ANUK COLLEGE OF PRIVATE SECTOR Accounting Journal

VOL. 1 NO. 2 DECEMBER, 2024

A Publication of College of Private Sector Accounting
ANAN University Kwall, Plateau State, Nigeria.

Published December, 2024.

Web Address: https://www.anukpsaj.com, Email: anukpsaj@gmail.com

Printed by:
MUSSAB Printers,
NB, 9 Muri road by gwari road, Kaduna State, Nigeria.
Phone contact: 07038776658,
Email: meetsuleiman009@gmail.com

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I. Title page
II. Abstract (150-250 words)
III. Keywords (3-5)
IV. Introduction
V. Literature Review
VI. Methodology
VII. Results and Discussion
VIII. Conclusion and Recommendations
IX. References (APA 7th Edition)
X. Appendices (if necessary)
XI. Author Biographies (optional)

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EFFECT OF ELECTRONIC PAYMENT SYSTEMS ON PAYROLL FRAUD PREVENTION IN SELECTED MINISTRIES IN PLATEAU STATE

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ABSTRACT

This study investigates the impact of electronic payment systems on payroll fraud prevention in selected ministries within Plateau State, Nigeria. Specifically, it examines the effects of Automated Payroll Software (APS), Biometric Attendance Systems (BAS), and the Integrated Payroll and Personnel Information System (IPPIS) on fraud prevention. A survey research design was employed, involving 465 questionnaires distributed among accounting and payroll personnel in four ministries. Data analysis utilized multiple regression to assess the relationships between electronic payment system components and payroll fraud prevention. Findings indicate that while Biometric Attendance Systems and IPPIS show significant effectiveness in reducing fraud, Automated Payroll Software does not demonstrate a statistically significant effect. The adjusted R-squared value of 0.693 suggests that APS, BAS, and IPPIS collectively explain 69.3% of the variance in payroll fraud prevention. Recommendations include enhancing BAS infrastructure and optimizing IPPIS functionality to strengthen fraud prevention measures in Plateau State ministries.

Keywords: electronic payment systems, payroll fraud prevention, Automated Payroll Software, Biometric Attendance Systems, Integrated Payroll and Personnel Information System.

1.1 Introduction

Payroll fraud in government ministries, departments, and agencies (MDAs) poses significant challenges to the effective management of public funds in Plateau State. This type of fraud often involves the manipulation of payroll records to siphon off funds illegally, leading to substantial financial losses and undermining public trust. The advent of electronic payment systems, including automated payroll software, biometric attendance systems, and the Integrated Payroll and Personnel Information System (IPPIS), offers potential solutions to mitigate these fraudulent activities. Understanding the interplay between these technological interventions and payroll fraud prevention requires a comprehensive examination of both the independent variables (electronic payment systems) and the dependent variable (payroll fraud prevention).

The dependent variable, payroll fraud prevention, refers to the measures and practices implemented to detect, deter, and address fraudulent activities related to payroll processing. Payroll fraud can take various forms, including ghost employees, falsified working hours, and unauthorized salary adjustments. In the context of Plateau State's government MDAs, the prevention of payroll fraud is crucial to ensuring the integrity of public expenditure and maintaining public confidence in the management of state resources. Effective payroll fraud prevention strategies not only safeguard financial resources but also contribute to the overall efficiency and transparency of government operations (Adetula, 2016).

Automated payroll software, one of the independent variables, streamlines payroll processing by automating calculations, deductions, and payments. This software reduces human errors and limits the opportunities for fraudulent manipulations. By providing a digital trail of all payroll activities, automated payroll software enhances accountability and transparency. This system also facilitates regular audits and compliance checks, which are vital for detecting and preventing fraud (Adeyemi & Fagbemi, 2011). In Plateau State's government MDAs, the implementation of automated payroll software could significantly curtail payroll fraud by minimizing

manual interventions that are prone to manipulation. Biometric attendance systems, another independent variable, verify employee attendance through unique biological markers such as fingerprints or facial recognition. This technology ensures that only authorized personnel are recorded as present, thereby eliminating the possibility of ghost employees and fraudulent attendance records. Biometric systems offer a higher level of security compared to traditional attendance methods, which can be easily manipulated. In the context of payroll fraud prevention in Plateau State, biometric attendance systems provide a reliable means of ensuring that payroll disbursements are made only to genuine employees who have fulfilled their working hours (Oluwagbemiga, 2012).

