

Designing a Software Framework to Automate Internal Audit Accounting System of an Organization

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ABSTRACT

In today's rapidly evolving business environment, the need for robust and efficient audit processes has become more critical than ever. This research aimed to design a software framework to automate internal audit accounting system of an organization. The proposed framework leverages modern technologies and methodologies to streamline the auditing process, ensuring accuracy, compliance, and efficiency. By automating repetitive and data-intensive tasks, the system reduces the risk of human error and enables auditors to focus on more complex, value-added activities. Key features of the framework include real-time data processing, integration with existing accounting software, and advanced reporting capabilities. The design also emphasizes flexibility, allowing the system to be customized to meet the specific needs of different organizations. Through this automated solution, organizations can achieve more consistent audit outcomes, enhance regulatory compliance, and optimize resource allocation. This framework represents a significant advancement in the field of audit accounting, providing a scalable and adaptable tool for modern organizations.

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1.0 Introduction

The increasing incidence of fraud and misappropriation of public fund and property by the accounting officers and chief executives in the handling of public fund possess a question as to whether auditing plays any role towards ensuring proper accountability. It is against this background that the constitution of the Federal Republic of Nigeria provides a law that established Audit Departments both at the Federal and State levels. Section 125(1) of the 1999 constitution provides that there shall be an Auditor General for each state of the Federation who shall be appointed in accordance with the provision of section 126 of the constitution. The term Audit is derived from the latin verb 'audie' which means 'to hear'. The origin of audit dates from ancient times when the landowners allowed tenant farmers to work on their land whilst the landowners themselves did not become involved in the business of farming. The landlords relied upon an overseer who 'listened' to the accounts of stewardship given by the tenants. At this period the word audit is described as independent examination of, and expression of opinion on, the financial statements of an enterprises by an appointed auditor in pursuance of that appointment and in compliance with any relevant stator obligation [1].

2.0 Related Works

Internal Audit is the examination, monitoring and analysis of activities related to a company's operation, including its business structure, employee information systems. An internal audit is designed to review what a company is doing in order to identify potential threats to the organization's health and profitability, and to make suggestions for mitigating the risk associated with those threats in order to minimize costs [1].

The scope of internal auditing within an organization is broad and may involve topics such as an organization's governance, risk management and management controls over: efficiency/effectiveness of operations (including safeguarding of assets), the reliability of financial and management reporting, and compliance with laws and regulations. Internal auditing may also involve conducting proactive fraud audits to identify potentially fraudulent acts; participating in fraud investigations under the direction of fraud investigation professionals, and conducting post investigation fraud audits to identify control breakdowns and establish financial loss [2].

According to James [3] the concept of audit has undergone a sea change and the earlier objectives, viz., "fault finding" is no more



relevant or management not interested in pursuing this. Internal Audit is a diverse and specialized function in various fields of auditing. It is a tool used to detect good, bad and the ugly. Internal Audit concept is an attempt to achieve an ideal combination of financial audit, operational auditing and reviews the plans for future. The Internal Audit, to be effective should provide three types of services PPC, viz., Preventive. Internal auditing may also involve conducting proactive fraud audits to identify potentially fraudulent acts; participating in fraud investigations under the direction of fraud investigation professionals, and conducting post investigation fraud audits to identify control breakdowns and establish financial loss [2].

An increasing amount of companies is transforming their IT departments towards cross-functional teams which are responsible for both development and operation of software and use automation to speed up their delivery process [4].

Computer assisted audit techniques (CAATs) encompass a range of computerized techniques that internal and external auditors use to facilitate their audit objectives. One of the most important CAATs is generalized audit software (GAS), which is a class of packaged software that allows auditors to interrogate a variety of databases, application software and other sources and then conduct analyzes and audit routines on the extracted or live data [5].

The ability to develop bots to automate tasks and processes using robotic process automation (RPA) is receiving significant attention in accounting. Auditors often struggle to know what tasks to automate and how to prioritize bot development. Drawing upon socio-technical systems (STS) theory and using a design science methodology, we develop and validate a three-step evaluation framework to assist auditors as they decide what activities to automate. We validate this framework using interviews, surveys of experienced internal and external auditors, and two case studies. By developing and validating our framework through the lens of STS theory, we also provide several insights that help explain the mixed findings in prior research regarding the effectiveness and adoption of emerging technologies in audit. The implications of our study yield many opportunities for future research in the areas of RPA and emerging technologies in audit [6].

