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Automated Revenue Collector App (ARCA) for Some Selected Local Government Areas of Yobe State

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ABSTRACT
The Automated Revenue Collection Application (ARCA) is an innovative and comprehensive software solution designed to revolutionize revenue collection processes for governments, municipalities, and other organizations. ARCA leverages cutting-edge technologies to streamline and optimize the entire revenue collection lifecycle. The benefits of the ARCA system include transparency, and revenue generation while reducing operational costs and fraud. Traditional revenue collection methods are often time-consuming, error-prone, and resource-intensive, leading to revenue leakage and financial inefficiencies. ARCA addresses these challenges by providing a seamless, end to-end digital platform to automate the entire revenue collection process. Features included in the ARCA include multiple channels for revenue collection, advanced Analytics and reporting, secure payment gateway. PHP, and JAVA and Python were used to develop the front end. MYSQL was used for database. The app was hosted online and tests to obtain performance evaluation. Results obtained after testing show that feedback from users for navigation and ease of operation was excellent overall.
Keywords: ARCA, Automation, Revenue, Taxation.

1.0 INTRODUCTION

Revenue collection in local government refers to the process of collecting funds or income by the local government authorities to finance their operations and provide public services to the community. Local governments rely on various sources of revenue to support their budgets, including taxes, fees, grants, and other forms of income.

In the fast-paced and ever-evolving landscape of revenue collection, organizations face mounting challenges in efficiently managing their financial streams while ensuring transparency and accountability [1]. The Automated Revenue Collection Application (ARCA) emerges as a groundbreaking solution poised to revolutionize revenue collection processes for governments, municipalities, and various other entities. ARCA leverages cutting-edge technologies and intelligent automation to streamline the entire revenue collection lifecycle, maximizing revenue generation, and minimizing operational inefficiencies [2]. Traditional revenue collection methods have long been plagued by manual processes, delayed payments, and susceptible to fraudulent activities [3]. ARCA, however, represents a paradigm shift, empowering organizations to embrace a modern, digital ecosystem that prioritizes accessibility, security, and real-time insights. With the automation of revenue and tax collection and the integration of advanced artificial intelligence and machine learning, ARCA introduces a new era of efficiency and precision in revenue management. This introduction explores the key features, benefits, and potential of ARCA in transforming revenue collection practices, catalyzing financial growth, and enhancing stakeholder trust. By embracing ARCA, organizations can embark on a transformative journey towards a more dynamic, streamlined, and accountable revenue collection process, thus fostering sustainable economic development and prosperity [4]. The Key Features should include:

i. Multi-channel Integration where multiple channels for revenue collection, including online portals, mobile applications, point-of-sale systems, and payment kiosks, ensuring accessibility and convenience for citizens and businesses would be supported.
ii. Personalized Billing and invoicing capabilities, tailored to each customer's specific needs and preferences, resulting in improved payment compliance.
iii. Analytics and reporting to generate real-time insights and comprehensive reports, empowering administrators with critical data to make informed decisions and optimize revenue collection strategies.
iv. Automated Reminders and Notifications to customers, reducing late payments and enhancing overall revenue collection efficiency.
v. Secure Payment Gateway incorporated encryption to ensure the security and integrity of financial transactions, instilling confidence in customers and enhancing trust in the revenue collection process.

Problem Statement

Collecting revenue manually can pose several challenges for local governments. These difficulties associated with manual revenue collection include:

1. Inefficiency and Time-Consuming: Manual tax collection processes involve a significant amount of paperwork, manual calculations, and data entry. This can be time-consuming and inefficient, leading to delays in processing and recording tax payments.
2. Human Error: Relying on manual data entry and calculations increases the risk of human error.

Justification

Collecting revenue manually can pose several challenges for local governments. These difficulties associated with manual revenue collection include:

1. Inefficiency and Time-Consuming: Manual tax collection processes involve a significant amount of paperwork, manual calculations, and data entry. This can be time-consuming and inefficient, leading to delays in processing and recording tax payments.
2. Human Error: Relying on manual data entry and calculations increases the risk of human error. Even minor mistakes can lead to incorrect revenue assessments, discrepancies in records, and potential disputes with taxpayers.
3. Difficulty in Tracking and Monitoring: With manual systems, it can be challenging to track and monitor revenue payments in real-time. This lack of visibility may result in delayed identification of non-compliant revenue payers or tax evasion, making it harder for local governments to enforce tax regulations effectively.
4. Limited Data Analysis: Manual tax collection processes often lack robust data analysis capabilities. Analysing tax data manually becomes time-consuming and may hinder local governments' ability to gain insights into revenue trends, identify areas of non-compliance, or make informed decisions based on data-driven analysis.
5. Higher Administrative Costs: Manual tax collection requires a significant investment in administrative resources, including personnel, paper-based forms, storage, and manual record-keeping. These costs can add up over time and strain the budget of the local government.
6. Reduced Transparency: Manual tax collection systems may lack transparency, as the process is largely opaque to taxpayers. This can create skepticism and erode public trust in the fairness and integrity of the tax collection process.
7. Limited Accessibility and Convenience: Manual tax collection often necessitates physical visits to government offices, which can be inconvenient for taxpayers. This can lead to lower compliance rates and increased tax evasion.