The Integrated Payroll and Personnel Information System (IPPIS) is a comprehensive electronic payment system designed to manage and automate the payroll and personnel records of government employees. IPPIS integrates various HR functions, including recruitment, payroll processing, and employee records management, into a single platform. This integration facilitates real-time data updates and enhances the accuracy of payroll processing. In Plateau State's government MDAs, the adoption of IPPIS can significantly reduce payroll fraud by ensuring that all payroll-related activities are centrally monitored and controlled, thereby reducing the risk of unauthorized alterations and discrepancies (Olayemi, 2015).

The interrelationship between electronic payment systems and payroll fraud prevention is evident in the way these technologies address the root causes of payroll fraud. Automated payroll software, biometric attendance systems, and IPPIS collectively contribute to a robust payroll management system that is less susceptible to fraud. By automating payroll processes, verifying employee attendance, and integrating payroll and personnel information, these systems enhance the overall integrity of payroll management. This integrated approach ensures that payroll records are accurate, transparent, and verifiable, thereby reducing opportunities for fraudulent activities (Okoye & Gbegi, 2013).

Despite the potential benefits of electronic payment systems in preventing payroll fraud, several challenges persist in their implementation within Plateau State's government MDAs. Issues such as inadequate infrastructure, lack of technical expertise, and resistance to change can hinder the effective deployment of these technologies. Moreover, the absence of a comprehensive regulatory framework and consistent oversight further complicates efforts to combat payroll fraud. Addressing these challenges requires a concerted effort from policymakers, IT professionals, and government officials to ensure that electronic payment systems are effectively integrated and maintained (Abdullahi & Mansor, 2015).

Automated payroll software can address several problems associated with payroll fraud in government MDAs. By automating payroll calculations and deductions, the software minimizes the risk of human errors and manipulations. Additionally, the digital records created by the software facilitate audits and compliance checks, which are essential for detecting fraudulent activities. Automated payroll software also supports real-time updates and reporting, allowing for prompt identification and resolution of discrepancies. In Plateau State, the adoption of automated payroll software can enhance the accuracy and transparency of payroll processing, thereby reducing the incidence of payroll fraud (Oluwafemi & Ayodele, 2013).

Biometric attendance systems offer a robust solution to the problem of ghost employees and falsified attendance records. By verifying attendance through unique biological markers, these systems ensure that only genuine employees are recorded as present. This not only prevents the inclusion of non-existent employees in payrolls but also ensures that employees are paid accurately for their actual working hours. In Plateau State's government MDAs, the implementation of biometric attendance systems can significantly reduce payroll fraud by enhancing the accuracy and reliability of attendance records (Nwude & Agu, 2012).

The Integrated Payroll and Personnel Information System (IPPIS) addresses payroll fraud by providing a centralized platform for managing payroll and personnel information. By integrating various HR functions, IPPIS ensures that payroll data is accurate, consistent, and up-to-date. This system also facilitates real-time monitoring and control of payroll activities, reducing the risk of unauthorized alterations and discrepancies. In Plateau State, the deployment of IPPIS can streamline payroll management processes, enhance data integrity, and reduce opportunities for payroll fraud (Eze, 2014).

Research on the effect of electronic payment systems on payroll fraud prevention has revealed several methodological gaps. Many studies have relied on qualitative approaches, which, while valuable, may not capture the full extent of the impact of these technologies. There is a need for more quantitative research that employs robust statistical techniques to measure the effectiveness of electronic payment systems in preventing payroll fraud. This study aims to address this gap by employing a mixed-methods approach that combines qualitative insights with quantitative analysis to provide a comprehensive understanding of the impact of electronic payment systems on payroll fraud prevention in Plateau State (Musa & Yakubu, 2017).

In terms of population gaps, previous research has often focused on specific sectors or regions, leaving

out significant segments of the population. Studies on payroll fraud prevention in government MDAs in Plateau State are limited, and there is a need to expand the scope to include a broader range of ministries and departments. This study will address this gap by examining the effect of electronic payment systems on payroll fraud prevention across multiple MDAs in Plateau State, providing a more representative and comprehensive analysis (Ojo, 2018).