Teeter *et al.* [7] present a research framework identifying areas where ICT and automated audit analytics enable auditors to work remotely, reduce travel costs and latency, and increase efficiency and coverage.

Kusnadi and Kirana [8] conducted research to identify the deficiencies in the application caused by the absence of a blueprint and to emphasize the importance of creating a blueprint in the application development process. The research adopts a descriptive qualitative approach and tends to use analysis. The primary data for this research were obtained through interviews and literature studies, and bibliographic references were used to compile the literature.

The requirements collected were thematically analyzed and used to design the web based financial audit system. The system developed seeks to provide new opportunities in compliance auditing, furthering more opportunities that will make auditing easier and more cost effective. In addition, there is an increase in financial transactions being cleared by the internal auditors, quick submission of audit reports to management and enhanced timely retrieval of audit information [9].

Bidarova *et al.* [10] proposed software module for automating the processes of preventive measures and internal audits in pharmaceutical organizations will help minimize risks within pharmaceutical organizations, eliminate and prevent inconsistencies identified during the internal audit and prevent possible errors in the future. The control tool described in the research will increase the efficiency of the quality system of pharmaceutical organizations. Disciplinary: Pharmacy Management.

Alles *et al.* [11] developed and implementation of monitoring and control layer for continuous monitoring of business process controls (CMBPC) in the US internal IT audit department of Siemens Corporation.

This research focuses on the utility of IPA for the audit profession. Specifically, this paper provides a framework for implementing IPA in audit engagements using the concept of audit workflow. A simple prototype based on a simulated use case is constructed to illustrate the IPA implementation framework [12].

The data are displayed in an interactive mode, providing auditors with a work platform to examine extracted data and prepare auditing reports. CPAS monitors key operational analytics, compares these with standards, and calls the auditor's attention to any problems that may exist. Ultimately, this technology will utilize system probes that will monitor the auditee system and intervene when needed [13].

Murthy & Groomer [14] the extensible markup language (XML) and Web services, can be utilized to facilitate continuous auditing for the next generation of accounting systems. Relying on a number of components of Web services technology, this article presents a new model for continuously audit business processes, referred to as continuous auditing web service (CAWS).

Internal and External Audit

Internal auditors and external auditors are both audit, but have different objectives. Internal auditors generally consider operations a whole relative to objectives. While, External auditors focus primarily on financial systems that have a direct, significant effect on the amounts reported in financial statements. Internal auditors consider even small amounts of fraud, waste, and abuse as symptoms of underlying issues. The external auditor considers just what materially affects the financial statements since that is the nature of their engagement [15].



Auditing in its modern concept is a systematic, intelligent, scientific, critical and thorough examination of books of accounts of the organization by an independent person or body of persons with the help of vouchers, documents, information and explanations received from the authorities, for the purpose of ascertaining whether the transactions entered in the books of accounts are genuine and have been entered with proper authority. Its job is also to find out whether they are arithmetically accurate and that the accounts and the financial statements are prepared in accordance with law and rules and regulations of the organization in particular the accounting standards and standard auditing practices mandated by the Institute of Chartered Accountants [3].

Manual Internal Audit Accounting (Internal Control) System

Internal control is broadly defined as a process, effected by an entity's board of directors, management, and other personnel, designed to provide reasonable assurance regarding the achievement and objectives for which all businesses strive. Manual Internal Audit (Internal Control) refers to all activities that are carried out by the Audit Unit manually to examine, monitor and analyze the activities related to a company's operation, including its business structure, employee behavior and information systems. An internal audit is designed to review what a company is doing in order to identify potential threats to the organization's health and profitability, and to make suggestions for mitigating the risk associated with those threats in order to minimize costs [1].

Automated Internal Audit Accounting System

Every business has numerous processes; some simple, others complex and cumbersome. But as the business grows, acquires new customers, enters new markets and keeps pace with constant changes in information technology, companies need to maintain highly accurate and up-to-date accounting, inventory and statutory records. This is where a Computerized System helps simplify, integrate, and streamline all the business processes, cost-effectively and easily and helps presents the true picture of all the business undertakings to users of financial reports. With the decrease in the price of computers and accounting programs, this method of keeping books is becoming popular [15].

3.0 System Analysis and Design

In carrying out this research, oral interview and observation were employed in finding facts about the existing system. Textbooks, Internet and Journal publications were also consulted for effective analysis and design of the new system.