To overcome these challenges, many local governments are transitioning to automated or computerized tax collection systems. These systems leverage technology to streamline processes, improve accuracy, enhance transparency, and provide taxpayers with convenient online payment options. Automated systems also enable better data analysis, reporting, and integration with other financial systems, leading to more effective revenue collection and management.

Therefore, the aim of the Automated Revenue Collection Application (ARCA) is to revolutionize the revenue collection process for governments, and organizations by leveraging cutting-edge technologies to automate, optimize, and enhance revenue generation, while ensuring transparency, efficiency, and security in the entire revenue collection lifecycle

Aim and Objectives of the study

The aim of the study is to design and develop an automated revenue collector APP for the financial system of some selected LGAs in Yobe state.

The specific objectives include

(i) To design and host a revenue collection app that will eliminate most of the manual process in tax collection for some selected LGAs of Yobe State.
(ii) To configure web server to store the revenue collection application.
(iii) To test and Identify, Visualizing and authenticating all tax payers.
(iv) To build the database of revenue payers by generating efficient and informative reports.

2.0 LITERATURE REVIEW

Taxation is the process by which governments collect revenue from individuals and businesses to fund public expenditures and provide essential services. While taxation can sometimes be seen as a burden, it offers several advantages and plays a crucial role in society [5]. Taxation provides governments with the necessary funds to finance public expenditures such as infrastructure development, healthcare, education, defense, public safety, and social welfare programs. Tax revenue is essential for maintaining and improving public services that benefit society as a whole. Progressive tax systems, where higher-income individuals or businesses are taxed at higher rates, can help redistribute wealth and reduce income inequality [6]. Taxes can be used as a tool to promote social justice by ensuring that wealthier individuals contribute a larger proportion of their income or assets for the benefit of society and the less fortunate. Taxation is a key component of fiscal policy, allowing governments to manage the economy [7]. Through taxation, governments can stimulate or cool down economic activity by adjusting tax rates, incentives, and deductions. Tax policy can be used to influence consumer spending, investment, and saving behaviors, thereby contributing to economic stability and growth [8]. Taxes enable the provision of public goods and services that are essential for society but are not efficiently provided by the private sector. These include infrastructure (roads, bridges, and utilities), public transportation, parks, libraries, public schools, healthcare facilities, and emergency services. Tax revenue ensures that these goods and services are available to all members of society, regardless of their ability to pay. Taxation can be used as a regulatory tool to discourage or mitigate negative externalities associated with certain activities. For example, higher taxes on tobacco products can help reduce smoking rates and the associated health costs. Similarly, taxes on carbon emissions can incentivize businesses and individuals to reduce their carbon footprint and contribute to environmental sustainability. Tax revenue is often allocated to fund social welfare programs, such as unemployment benefits, retirement pensions, healthcare subsidies, and poverty alleviation initiatives [9]. These programs provide a safety net for vulnerable individuals and families, promote social cohesion, and support economic stability by reducing inequality and poverty. Tax revenue is vital for nation-building activities, including defense and security. It funds military forces, intelligence agencies, and national security measures necessary to protect a country's borders, maintain internal stability, and safeguard its citizens. It is important to note that tax systems should be designed and implemented fairly, taking into account the economic capacity of taxpayers and ensuring that the tax burden is distributed equitably. Well-designed and effectively managed tax systems are crucial for generating revenue, promoting economic growth, and achieving social objectives [10]. There are various methods through which governments collect tax revenue. These methods can vary depending on the country and its tax system. Here are some common methods of tax revenue collection: Income tax, sales tax, Value Added Tax (VAT), property tax, corporate tax, excise tax, customs duties, payroll tax, and wealth tax [11]. Some countries impose wealth taxes on individuals or households based on their net worth or assets. These taxes are relatively less common and are often targeted at high-net-worth individuals. It's important to note that the specific tax collection methods and rates can vary significantly

between countries, and governments may employ a combination of these methods to generate tax revenue [12].

Advantages of Automated Revenue Collection

Automated tax collection, also known as electronic tax filing and payment systems, offers several advantages over traditional manual methods. Automated tax collection refers to the use of technology and automated systems to streamline and facilitate the process of collecting taxes. There are several reasons why governments may choose to implement automated tax collection methods:

Efficiency and Accuracy: Automated tax collection systems can significantly improve efficiency and accuracy in the tax collection process. By leveraging technology, governments can reduce manual errors, streamline data entry, and automate calculations, resulting in more accurate tax assessments and reduced administrative burden.

Cost Reduction: Automated tax collection systems can help reduce costs associated with manual tax processing and administration. By automating various tasks such as data entry, record keeping, and tax return processing, governments can save on labor costs and allocate resources more effectively [13].

