication to save guide voters form casting double vote. The two-factor authentication was utilized to developed the mobile voting system, authenticating voters and storing vote using blockchain security mechanism. However, developed system was evaluated using the ISO 9241-11 usability model. the result of the evaluation shows that the developed system has a good rating of usability. Hence, the system can be utilized in the voting system procedure.

In respect to the paper work titled ‘*A blockchain and machine learning based drug supply chain management and recommendation system for smart pharmaceutical industry’* . (Abbas et al., 2020) which are the research explained that the tracking of drug product during the chain of supply process are major issue or challenges faces by the pharmaceutical companies in recent time. this gives room for counterfeits to include their own fake drugs medicines into the market. However, the counterfeit drugs are analyzed to be of huge challenge within the pharmaceutical industry across the globe. Hence, it’s essential to develop a system that can keep track of drug supply at every stage in other to easily identify and solve the drug counterfeit issue. The researcher proposed a machine learning based drug supply chain management and recommendation system (DSCMR). The developed system integrated a machine learning model with blockchain system using the REST API. Finally, in other to validate the efficiency of the proposed system several tests are perform to evaluate the efficiency and usability of the proposed system.

(Antipova, 2018) proposed ‘*using blockchain technology for government auditing’,* the study primarily aim at utilizing blockchain technology in performing auditing that is manually carried out by the government auditors in the public sectors. The primary idea of the research work is to design a blockchain technology framework for tackling the government auditing issues. However, this methodology view auditing process as chess, because the process control is studied based on the interrelated and affiliated side, and the time factors are taking into account. Its concluded that the adoption of blockchain technology in day to day auditing is a perfect approach to minimize, reduce or avoid fraud in budget money.

**Summary of Related Paper**

**Table 1.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Author/Year** | **Title** | **Research problem** | **Research approach** | **Results** | **Limitations** |
| **1** | (Lamkoti et al., 2021) | certificate verification using block chain and generation of transcripts’ | The researcher specifies that in the absent of effective anti-forgery system result to forgery of certificate, diplomas or transcripts by students | The flow of the proposed system will contain a Certificated Issuer that will automatically generate certificate and the certificate generate will be authenticated or validate within the organization by the panel, before its sent to a student. | This system ensure student facing minimal risk of losing a certificate, of demanding new certificate, and certificate validation | Only the financial sector is considered in this research work. |
| **2** | of (Chaieb et al., 2018) | Verify you vote: a verifiable blockchain based online voting protocol | Issue of double voting, unsecure voting count. | A fully functioning online electronic voting system based on blockchain protocol is designed in this research work. The proposed Electronic voting system developed in this research work is called the Verity-Your-Vote (VYV). This system includes a primitive’s cryptography that is based on Elliptic Curve Cryptography (ECC), pairings and the Identity Based Encryption (IBE) | The proposed system ensures the following security and privacy properties in term of eligible voters can only vote, authentication of voters, privacy of voters, receipt-freeness, individual and collective verification | Only voting system is considered in the research work |
|  | (Ahmed et al., 2020), | the feature of electronic voting system using block chain technology | the researcher identify that the traditional electronic voting system as numerous limitation attached to it | the researchers propose a blockchain based distributed system for building a secure, fairness, transparent and flexible electronic voting (e-voting) system | secure novel distributed block-chain based application, which allow privacy, transparency, reliability, security and reduction of expenditure for hosting countrywide election | voting system only is considered in this paperwork |
|  | (Bhaskar, 2020) | Blockchain in education management : present and future applications | Lack of comprehensive survey on application of blockchain in educational sector | The researcher adopted a bibliometric analysis that is been carryout on published journals, and paperwork | The result of this findings provides a benchmark for the education institute, for various application of blockchain technology in the educational system. | Only the educational sector is considered in this research work. |
|  | (Fedorova et al., 2020) | application of blockchain technology in Higher education | Lack of critical analysis on blockchain application in education sector | The research work analysis the massachussetts institute of technology (MIT) based on the adoption of blockchain in protecting and validating their issued certificate, in addition the Sony Global Education, and the University of Nicosia which adopt the smart contract techniques and cryptocurrency as form of payment | The result of the literature review shows that the adoption of blockchain technology in education system enable the system more to be more secure, transparent and accessible | Only the education sector is considered. |
|  | (Aini et al., 2020) | embedding a blockchain technology pattern into the QR code for and authentication certificate | The education sector is faced with the challenge of high increase rate in forging diploma certificate. | The researcher adopts blockchain technology in creating easy environment for user to authenticate their diploma certificate. SWOT analysis is applied in the research work to keep track of all possibility on the blockchain technology | A system that produce physical certificate in the form of paper is printed by the system and a QR code printed on it certificate | The research work is limited to the educational sector |
|  | (Yakovenko, 2019.) | the block chain technology as a catalyst for digital transformation of education | Time and cost of processing information in the education sectors | The researcher adopts blockchain technology | Numerous educational development direction based on blockchain technology are showcase | The review is based on only educational sector |
|  | (Dogo et al., 2018) | Blockchain 3.0: towards a secure ballot coin Democracy through a digitized public ledger in developing countries | Issues related to digitalized voting system in developing country | The researchers adopt the quantitative Strengths, Weaknesses, Opportunities and Threats (SWOT) and Political Economic Social and Technology (PEST) analysis approach | An internal, external factor and the strategic direction in adopting BEEV in Nigeria was developed | The survey analysis only consider electronic voting system in developing country. |
|  | (Lu et al., 2022)*.* | Design of enterprise financial information management system based on blockchain technology | The easy accessibility to data as lead to numerous fraud act, and it’s quite impossible sometimes to keep track of data source belonging to an individual or financial enterprise. Due to the inadequate and key information to financial statement, as result information management become complex for businesses | The used of blockchain public key crypto system | A secure transaction management system using blockchain technology | This research paper is limited only to financial sector |
|  | of (Wang et al., 2021) | the application of blockchain in artificial intelligent | Lack of data preservation, centralize decision making, unsecure data model in artificial intelligent | a comprehensive review was performed on how the blockchain technology can benefit the AI domain | explained how different attribute of blockchain can be utilized to support data sharing, privacy and trusted artificial intelligent with a decentralize intelligence. | Limited to blockchain application in AI domain |
|  | (Abayomi-zannu et al., 2019) | Implementing a Mobile Voting System Utilizing Blockchain Technology and Two-Factor Authentication in Nigeria | The Nigeria voting system is attached with various form of manipulations. this result to the introduction of mobile voting system, but this also come along with lack of secure stored casted vote | the researcher proposed the use of blockchain technology to mitigate the voting related issue and adopt the two-factor authentication to save guide voters form casting double vote | A secure mobile voting system is developed for avoiding double voting and securing voters votes. | Android based platform is only considered in the paperwork |
|  | (Abbas et al., 2020) | A blockchain and machine learning based drug supply chain management and recommendation system for smart pharmaceutical industry | the tracking of drug product during the chain of supply process is identify as the major issue or challenges faces by the pharmaceutical companies. This open the door to counterfeits medicinal drugs to be include into the market | The researcher integrated a machine learning model with blockchain system using the REST API | A system is developed to keep track of drug supply at every stage in other to easily identify and solve the drug counterfeit issue | The developed framework only considers tracking of drug supply. |
|  | (Antipova, 2018) | using blockchain technology for government auditing | Time consumption in manually performing auditing | The researcher adopts a blockchain technology framework for tackling the government auditing issues | The propose framework minimize, reduce or avoid fraud in budget money | Government sector is only considered in the research work. |