Analysis of the Existing System

The first step in analyzing an existing system is to identify how the existing system operates, what is the problem, what is to be done in order to solve the problem and to make sure that the measure(s)

taken to resolve the problem is sufficient and consistent. In carrying out this analysis, manual system of operation of the organization was observed as follows: All expenses intended to be spent are prepared in the payment vouchers and the vouchers are taken to the Audit Unit to check the payment in order to confirm the calculations and authenticate approval. The unit keeps records of each class of expenditure and from time-to-time compare the allocated amount budgeted for each class of expenditure in order to advice management in taking decision on its rate of spending.

In the case of personnel records, the Personnel Manager takes all the staff records to the Audit Unit for examination and recording in to the appropriate ledger. Whenever the need arise, the information would be organized and brought to management for decision making.

UML (Unified Modelling Language) Design

The Unified Modelling Language (UML) is a general-purpose modelling language in the field of software engineering, which is designed to provide a standard way to actualise the design of a system. This includes:-

1. Used Case Diagram
2. Activity Diagram

Use Case Diagram

The Use Case Diagram recognize the functionality provided by the system (use case), the user (actor) who interact with the system and the association between the user and the functionality. This is used in the analysis phase of software development to articulate the high level requirement of the system.

Description of Diagram

This use case describes how the Administrator update information in Internal Audit System such as add, Update and generate report.

Events flow

The use case starts when the User wishes to add, update and generate any information.

1. The system demands that the User specify the function he would like to perform (either add, update or generate report).
2. Once the User selects his request, one of the sub flows is executed. If the User selected - Employee, the employee form is displayed to either add or update records.

If the User selected - Expenses, the Expenses form is displayed to allow user make request for expenditure. If the User selected - Budget, the Budget Form is created to allow user add or update budget. If the User selected - Report, the report generation section is executed to allow user generate whichever report – variance analysis, employee information or Budget report.

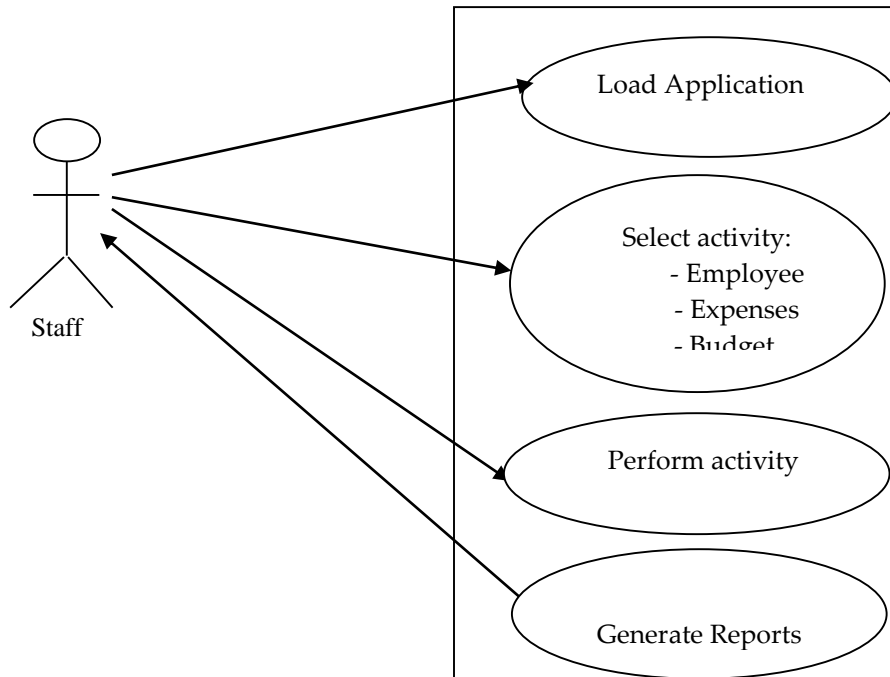


Figure 1: Use-Case Diagram for Internal Audit System

System Interfaces

This part describes how the software interfaces with the user for input or output. Therefore, for this research studies, these comprise of User Interface and Admin. Interface of the system.