Increased Compliance: Automation can improve tax compliance rates by making it easier for taxpayers to fulfill their tax obligations. Automated systems can provide clear instructions; simplify tax filing procedures, and offer online platforms for submitting tax returns and making payments. This convenience can encourage taxpayers to comply with tax laws and reduce instances of non-compliance.

Faster Processing: Automated tax collection systems can significantly speed up the processing of tax returns and refunds. With electronic filing and automated workflows, tax authorities can process returns more quickly, validate information more efficiently, and issue refunds in a timely manner.

Enhanced Data Analysis: Automation enables tax authorities to collect and analyze vast amounts of data more effectively. By utilizing data analytics tools, governments can identify trends, detect potential tax evasion or fraud, and gain insights into taxpayer behavior. This information can inform policy decisions, improve tax administration, and enhance overall tax revenue collection [14].

Improved Transparency: Automated tax collection systems can enhance transparency and accountability. By providing taxpayers with access to their tax information and facilitating online interactions with tax authorities, citizens can have clearer visibility into their tax obligations and understand how their tax payments contribute to public services and infrastructure.

Reduced Tax Gap: The tax gap refers to the difference between the amount of tax owed and the amount actually collected. Automation can help reduce the tax gap by improving compliance, detecting errors or inconsistencies, and enabling more effective enforcement measures against tax evasion and fraud [15].

Overall, automated tax collection offers numerous benefits for both governments and taxpayers. It improves efficiency, accuracy, compliance rates, and transparency, while also reducing costs and enhancing the effectiveness of tax administration [16].

The history of automated payment systems is a fascinating journey that has evolved over several decades, revolutionizing the way we conduct financial transactions. The concept of automated payments gained momentum with the introduction of credit cards in the 1960s. These cards allowed consumers to make purchases on credit and repay the amount later, laying the foundation for modern payment systems. The development of the EFT system allowed the electronic exchange of money between banks. The invention of the Automated Teller Machine (ATM) in the late 1960s its subsequent widespread adoption in the 1970s made it possible for individuals to withdraw cash and conduct basic banking transactions outside of banking hours. The 1980s saw the rise of electronic payment networks which facilitated real-time authorization and settlement of credit card transactions. This paved the way for faster and more secure payments. The advent of the internet led to the emergence of online banking and electronic commerce. The introduction of secure online payment gateways and the use of encrypted protocols allowed consumers to make purchases and payments online, significantly expanding the scope of automated payment systems. The proliferation of mobile devices led to the development of mobile payment solutions and digital wallets. This allows users to make contactless payments using their smartphones [17]. Streamline Revenue Collection Processes: ARCA aims to streamline revenue collection processes

by automating routine tasks, simplifying payment procedures, and providing multiple channels for payment, making it easier for customers to fulfill their financial obligations. Maximize Revenue Generation. Automated revenue collections personalized billing, timely reminders, and advanced analytics capabilities are designed to maximize revenue collection, minimizing revenue leakage and enhancing overall financial performance for implementing organizations. Automated revenue collections focus on promoting transparency and accountability in revenue collection through real-time tracking, comprehensive reporting, and audit capabilities, providing stakeholders with clear incorporates encryption and technology to ensure secure payment processing and employs AI-driven algorithms for fraud detection, safeguarding revenues and maintaining the credibility of the revenue collection system. Automated revenue collections aim to reduce administrative overhead and operational costs by automating revenue collection processes, enabling organizations to allocate resources more efficiently and effectively. Automated revenue collections provide Real-Time Insights for Informed Decision-Making; it offers advanced data analytics and reporting features, providing decision-makers with real-time insights to make informed, data-driven decisions regarding revenue collection strategies. Enhance Customer Experience. ARCA focuses on improving the customer experience by providing a user-friendly interface, personalized billing options, and timely reminders, ensuring greater customer satisfaction and higher payment compliance. Facilitate Multi-channel Payment Options, these multi-channel payment options, including online portals, mobile applications and point-of-sale systems enabling customers to make payments conveniently using their preferred methods [18]. Automated revenue collections foster sustainable economic growth by optimizing revenue collection, ARCA contributes to a stable financial foundation for implementing organizations, supporting sustainable economic growth and development. Ensure Adaptability and Scalability. Automated revenue collections is designed to be flexible and scalable, accommodating the evolving needs and expanding user base of organizations, ensuring it remains a robust and future-proof revenue collection solution. By striving to achieve these aims and objectives, the Automated Revenue Collection Application (ARCA) emerges as a powerful and transformative tool, empowering organizations to unlock their revenue collection potential and drive financial success while building trust among stakeholders and supporting economic prosperity [19].