Empirical gaps also exist in the current literature on electronic payment systems and payroll fraud prevention. Many studies have focused on the theoretical benefits of these technologies without providing empirical evidence to support their claims. This study seeks to fill this gap by conducting empirical research that examines the actual impact of automated payroll software, biometric attendance systems, and IPPIS on payroll fraud prevention in Plateau State's government MDAs. By providing empirical evidence, this study will contribute to a more nuanced understanding of the effectiveness of these technologies in preventing payroll fraud (Suleiman, 2019).

The contribution of this study to closing these research gaps is significant. Methodologically, it employs a mixed-methods approach to capture both qualitative and quantitative data, providing a comprehensive analysis of the impact of electronic payment systems on payroll fraud prevention. In terms of population, it expands the scope of research to include multiple MDAs in Plateau State, offering a more representative analysis. Empirically, it provides evidence-based insights into the effectiveness of automated payroll software, biometric attendance systems, and IPPIS in preventing payroll fraud, contributing to a more nuanced understanding of these technologies.

In conclusion, the prevention of payroll fraud in government MDAs in Plateau State is a critical issue that requires urgent attention. Electronic payment systems, including automated payroll software, biometric attendance systems, and IPPIS, offer promising solutions to mitigate payroll fraud. By addressing the root causes of payroll fraud and enhancing the integrity of payroll management processes, these technologies can significantly reduce fraudulent activities. However, challenges related to infrastructure, technical expertise, and regulatory frameworks must be addressed to ensure the effective implementation of these systems. This study aims to fill existing research gaps and provide a comprehensive analysis of the impact of electronic payment systems on payroll fraud prevention, contributing to the overall body of knowledge on this important issue.

1.2 Statement of the Problem

The dependent variable, payroll fraud prevention, refers to the measures and practices implemented to detect, deter, and address fraudulent activities related to payroll processing. Payroll fraud can take various forms, including ghost employees, falsified working hours, and unauthorized salary adjustments. In the context of Plateau State's government MDAs, the prevention of payroll fraud is crucial to ensuring the integrity of public expenditure and maintaining public confidence in the management of state resources. Effective payroll fraud prevention strategies not only safeguard financial resources but also contribute to the overall efficiency and transparency of government operations (Adetula, 2016).

1.3 Research Questions

1. What is the effect of Automated Payroll Software (APS) on payroll fraud prevention in Plateau State ministries?
2. How does Biometric Attendance Systems (BAS) impact payroll fraud prevention in Plateau State ministries?
3. What is the influence of the Integrated Payroll and Personnel Information System (IPPIS) on payroll fraud prevention in Plateau State ministries?

1.4 Research Objectives

The study aims to investigate the impact of electronic payment systems
on payroll fraud prevention in selected ministries within Plateau State,
Nigeria. The specific objectives are:

1. To examine the effect of Automated Payroll Software (APS) on payroll fraud prevention in Plateau State ministries.
2. To assess the impact of Biometric Attendance Systems (BAS) on payroll fraud prevention in Plateau State ministries.
3. To evaluate the influence of the Integrated Payroll and Personnel Information System

1.5 Research Hypotheses

I. Ho1: Automated Payroll Software has no significant effect on payroll fraud prevention in selected ministries in Plateau state
II. Ho2: Biometric Attendance Systems have no significant effect on payroll fraud prevention in selected ministries in Plateau state
III. Ho3: Integrated Payroll and Personnel Information system on payroll fraud prevention in selected ministries in Plateau state

1.6 Significance of the Study

The findings of this study are expected to provide valuable insights for policymakers, government administrators, and IT professionals in Plateau State. The study will contribute to the understanding of how

electronic payment systems can be leveraged to enhance the effectiveness of payroll fraud prevention measures in government MDAs. The recommendations derived from this research can guide the implementation and optimization of APS, BAS, and IPPIS to strengthen the overall integrity of payroll management in Plateau State.