**Reference**

Abayomi-zannu, T. P., Odun-ayo, I., & Tatama, B. F. (2019). *Implementing a Mobile Voting System Utilizing Blockchain Technology and Two-Factor Authentication in Nigeria*. *Ic4s*.

Abbas, K., Afaq, M., Khan, T. A., & Song, W. (2020). *A Blockchain and Machine Learning-Based Drug Supply Chain Management and Recommendation System for Smart Pharmaceutical Industry*. 1–31. https://doi.org/10.3390/electronics9050852

Ahmed, R., Shamrat, F. M. J. M., Ali, A., Mia, R., & Khatun, M. A. (2020). *The Future Of Electronic Voting System Using Blockchain*. *December*.

Aini, Q., Rahardja, U., Tangkaw, M. R., Puji, N., & Santoso, L. (2020). *Embedding a Blockchain Technology Pattern Into the QR Code for an Authentication Certificate*. *5*(2), 239–244. https://doi.org/10.15575/join.v5i2.583

Antipova, T. (2018). *Using blockchain technology for government auditing USING BLOCKCHAIN TECHNOLOGY FOR GOVERNMENT AUDITING*.

*appropriated to enhance online learning ?* (2015).

Bhaskar, P. (2020). *Blockchain in education management : present and future applications*. https://doi.org/10.1108/ITSE-07-2020-0102

Bitcoin, B. (n.d.). *BlockChain Technology*.

Chaieb, M., Yousfi, S., Lafourcade, P., Robbana, R., Chaieb, M., Yousfi, S., Lafourcade, P., & Verifiable, R. R. V. A. (2018). *Verify-Your-Vote : A Verifiable Blockchain-based Online Voting Protocol To cite this version : HAL Id : hal-01874855 Verify-Your-Vote : A Verifiable Blockchain-based Online Voting Protocol*.

D, C. O. P. (2013). *Budget Preparation and Implementation in the Nigerian Public Sector*. *4*(16), 50–55.

Dogo, E. M., Nwulu, N. I., Olaniyi, O. M., Aigbavboa, C. O., & Nkonyana, T. (2018). *Blockchain 3 . 0 : Towards a Secure Ballotcoin Democracy through a Digitized Public Ledger in Developing Countries*. *Icta*.

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Journal, I., Grech, A., & Lamkoti, R. S. (n.d.). *IJERT-Certificate Verification using Blockchain and Generation of Transcript Certificate Verification using Blockchain and Generation of Transcript*.

Lu, Y., Wang, Y., & Chen, R. (2022). *Design of Enterprise Financial Information Management System Based on Blockchain Technology*. *2022*.

Ogujiuba, K. K., & Ehigiamusoe, K. U. (2014). *Capital Budget Implementation in Nigeria : Evidence from the 2012 Capital Capital Budget Implementation in Nigeria : Evidence from the 2012 Capital Budget*. *September*. https://doi.org/10.5709/ce.1897-9254.147

Publication, I. (n.d.). *IJMET\_10\_01\_092.pdf*.

Wang, R., Luo, M., Wen, Y., Wang, L., Choo, K. R., & He, D. (2021). *The Applications of Blockchain in Artificial Intelligence*. *2021*.