3.0 METHODOLOGY

Research design

The research design was derived by developing an online paying app for revenue collection in some selected local governments Areas of Yobe state. Yobe State (YBS) is located in the North East zone of the country. Yobe state was created out of the former Borno State on 27th August 1991. It is located within latitude 11o N and longitude13.50 E. It has a total land area of 47,153 km2 and shares common boundaries with Borno State to the East and South East, Jigawa state to the North West, Bauchi and Gombe States to the South West. It also shares an international border with the Republic of Niger stretching to over323 kilometers to the North. Major towns in the state include Damaturu (state capital), Potiskum, Gashua, Geidam and Nguru [20].

The data for the study was collected through the interview method by the researcher; this is because the target respondents for the research are mostly are literate. The interview questions were designed with simplicity and a clearer understanding for the respondents. The website was developed using javascript, php and was hosted on the web. Payment was made for subscription and all have been applied. Data analysis was conducted using SPSS package to ascertain the navigation, appearance and workability of the app.

The Proposed System

After critically examining the existing system of revenue collection by the Yobe state government and the Board of internal revenue with a view to discover problem areas, it became obvious that the development and deployment of an automated computerized revenue processing system is a matter of absolute necessity if all the leakages in the revenue collection and management processes must be eliminated. The proposed system which consist of the following modules: Data Capture and personal information module, Collection and Accounts, then the Administrative Panel Module.

Web technology and Programming Tools

The collection of tools used in designing web content is term as web technology and the most prominent and widely used are Javascript, PHP, Python and MySQL.

Javascript

JavaScript is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. JavaScript is a high-level, often just-in-time compiled language that conforms to the ECMAScript standard. It has dynamic typing, prototype-based object-orientation, and first-class functions. It is multi-paradigm, supporting event-driven, functional, and imperative programming styles. It has application programming interfaces (APIs) for working with text, dates, regular expressions, standard data structures, and the Document Object Model [21].

PHP

PHP is a general-purpose scripting language geared towards web development. The PHP reference implementation is now produced by the PHP Group. PHP code is usually processed on a web server by a PHP interpreter implemented as a module, a daemon or a Common Gateway Interface executable. On a web server, the result of the interpreted and executed PHP code which may be any type of data, such as generated HTML or binary image data would form the whole or part of an HTTP response. Various web template systems, web content management systems and web frameworks exist that can be employed to orchestrate or facilitate the generation of that response [22].

Python

Python has found its use in numerous applications because of its simplicity. It has now emerged as the popular web programming language because of the functionalities offered by it being a flexible language; it is gaining the attention of web developers. Python eases the task of web programming by offering web frameworks which helps in fast web development where developers need not program from the scratch [23].

MySQL

MySQL is the relational database management system (RDBMS) that was used. It is an essential tool in many environments, from the more traditional uses in business, research, and education contexts, to newer applications, such as powering search engines on the Internet. However, despite the importance of a good database for managing and accessing information resources, many organizations have found them out of reach of their financial resources. One of the newer entries into the no-to-low cost database arena is MySQL, a SQL client/server relational database management system originating from Scandinavia. MySQL includes an SQL server, client programs for accessing the server, administrative tools, and a programming interface for writing programs

Data sample collection and Procedure

The data was collected through the interview method by the researcher; this is because the target respondents for the research the users, revenue administrators and payers were asked about the operation and navigation of the app. The interview questions were designed with simplicity and a clearer understanding for the respondents. Other collections methods used are survey, observation and investigation within the selected local Government Areas of the states. Secondary data also obtained through some published research works. Factors that affect app quality include performance, stability, testing, and usability, and these all come down to the end user experience. Some performance and stability considerations include: Is it loading fast enough? Is it draining the battery? Is it crashing constantly? Rigorous testing ensures that an app performs well, is stable, and is usable. And finally, high quality apps need to be user-friendly. Regardless of what the ultimate function of the app is, users need to be able to interact with the app with ease.

Requirements Gathering: The design process begins with a thorough analysis of the requirements and needs of the organizations or governments implementing ARCA. This involves engaging stakeholders, conducting interviews, and studying existing revenue collection processes to understand the specific functionalities and features needed.

User-Centered Design: ARCA's design follows a user-centered approach, prioritizing the needs and preferences of end-users, such as taxpayers, businesses, and revenue administrators. User experience (UX) design principles are applied to ensure a user-friendly interface, easy navigation, and intuitive interactions.

Agile Development: ARCA's design and development are often executed using agile methodologies. Agile allows for iterative development, continuous feedback, and incremental improvements, ensuring that the application adapts to changing requirements and remains flexible throughout the development lifecycle.

Secure Software Development: Security is a paramount concern in designing ARCA. Secure software development practices, including secure coding, encryption, access controls, and vulnerability assessments, are implemented to safeguard sensitive financial data and prevent unauthorized access.

Data Management and Analytics: A robust data management system is employed to store and process revenue-related information securely. Data analytics capabilities are integrated into ARCA to generate real-time insights and comprehensive reports, aiding decision-making and revenue optimization.

Scalability and Performance: ARCA's design takes into account scalability to handle increasing numbers of users and transactions as the application gains popularity. Performance optimization techniques are employed to ensure that the application runs efficiently and responsively.