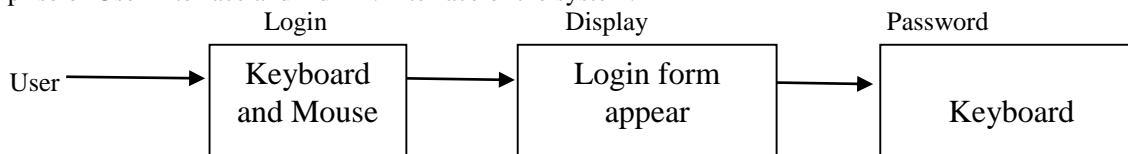


Figure 2: Design of Expenses Form

Input Design

Data is the main ingredients required in every system for processing. Therefore the design for input was done to avoid delay in entering the data and keep the process simple to end users. Forms are designed for users to supply data into the system. The following are the major input screen used for the proposed system:



First Name

Middle name

Last Name

Department

Expenditure Date

Account ID

Amount

Approved by

Figure 3: Design of Expenses Form

Acct ID

Acc Description

Budget Year

Amount

Expenditure Date

Figure 4: Design of Budget Form

PSN Date of Employ

First Name Qualification

Middle Name Department

Last Name GradeLevel

DoB Position

LGA

State

Figure 5: Design of Employee Form

| Exp. Date | Acct. Description | Budgeted Amount | Amount Spent | Variance |
|-----------|-------------------|-----------------|--------------|----------|
| | | | | |
| | | | | |
| | | | | |

Figure 6: Output Design of Variance Report

| First Name | Employee PSN | Middle Name | Last Name | Qualif. | G/level | Position | Dept. | LGA | State |
|------------|--------------|-------------|-----------|---------|---------|----------|-------|-----|-------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Figure 7: Output Design of Personnel Report

| Output Design of Budget Report | | | |
|--------------------------------|-------------------|-------------|---------------|
| Acct ID | Acct. Description | Budget Date | Budget Amount |
| | | | |
| | | | |
| | | | |

Figure 8: Output Design of Budget Report

Database Design

This is the process of producing a detailed data model of a database. A fully attributed data model contains detailed

attributes for each entity. In this research, the database structures used to store data is relational database.

Table 1: Expenses Request/Approval

| FIELD NAME | CHARACTER | FIELD WIDTH |
|-----------------|-----------|-------------|
| DATE OF REQUEST | DATE | 8 |
| DEPARTMENT | TEXT | 10 |
| STAFF NAME | TEXT | 20 |
| EXPENSES | TEXT | 15 |
| AMOUNT | NUMBER | 10 |
| APPROVED BY | TEXT | 20 |
| POSITION/RANK | TEXT | 12 |

| | | |
|-----------------|------|----|
| POSITION/RANK | TEXT | 12 |
| LGA | TEXT | 10 |
| STATE OF ORIGIN | TEXT | 10 |

Table 2: Employee

| FIELD NAME | CHARACTER | FIELD WIDTH |
|------------------------|-----------|-------------|
| STAFF ID | VARCHAR | 8 |
| EMPLOYEE NAME | TEXT | 25 |
| DEPARTMENT | TEXT | 10 |
| DATE OF BIRTH | DATE | 8 |
| DATE OF FIRST APPOINT. | DATE | 8 |
| DATE OF LAST PROMOTION | DATE | 8 |
| QUALIFICATION | TEXT | 12 |
| GRADE LEVEL | NUMERIC | 4 |

Table 3: Budget Allocation

| FIELD NAME | CHARACTER | FIELD WIDTH |
|---------------------------|-----------|-------------|
| DATE OF REQUEST | DATE | 8 |
| DEPARTMENT | TEXT | 10 |
| STAFF NAME | TEXT | 20 |
| EXPENSES | TEXT | 15 |
| AMOUNT | NUMBER | 10 |
| NAME OF APPROVING OFFICER | TEXT | 20 |
| POSITION/RANK | TEXT | 12 |

4.0 System Implementation

Implementation phase is the most important place in the software process, where all the “paper” work is realised and the system is made functional. Here, Login Menu and various forms snapped shot are presented using sample of data.

Implementation of Main Menu

The Switch Board is the first page to be displayed when the software is loaded. It contains various buttons that can be used to carry out operations.

Chart of Account Form

The Chart of Account Form is a place where Account ID, Description and Account type will be entered.

Local Government Form

Bellow is the Local Government Form where each Local Government and State will be keyed in before starting any operation.