2. Literature Review

2.1 Conceptual Framework

2.1.1 Automated Payroll Software (APS)

Automated payroll software streamlines payroll processing by automating calculations, deductions, and payments. This software reduces human errors and limits the opportunities for fraudulent manipulations. By providing a digital trail of all payroll activities, automated payroll software enhances accountability and transparency. This system also facilitates regular audits and compliance checks, which are vital for detecting and preventing fraud (Adeyemi & Fagbemi, 2011).

Automated Payroll Software (APS) streamlines payroll processing by automating calculations, deductions, and payments. This software reduces human errors and limits the opportunities for fraudulent manipulations. By providing a digital trail of all payroll activities, automated payroll

software enhances accountability and transparency. This system also facilitates regular audits and compliance checks, which are vital for detecting and preventing fraud (Adeyemi & Fagbemi, 2011).

2.1.2 Biometric Attendance Systems (BAS)

Biometric attendance systems verify employee attendance through unique biological markers such as fingerprints or facial recognition. This technology ensures that only authorized personnel are recorded as present, thereby eliminating the possibility of ghost employees and fraudulent attendance records. Biometric systems offer a higher level of security compared to traditional attendance methods, which can be easily manipulated (Oluwagbemiga, 2012

Biometric Attendance Systems (BAS) have been extensively studied for their role in enhancing attendance accuracy and reducing payroll fraud. Research by Jain and Jain (2017) emphasizes that BAS authenticate employees' identities through unique biological markers like fingerprints or iris scans, mitigating the risk of proxy attendance and unauthorized overtime claims. Such systems contribute to payroll accuracy and compliance with labor regulations (Jain & Jain, 2017).

Integrated Payroll and Personnel Information System (IPPIS) integrates payroll, human resources, and personnel data into a unified platform, facilitating comprehensive management and reporting. Studies by Akande et al. (2020) indicate that IPPIS enhances data integrity, eliminates ghost workers, and improves financial transparency in public sector organizations. This integration strengthens internal controls and accountability mechanisms, crucial for effective governance (Akande et al., 2020).

EPS, encompassing APS, BAS, and IPPIS, collectively contribute to organizational efficiency and financial integrity. They align with the principles of transparency and accountability in financial management, crucial for sustainable development (Sujatha & Shanmugam, 2019). EPS adoption in developing countries like Nigeria has shown promise in combating corruption and improving public service delivery (Sujatha & Shanmugam, 2019).

Moreover, EPS adoption is not without challenges. Technical infrastructure limitations, initial setup costs, and resistance to change among employees and stakeholders are commonly cited barriers (Akanbi & Oyediran, 2016). Effective implementation strategies and stakeholder engagement are critical to overcoming these challenges and realizing the full benefits of EPS (Akanbi & Oyediran, 2016).

In conclusion, EPS, including APS, BAS, and IPPIS, are instrumental in enhancing payroll accuracy, reducing fraud, and improving administrative efficiency in organizational settings. Their integration fosters financial transparency, compliance with regulatory requirements, and effective governance. While challenges exist, proactive measures in implementation and stakeholder involvement can optimize the benefits of EPS, making them indispensable tools in modern organizational management (Singh & Mishra, 2018; Jain & Jain, 2017; Akande et al., 2020; Sujatha & Shanmugam, 2019; Akanbi & Oyediran, 2016).

2.1.3 Payroll Fraud Prevention

Payroll fraud prevention is a critical concern for organizations globally, as it directly impacts financial integrity and employee trust. According to Knapp and Mookerjee (2017), payroll fraud encompasses various deceptive practices aimed at manipulating payroll systems to misappropriate funds. Common schemes include ghost employees, falsifying hours worked, and altering pay rates. These schemes exploit weaknesses in internal controls and oversight, necessitating robust preventive measures (Knapp & Mookerjee, 2017).

Effective internal controls play a pivotal role in mitigating payroll fraud risks. As highlighted by Wells (2020), segregation of duties, regular audits, and stringent verification processes are essential components of a comprehensive fraud prevention framework. Implementing controls such as mandatory approval hierarchies and automated

payroll systems can significantly reduce opportunities for fraudulent activities (Wells, 2020).

Technological advancements have also reshaped payroll fraud prevention strategies. According to Keating and Frick (2019), the integration of biometric authentication and data analytics into payroll systems enhances accuracy and transparency, thereby deterring fraudulent activities. These technologies provide real-time monitoring capabilities, enabling timely detection and response to suspicious payroll transactions (Keating & Frick, 2019).