Testing and Quality Assurance: Rigorous testing and quality assurance processes are conducted throughout the development lifecycle to identify and address any bugs, errors, or usability issues, ensuring a stable and reliable application.

Overall, the design of the Automated Revenue Collection Application (ARCA) is a holistic approach that aims to address the complexities of revenue collection while incorporating advanced technologies, ensuring security, user-friendliness, and scalability to Yobe State Internal Revenue Board. By employing these methods, ARCA can efficiently meet the needs of implementing organizations, improve financial outcomes, and foster trust among stakeholders.

4.0 FINDINGS AND ANALYSIS OF THE DESIGNED SYSTEM

Systems Design

Systems design in the process of describing the new system. Systems design details system outputs, inputs and user interfaces, specifies hardware, software, database, data communication facilities, personnel and procedure components and shows how these components are related. Figure 1 shows the procedure of revenue collection.

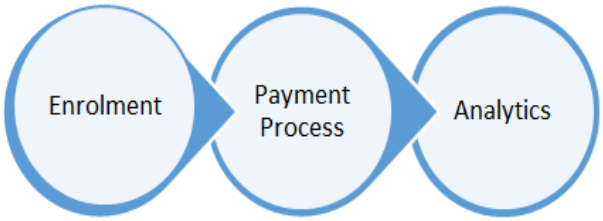

Figure 1: Overall system

Enrolment: This is where the tax payers are enrolled. Personal data and demographic data is eneterd in to the atutomated tax collection system. Data collected include tax payers name, tax identificationnumber (TIN) address, age sex and address and tax category. Enrolment is operated by the system user and can also be accessed by the admin. Also data of users that would operate the system is also entered. There would be users and an a superuser called an administrator. Figure 2 shows a capture of the log in page for tax payers and system users.

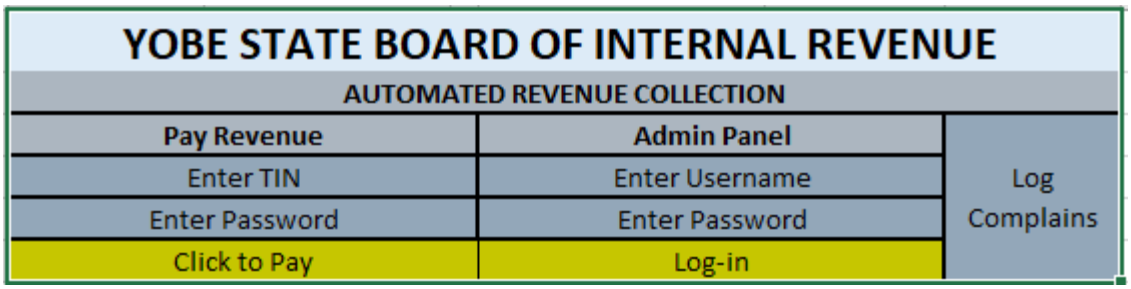

Figure 2: Login page for system users.

Payment Process: The payment process starts from where the tax payer enters his TIN and password. He would verify his details and tax category then proceeds to pay the amount against his category. Figure 3 shows a cappture of post login where he verifies his information before proceeding to make payment. If he feels there is any need to make a complain ghen there is a log complains button where he can log his complains. The tax payer would also be able to print an evidence of payment to show during tax payment verification and inspection.

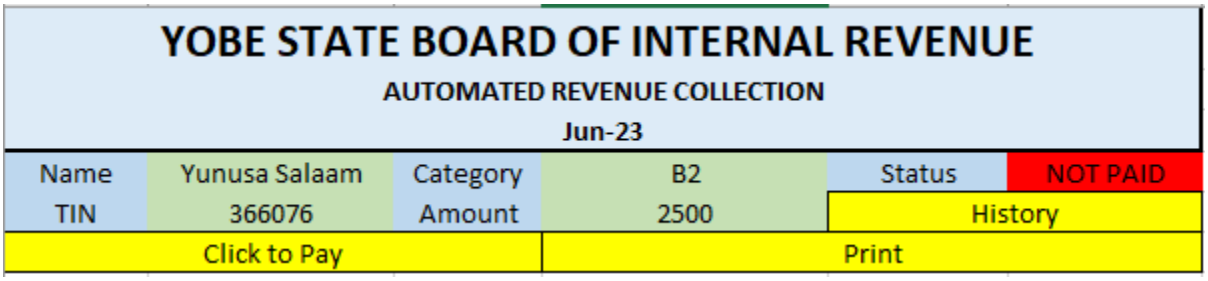

Figure 3: Post Login page for tax payers

Analytics

This is where all data entered by the users and the monies collected by the tax payers is visualized. Figure 4 shows the post login page for administrators. Here reports can be generated and all tax payers and data can be seen. The amount paid by each tax payer and the date the payment was made would also be recorded. Various analytic and payments by state, date, period, local government, sex, tax category and default payment would be made available. Figure 5 shows a sample of payments made by tax payers in June 2023.