Figure 9: Main Menu

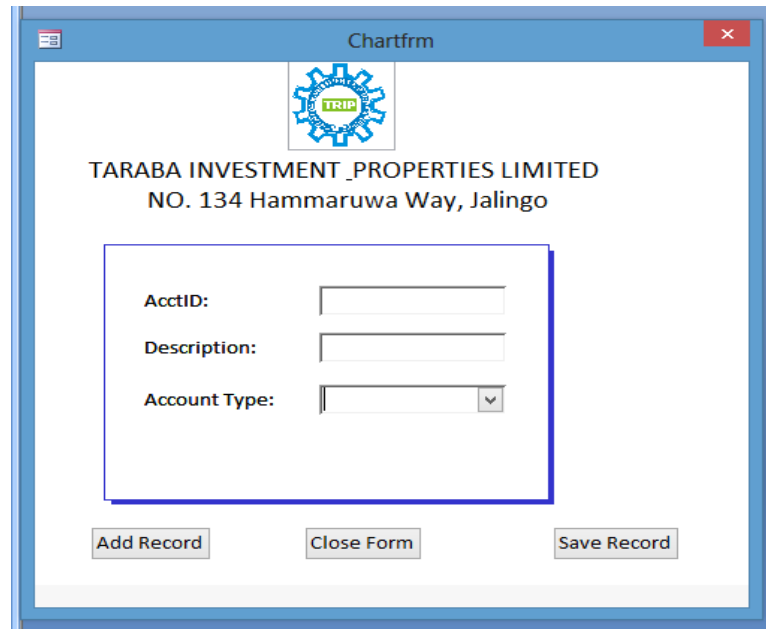


Figure 10: Account Form

Figure 11: Local Government Form

Implementation of Employee Record Form

Below is the sample of Form use to enter the Employee records.

Figure 12: Employee Record Form

Implementation of Expenses/Approval Form

This is the expenses and approval form that any staff will use to carry out any expenditure.

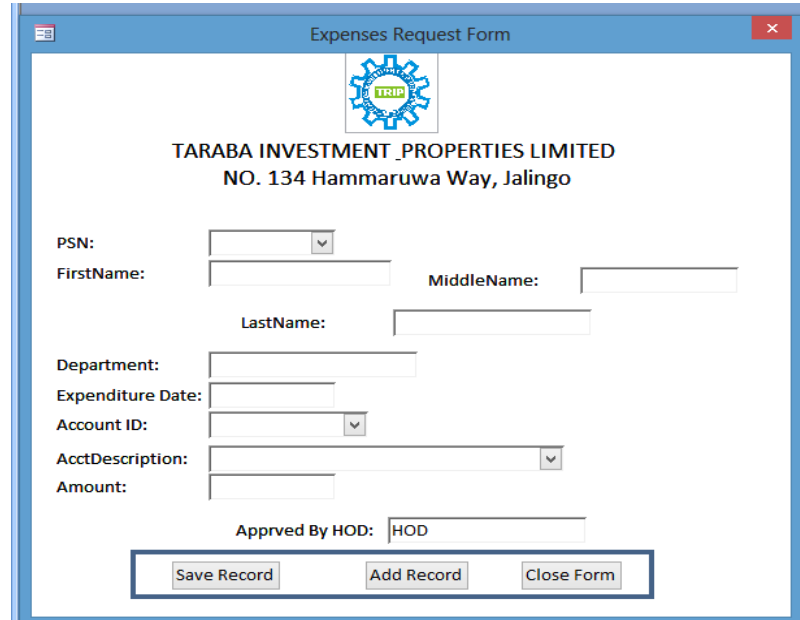


Figure 13: Approval Form

Implementation of Budget Form

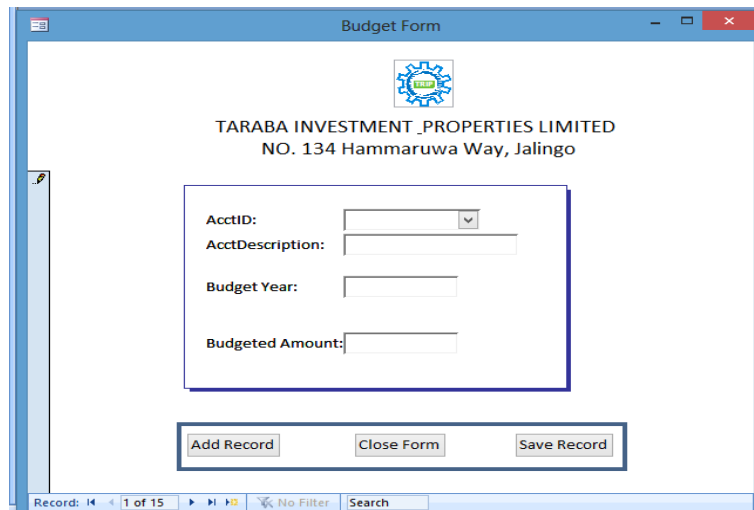



Figure 14: Budget Form

Implementation of Report of Variance Analysis

Samples of records are used to demonstrate the Report of the Variance Analysis.