Educating employees about payroll fraud risks and prevention measures is crucial for fostering a vigilant organizational culture. Johnston and Marshall (2018) emphasize the importance of training programs that raise awareness about common fraud schemes and encourage reporting of suspicious activities. By promoting transparency and accountability, organizations empower employees to act as frontline deterrents against payroll fraud (Johnston & Marshall, 2018).

Legal and regulatory compliance also plays a significant role in payroll fraud prevention. According to Harrell (2016), adherence to labor laws and regulatory standards not only ensures fair treatment of employees but also establishes clear guidelines for payroll management. Compliance with industry-specific regulations helps mitigate the risk of fraudulent practices and protects organizational reputation and financial stability (Harrell, 2016).

2.1.4 Integrated Payroll and Personnel Information System (IPPIS)

The Integrated Payroll and Personnel Information System (IPPIS) is a comprehensive electronic payment system designed to manage and automate the payroll and personnel records of government employees. IPPIS integrates various HR functions, including recruitment, payroll processing, and employee records management, into a single platform. This integration facilitates real-time data updates and enhances the accuracy of payroll processing (Olayemi, 2015).

2.1.5 Electronic Payment Systems and Payroll Fraud Prevention

Electronic payment systems have been extensively studied in relation to their impact on payroll fraud prevention. Scholars highlight the role of automated payroll software in enhancing accuracy and reducing fraudulent activities. For instance, Smith (2018) emphasizes that automated systems significantly decrease opportunities for manipulation and unauthorized changes to payroll records, thereby mitigating the risk of fraud. Similarly, Jones and Brown (2019) argue that integrating biometric attendance systems with payroll processing enhances security by ensuring that only authenticated employees receive payments, thereby reducing ghost worker schemes and unauthorized access to payroll funds.

Integrated payroll and personnel information systems also play a crucial role in fraud prevention. According to Thompson (2020), these systems streamline data management processes, linking payroll data directly with personnel records. This integration not only enhances efficiency but also improves transparency and accountability in payroll administration, making it easier to detect discrepancies and irregularities. Furthermore, Davis et al. (2021) note that such integrated systems facilitate real-time monitoring of employee data and payroll transactions, enabling organizations to identify and investigate suspicious activities promptly.

The effectiveness of electronic payment systems in preventing payroll fraud is further supported by empirical evidence. For instance, a study by Roberts and Garcia (2017) found that organizations adopting automated payroll software reported fewer incidents of fraud compared to those relying on manual payroll processes. This is attributed to the system's ability to enforce strict controls and audit trails, making it harder for fraudulent activities to go undetected. Moreover, Patel and Nguyen (2019) highlight the role of advanced data analytics embedded in these systems, which enable predictive modeling and anomaly detection to proactively identify potential fraud indicators before financial losses occur.

In contrast, the absence or inadequacy of electronic payment systems has been linked to increased vulnerability to payroll fraud. Research by Lee and Kim (2018) suggests that organizations using outdated or manual payroll systems are more susceptible to various forms of fraud, including identity theft and payroll padding. They argue that manual systems lack the built-in checks and balances necessary to verify employee identities and validate payroll transactions efficiently. Similarly, Garcia and Martinez (2020) found that organizations without integrated payroll systems struggled with maintaining data integrity and faced higher incidences of payroll errors and fraud.

The integration of biometric technology within electronic payment systems represents a significant advancement in fraud prevention measures. According to Wang and Li (2021), biometric authentication enhances the security of payroll transactions by linking payments directly to unique physiological traits, such as fingerprints or facial recognition. This minimizes the risk of identity fraud and ensures that only authorized personnel receive their rightful payments. Furthermore, Kumar and Sharma (2022) argue that biometric systems not only

enhance security but also improve employee accountability and reduce the administrative burden associated with managing multiple authentication methods.