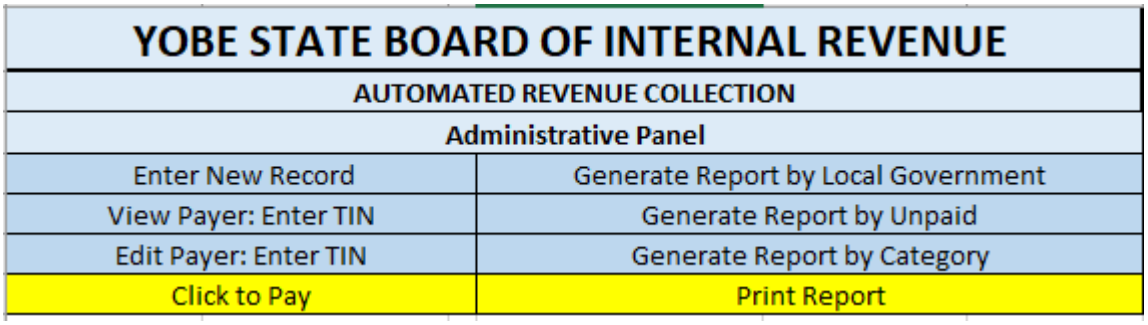

Figure 4: Post Login Page for Administrators

YOBE STATE BOARD OF INTERNAL REVENUE					
AUTOMATED REVENUE COLLECTION					
Jun-23					
s/no	Date Paid	TIN	Name	Category	Amount
45	09/08/2023	765775	Musa Abdulkadir	B1	2,000.00
46	09/08/2023	976854	Hauwa Abdullahi	B5	5,000.00
47	09/08/2023	212324	Hameeda Abdulkadir	B2	2,000.00
48	09/08/2023	156543	Abdulhammed Isa	A1	12,000.00
49	09/08/2023	100762	Mohammed Musa	B2	2,000.00
50	09/08/2023	144981	Jibrin Sadiq	B2	2,000.00
51	09/08/2023	189200	Tijjani Musa	A1	12,000.00
52	09/08/2023	233419	Rabi Hassan	B2	2,000.00
53	09/08/2023	277638	Samira Husain	B2	2,000.00
54	09/08/2023	321857	Taheer Nour	B5	5,000.00
55	09/08/2023	366076	Yunusa Salaam	B2	2,000.00
56	09/08/2023	410295	Hassan Mato	B2	2,000.00
57	09/08/2023	454514	Ahmed Sadiq	B3	3,000.00

Figure 5: Sample Outputs from the software

System Performance Evaluation

User Testing:

The system was put to test to randomly selected people and asked to perform the process of tax payment. Their feedback was recorded for navigation and ease of operation.

Navigation:

Results obtained after testing was shown in table 1.

Table 1: Results for Navigation of app

Ease of Navigation	Frequency
Excellent	45
Good	34
Fair	15
Not Good	6
Bad	0
Total	100

From the above table 1, t was indicated that 45 people considered the navigation excellent, while 34 people agreed it was good and 15 people recorded the navigation to be fair. Only 6 people said it wasn't good. There was zero record for bad.

Figure 6: the chart illustrate the respondents view on ease of navigation

Figure above show that majority of the respondent agreed to the usage of navigating through the Revenue collection App was excellent against less than 10% that disagree to the agreement.

Ease of Operation:

Table 2 shows the results obtained for the ease operation of the application.

Table 2: Results for ease of operation of app

Ease of Operation	Frequency
Excellent	55
Good	23
Fair	22
Not Good	0
Bad	0
Total	100

From the above table which indicates that 55 respondents, 23 respondent and 22 respondent agreed to the operation with the App as excellent, good and fairs respectively while non-recorded it as either bad or not good.

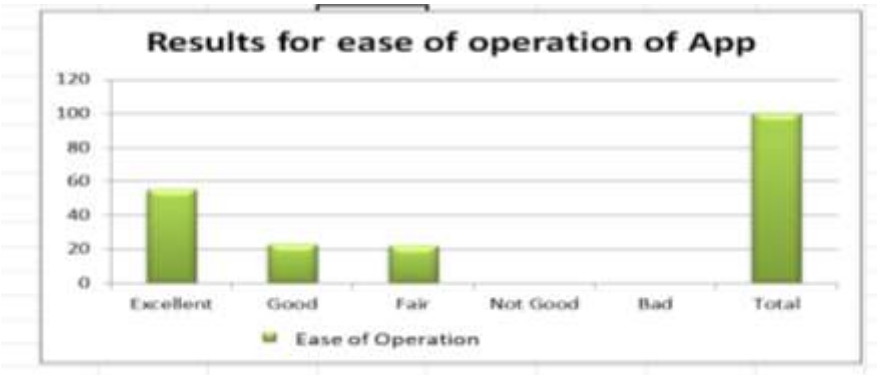

Figure 7 the chart illustrate the respondents view on ease of operation

Level of Trust

Previous tax collection manual was done manually but the automated revenue collection system is paid using electronic means and the level of confidence of the tax payers was recorded to ascertain their perception toward the use and acceptability of the automated revenue collection application.