Qrybudgeted Varianc1

TARABA INVESTMENT_PROPERTIES LIMITED
NO. 134 Hammaruwa Way, Jalingo


Variance Analysis

| ExpDate by Month | ExpDate | AcctDescription | Budgetedamount | Amount | Variance |
|------------------|------------|-----------------|----------------|--------|----------|
| January 2015 | | | | | |
| | 23/01/2015 | VEHICLE REPAIRS | 50000 | 6000 | -44000 |
| 24 January 2015 | | | | | |

Figure 15: Report of Variance Analysis

Implementation of Report of Budget Allocation

The report of the Budget Allocation is shown below:



BudgetT

TARABA INVESTMENT_PROPERTIES LIMITED
NO. 134 Hammaruwa Way, Jalingo

Budget

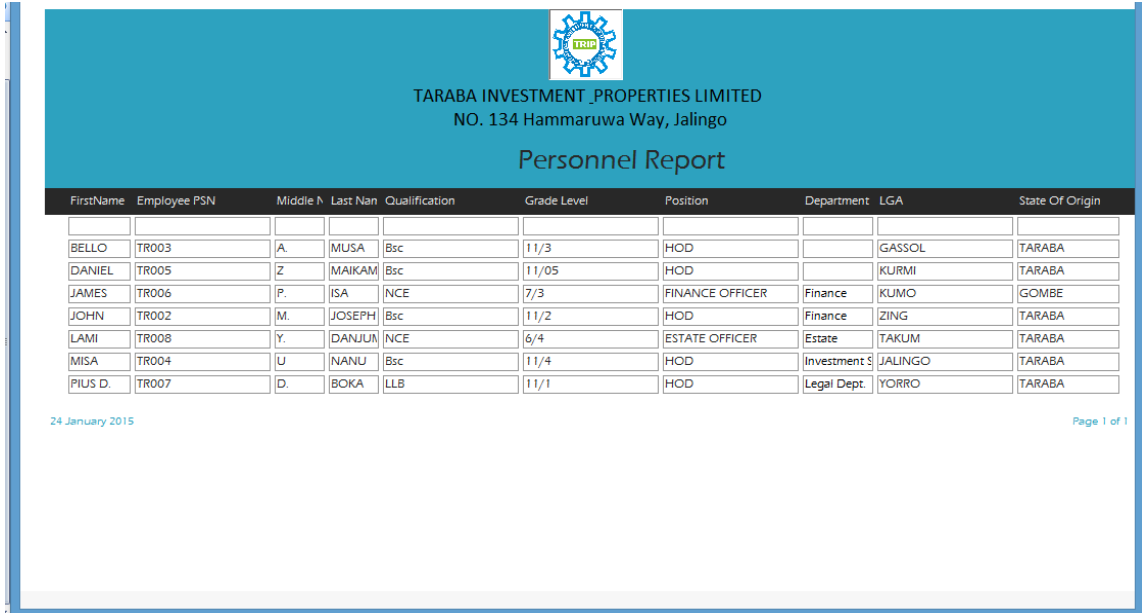
| AcctID | AcctDescription | Budget Date | Budgetedamount |
|--------|-----------------|-------------|----------------|
| 19 | Vehicle repairs | 2015 | 50000 |

24 January 2015 Page 1 of 1

Figure 16: Report of Budget Allocation

Implementation of Comprehensive Report of Employees

Using some samples of data below is the snap shot of employees Comprehensive Report.