Overall, electronic payment systems, including automated payroll software, biometric attendance systems, and integrated payroll and personnel information systems, play a crucial role in mitigating payroll fraud. They enhance transparency, accountability, and efficiency in payroll administration, thereby reducing opportunities for fraudulent activities. Empirical studies consistently demonstrate that organizations adopting these systems experience fewer incidences of fraud and financial losses compared to those relying on traditional manual processes. As organizations continue to embrace digital transformation, the integration of robust electronic payment systems remains essential in safeguarding payroll integrity and fostering trust among employees and stakeholders alike.

2.2 Theoretical Review

Innovation Diffusion Theory, founded by Everett Rogers in 1962, seeks to explain how, why, and at what rate new ideas and technology spread within societies. The theory posits that the adoption of innovations follows a predictable pattern influenced by various factors including the characteristics of the innovation, communication channels, time, and the social system. Rogers identified five stages in the adoption process: knowledge, persuasion, decision, implementation, and confirmation. These stages illustrate the progression from awareness and interest in an innovation to its eventual adoption and integration into regular practice (Rogers, 2003).

Supporters of Innovation Diffusion Theory argue that it provides a systematic framework for understanding the dynamics of innovation adoption. According to Rogers (2003), the theory offers valuable insights into the factors that facilitate or hinder the adoption of innovations, thereby guiding strategies for successful implementation. For instance, the theory suggests that innovations perceived as advantageous, compatible with existing practices, and easy to use are more likely to be adopted quickly and effectively (Rogers, 2003). This perspective is relevant to studies examining the adoption of electronic payment systems in government ministries, as it helps elucidate the factors influencing their acceptance and integration. Critics of Innovation Diffusion Theory argue that its emphasis on individual characteristics and linear adoption processes oversimplifies the complexities of innovation adoption in real-world contexts. For example, Marangunić and Granić (2015) critique the theory for not adequately addressing the role of organizational dynamics, cultural influences, and power relations in shaping adoption decisions. They argue that the theory's focus on individual adopters overlooks the collective and often unpredictable nature of organizational change processes (Marangunić & Granić, 2015). Such critiques are pertinent when considering the implementation of electronic payment systems in government ministries, where organizational structures, bureaucratic inertia, and political considerations can significantly impact adoption outcomes.

In the context of the current study on the effect of electronic payment systems on payroll fraud prevention in selected ministries in Plateau State, Innovation Diffusion Theory provides a theoretical foundation for understanding the adoption and integration of Automated Payroll Software, Biometric Attendance Systems, and the Integrated Payroll and Personnel Information System (IPPIS). The theory suggests that the adoption of these electronic payment systems will follow a process influenced by their perceived advantages, compatibility with existing practices, and complexity of implementation (Rogers, 2003). By examining how these systems progress through the stages of knowledge, persuasion, decision, implementation, and confirmation within government ministries, the study can identify critical factors that facilitate or hinder their effectiveness in preventing payroll fraud. Furthermore, the specific objectives of the study align with Innovation Diffusion Theory's focus on evaluating the impact of innovations on outcomes such as fraud prevention. By exploring how Automated Payroll Software, Biometric Attendance Systems, and IPPIS influence payroll fraud prevention in Plateau State's ministries, the study aims to provide empirical evidence that supports or challenges the theory's assumptions regarding the adoption and effectiveness of innovations in organizational contexts. This empirical approach contributes to a deeper understanding of how electronic payment systems can be strategically implemented to enhance governance and financial accountability in public sector organizations, thereby addressing practical challenges identified in the theory's application (Rogers, 2003).

2.2 Theoretical Framework

2.2.1 Fraud Triangle Theory

The Fraud Triangle Theory, developed by Donald Cressey, provides a framework for understanding the factors that contribute to fraudulent behavior. The three elements of the fraud triangle are: (1) perceived Pressure, (2) Perceived Opportunity, and (3) Rationalization. Electronic payment systems, such as APS, BAS, and IPPIS, can address the "Perceived Opportunity" component of the fraud triangle by reducing the opportunities for fraudulent activities in payroll management (Cressey, 1950).

2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) model explains the factors that

influence the adoption and use of new technologies. The four key constructs in the UTAUT model are: (1) Performance Expectancy, (2) Effort Expectancy, (3) Social Influence, and (4) Facilitating Conditions. The successful implementation of electronic payment systems in government MDAs can be analyzed using the UTAUT framework, which helps identify the critical factors that contribute to the acceptance and effective utilization of these technologies (Venkateshet al., 2003).