Table 3: Results for Trust Perception of revenue collection app

Trust Perception	Frequency
Highly Trusted	85
Trusted	10
Fair Trusted	5
Not Trusted	0
Badly Trusted	0
Total	100

As demonstrated from table 3 above, 85% tax payers during testing said the Trusted the app highly while 10 %was recorded for only Trust. 5% respondents recorded fairly trusted whereas none agreed that was not trusted or badly trusted.

Figure 8 the chart illustrate the respondents view on level of trust perception for the App

5.0 DISCUSSION OF FINDINGS

During testing, ARCA showcased significant improvements in efficiency compared to traditional manual revenue collection methods. The application streamlined processes, reducing the time required for revenue collection tasks and minimizing human errors in data entry and calculations. The process flow was simple and easy to use and understand by tax payers and users. Increased Revenue Generation: ARCA's personalized billing, timely reminders, and real-time analytics positively impacted revenue generation. The system optimized payment processes, leading to higher payment compliance and reduced instances of late or missed payments. Rigorous testing and security measures ensured that ARCA's payment gateway and data storage systems were secure and protected against unauthorized access. The application's security integration enhanced transaction security and transparency. During user acceptance testing, feedback from taxpayers, businesses, and administrators indicated a positive user experience with ARCA. Users appreciated the convenience of multiple payment channels, personalized billing options, and timely reminders. This can be seen in the number that recorded excellent reviews in tables 1 and 2. ARCA's data analytics capabilities provided administrators with real-time insights into revenue trends, payment patterns, and collection performance as shown in figure 5 allowed them to make data-driven decisions and optimize revenue collection strategies. Testing revealed that ARCA's automation and streamlined processes resulted in reduced administrative overhead and operational costs, providing cost savings for implementing organizations. It's important to note that the specific results obtained during testing depend on the scope and scale of the application, the quality of the design and development, and the uniqueness of the revenue collection requirement. ARCA's design and testing included considerations for regulatory compliance, ensuring that the application adhered to the relevant financial and data protection regulations.

SUMMARY

This study aimed to design and implemented a revenue collection App that will be very suitable for taxation for some selected Local Government Areas of Yobe state. Collecting taxes manually can pose several challenges for local governments. These difficulties associated with manual tax collection include, inefficiency and time-consuming, significant amount of paperwork, human error, difficulty in tracking and monitoring, limited data analysis, higher administrative costs, reduced transparency and limited accessibility and convenience. The study proposed the use of automated and mobile tax collection systems. These systems leverage technology to streamline processes, improve accuracy, enhance transparency, and provide taxpayers with convenient online payment options. Interview questions was administered directly to the tax payers and excellent feedback was retrieve and administered properly which proof the ascertain that the ARCA within Yobe state can perform better in the global arena, which can boost the internal revenue of the state. that is possible through the Revenue collection APP and

encouraging the revenue collectors by developing better strategies that will maintained the Internal revenue status.

The results will also provide base line information for the Administrators, besides, it will generate more revenue for the state and the living standard will be raised and hence there will be improvement in the national economy and Yobe State at large for socio-economic development. Data was collected from some selected Local Government Areas of the state and was analyzed using some statistical tools and finally results were presented both in tabular form and some illustrated on a chart

CONCLUSION

In conclusion, the Automated Revenue Collection Application (ARCA) stands as a transformative and forward-thinking solution that has the potential to reshape revenue collection practices for governments, municipalities, and organizations alike. Through the integration of cutting-edge technologies, ARCA has demonstrated its ability to optimize efficiency, maximize revenue generation, and promote financial transparency while safeguarding sensitive data and preventing fraudulent activities. The comprehensive design of ARCA encompasses user-centered principles, ensuring a seamless and user-friendly experience for taxpayers, businesses, and revenue administrators. By incorporating multiple payment channels, personalized billing, and timely reminders, ARCA will enhance customer satisfaction and payment compliance, ultimately contributing to increased revenue streams. ARCA's adoption of analytics and real-time reporting empowers administrators with invaluable insights into revenue trends and collection performance. Its successful implementation holds the potential to unlock new avenues for economic growth, financial stability, and enhanced trust between governments, organizations, and their stakeholders.

RECOMMENDATION

After the implementation of the site, there is need for monitoring it proper utilization, which the researcher found out that some observations' should be put in place for appropriate utility and to explore he good use of the system. Some of the recommendations were considered mandates for this appropriateness;

1. The tax payers should be encourage by the authority , to fully explore the potentiality of the system
2. A sensitization is needed to fully engage all Tax payers and revenue collectors within the state, for them to harnessed adequately dividend of the automated revenue collection system.
3. An upgrade on the website from testimonies from the tax payers and revenue collectors will encourage the entire state to make use of the APP within the entire 17 LGAs of the state.