TARABA INVESTMENT PROPERTIES LIMITED
NO. 134 Hammaruwa Way, Jalingo

Personnel Report

| First Name | Employee PSN | Middle Initial | Last Name | Qualification | Grade Level | Position | Department | LGA | State Of Origin |
|------------|--------------|----------------|-----------|---------------|-------------|-----------------|--------------|---------|-----------------|
| BELLO | TR003 | A. | MUSA | Bsc | 11/3 | HOD | | GASSOL | TARABA |
| DANIEL | TR005 | Z | MAIKAM | Bsc | 11/05 | HOD | | KURMI | TARABA |
| JAMES | TR006 | P. | ISA | NCE | 7/3 | FINANCE OFFICER | Finance | KUMO | GOMBE |
| JOHN | TR002 | M. | JOSEPH | Bsc | 11/2 | HOD | Finance | ZING | TARABA |
| LAMI | TR008 | Y. | DANJUN | NCE | 6/4 | ESTATE OFFICER | Estate | TAKUM | TARABA |
| MISA | TR004 | U | NANJU | Bsc | 11/4 | HOD | Investment S | JALINGO | TARABA |
| PIUS D. | TR007 | D. | BOKA | LLB | 11/1 | HOD | Legal Dept. | YORRO | TARABA |

24 January 2015 Page 1 of 1

Figure 17: Comprehensive Report of Employees

Table 4: Method's Adopted for Automating Audit Accounting System

| S/N | Author/s and Date | Research Title | Method/s Used |
|-----|--|--|--|
| 1. | Teeter, R. A., Alles, M. G., & Vasarhelyi, M. A. (2010) | The remote audit. Journal of emerging technologies in accounting | Analytical Procedures |
| 2. | Debreceny, R., Lee, S. L., Neo, W., & Toh, J. S. (2005) | Employing generalized audit software in the financial services sector: Challenges and opportunities | Computer Assisted Audit Techniques (CAATs) |
| 3. | Eulerich, M., Pawlowski, J., Waddoups, N. J., & Wood, D. A. (2022) | A framework for using robotic process automation for audit tasks | Socio-technical systems (STS) |
| 4. | Murthy, U. S., & Groomer, S. M. (2004) | A continuous auditing web services model for XML-based accounting systems | Continuous auditing web service (CAWS) |
| 5. | Plant, O. H., van Hillegersberg, J., & Aldea, A. (2022) | Rethinking IT governance: Designing a framework for mitigating risk and fostering internal control in a DevOps environment | DevOp Approach |
| 6. | Kusnadi, S. S. N., & Kirana, N. W. I. (2023) | The Influence of Blueprints on Internal Audit Monitoring System (IAMS) Application Development | Descriptive Qualitative Approach |
| 7. | Adong, G. (2016) | Web based financial audit system for a multi campus institution | Paper Prototyping |

| | | | |
|----|--|---|---|
| 8 | Bidarova, F. N., Remizov, O. V., Tsakhilova, E. N., Tsiklauri, V. G., Karaeva, M. S., & Kataev, D. O. (2022) | Development of an Automated Module for Preventive Measures and Internal Audits in Pharmaceutical Organizations | Service Inspector Platform |
| 9 | Vasarhelyi, M. A., & Halper, F. B. (2018) | The continuous audit of online Systems | Continuous Process Auditing System (CPAS) |
| 10 | Alles, M., Brennan, G., Kogan, A., & Vasarhelyi, M. A. (2006) | Continuous monitoring of business process controls: A pilot implementation of a continuous auditing system at Siemens | Continuous Monitoring of Business Process Controls (CMBPC) |
| 11 | Zhang, C. (2019) | Intelligent process automation in audit | Robotic Process Automation (RPA) and Artificial Intelligence (AI) |

5.0 Conclusion

A new computer system for automated internal audit accounting system has been designed and implemented in this project. The exercise was carried out based on the operations of the auditing/personnel department of Taraba Investment and Properties Ltd. Number of problems encountered in the manual internal audit accounting system process as follows:-

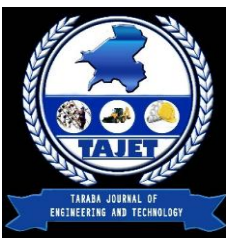
1. Handling records beset with problems. The records are not kept well and retrieval sometimes becomes very difficult.
2. Loss of records is always common to manual auditing as there is no computerized way of storing the information contained in these records.
3. Calculation can sometime be wrong. In most cases, this happens through many accounts and names which resulted to suspense account being opened and could not be closed unless as a charge or credit to profit and loss account.

Hence, the introduction of automated system based on the foregoing opportunities:

- i. Consistency of automated internal audit accounting system standard
- ii. Fast discharge of auditing responsibilities
- iii. Accuracy of computations
- iv. Exercise man-hour requirement of the system
- v. Provision of easy adjustment when there is mistake

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