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REFERENCES

[1] Hussaini, I., Bukar, B. A., & Adamu, B. (2023). Effects of Automated Tax Services on Generating Government Revenue in Nigeria. Social Science Journal for Advanced Research, 3(3), 23-31.

[2] Omeh, V. A. (2023). Impact of Electronic Payment System on Tax evasion in Nigeria (2015 2021). EBSU Journal of Social Sciences and Humanities, 13(2).

[3] Mohammed, S. D., Mas' ud, A., Karaye, Y. I., Sallau, M. M., Adam, A. D., & Sulaiman, B. A. (2023). An Evaluation of Tax Digitalization Efforts by Federal Inland Revenue Service and their Impacts on Tax Collection 2002-2021. Journal of Accounting and Taxation, 3(2), 105-122.

[4] Ike, E. R., & Bright, A. O. Impact of E–Taxation on Tax Administration in Nigeria.

[5] Blake, M., & Kriticos, S. (2019). Enhancing property tax compliance in Mandalay

[6] Christopher, K. K., Arul, X. V., & Karthikeyen, P, (2019) Smart toll tax automation and

Monitoring System using Android application. IEEE International Conference on Intelligent Techniques in Control, Optimization and Signal Processing (INCOS) (pp. 1-6). IEEE.

[7] Fetzer, T., & Dinger, B. (2019). The Digital Platform Economy and Its Challenges to Taxation. TsinghuaChina L. Rev., 12, 29.

[8] Ionescu, L. (2019). Should governments tax companies' use of robots? Automated workers, technological Unemployment, and wage inequality. Economics, Management, and Financial Markets, 14(2), 64-69.

[9] Jang, S., & Eger III, R. J. (2019). The effects of state delinquent tax collection outsourcing on administrative effectiveness, efficiency, and procedural fairness. The American Review of Public Administration, 49(2), 236-251.

[10] Khan, E., Garg, D., Tiwari, R., & Upadhyay, S. (2018, February). Automated toll tax collection system using Cloud database. In 2018 3rd International Conference On Internet of Things: Smart Innovation and Usages (IoT-SIU) (pp. 1-5). IEEE.

[11] Okunogbe, O., & Santoro, F. (2023). Increasing Tax Collection in African Countries: The Role of Information Technology. Journal of African Economies, 32(Supplement_1), i57-i83.

[12] Olufemi, A. T., Jayeola, O. L. A. B. I. S. I., Oladele, A. S., & Naimot, A. O. (2018). Tax revenue and economic growth in Nigeria. Scholedge International Journal of Management & Development, 5(7), 72-85.

[13] Politou, E., Alepis, E., & Patsakis, C. (2019). Profiling tax and financial behaviour with big data under the GDPR. Computer law & security review, 35(3), 306-329.

[14] Scarcella, L. (2019). Tax compliance and privacy rights in profiling and automated decision making. Internet Policy Review, 8(4).

[15] Sidhu, N., Jain, A., Shukla, Y., Patil, T. B., & Sawant-Patil, S. T. (2018). Automated Toll Collection coupled with Anti-theft and Vehicle Document Verification System using RFID and Arduino Uno. International J ournal of Computer Sciences and Engineering.

[16] Tsindeliani, I., Matyanova, E., Razgildeev, A., Vasilyeva, E., Dudnik, D., & Mikhailova, A. (2021). Tax optimization in the modern tax system under the influence of digitalization: Russian case study. European Journal of Comparative Law and Governance, 8(4), 429-452

[17] Sande, D., Okiro, K., Wanjare, J., Omoro, N., & Ojera, P. B. (2023). The Joint Effect of Budgeting Practices, Public Participation and Automated Revenue Collection System on Financial Performance of County Governments in Kenya. African Journal of Emerging Issues, 5(8), 67-86.

[18] Umenweke, M. N., Nwabachili, C. O., & Anushiem, U. M. (2023). Appraisal of the Challenges for Taxation of Digital Economy in Nigeria. Unizik Law Journal, 19(1).

[19] Patlak, O. (2023). Strategies to Ensure Software Quality in Existing Java Applications (Doctoral dissertation, University of Applied Sciences).

[20] Olaolu Olabimtan, C. E. (2010). Public Financial Management Performance Assessment Report for Yobe State, Nigeria.(PEFA). Yobe.

[21] Trubiani, C., Pinciroli, R., Biaggi, A., & Fontana, F. A. (2023). Automated Detection of Software Performance Antipatterns in Java-Based Applications. IEEE Transactions on Software Engineering.

[22] Nass, M., Alégroth, E., Feldt, R., & Coppola, R. (2023, April). Robust web element identification for evolving applications by considering visual overlaps. In 2023 IEEE Conference on Software Testing, Verification and Validation (ICST) (pp. 258-268). IEEE.

[23] Ding, Y., & Zhou, G. L. (2023). Some Applications of the Maynard–Tao Theorem. The American Mathematical Monthly, 130(6), 583-586.