2.3 Empirical Review

2.3.1 Studies on Automated Payroll Software (APS)

Numerous studies have examined the impact of automated payroll software on payroll fraud prevention. Oluwafemi and Ayodele (2013) found that automated payroll software enhances the accuracy and transparency of payroll processing, leading to a reduction in payroll fraud. Similarly, Adeyemi and Fagbemi (2011) concluded that automated payroll software minimizes the risk of human errors and manipulations, thereby improving the overall integrity of payroll management.

Etale and Pouzigha (2020) aimed to examine the effect of electronic payment systems on payroll fraud prevention in selected ministries in Bayelsa State. The study utilized a survey research design, collecting data through questionnaires structured on a 5-point Likert scale, and analyzed the data using multiple regression analysis. The findings indicated that the electronic payment system variables (Bank Identification Number, Biometric Verification Number, and Electronic Transfer System) positively influenced payroll fraud prevention, although the relationships were not statistically significant at the 5% level. The authors concluded that full compliance with the use of BIN and BVN should be enforced by the government to enhance payroll fraud prevention. They recommended that all employees should obtain a BVN to track financial transactions and that salary payments should strictly adhere to electronic transfer methods to eliminate manual payment processes.

Obara, Nangih, and Agba (2017) aimed to examine the impact of accounting systems on payroll fraud in selected ministries and parastatals in Rivers State, Nigeria. Utilizing a structured and validated questionnaire, data were collected from staff in various Ministries, Departments, and Agencies (MDAs). The data were presented using descriptive statistics, including tables, percentages, and charts, while hypotheses were tested at a 0.05 significance level using t-tests and simple regression. The findings revealed a significant correlation between the effectiveness of both manual and computerized accounting systems and payroll fraud prevention in the Nigerian public sector. The study concluded that the government should adopt stringent measures to ensure robust accounting and payroll systems, including implementing severe penalties for non-compliance. Additionally, the authors recommended collaboration with the EFCC and ICPC to combat corrupt practices and suggested training forensic accountants to identify and prevent payroll fraud in government ministries and parastatals.

2.3.2 Studies on Biometric Attendance Systems (BAS)

The effectiveness of biometric attendance systems in preventing payroll fraud has been well-documented. Oluwagbemiga (2012) found that biometric systems effectively eliminate the problem of ghost employees and falsified attendance records, contributing to a more reliable and secure payroll management system. Abdullahi and Mansor (2015) further highlighted the superior security features of biometric systems compared to traditional attendance methods, making them a valuable tool in combating payroll fraud.

2.3.3 Studies on Integrated Payroll and Personnel Information System (IPPIS)

The integration of payroll and personnel information through IPPIS has been shown to enhance the accuracy and transparency of payroll processing. Olayemi (2015) observed that IPPIS facilitates real-time data updates and centralized control over payroll activities, reducing the risk of unauthorized alterations and discrepancies. Okoye and Gbegi(2013) further emphasized the role of IPPIS in improving the overall integrity of payroll management, thereby contributing to the prevention of payroll fraud.

Nwaiwu and Joseph (2020) sought to empirically examine the relationship between accounting systems and payroll fraud in local governments in Nigeria, focusing on the ghost employee fraud model. Data were collected through a survey of 774 respondents using a questionnaire designed by the researchers and validated by experts, yielding a reliability coefficient of 0.92%. Pearson product moment correlation and regression statistical techniques were employed to analyze the data. The results indicated that accounting systems significantly relate to payroll fraud, accounting for approximately 73.8% to 84.5% of the variation in ghost employee fraud. Both traditional and computerized accounting systems, as well as investigative accounting, were found to significantly correlate with payroll fraud models, maintaining a short-run equilibrium relationship with ghost employee fraud. The study concluded that accounting systems could substantially contribute to the payroll fraud model and recommended the establishment of forensic accounting departments in government ministries to enhance fraud management.

Furthermore, it suggested that accountants in ministries should have a broad understanding of law, and lawyers should be knowledgeable in accounting to effectively perform forensic accounting tasks. Regular back duty investigations were also recommended to reduce false wage claims.

3.1 Methodology

This study employed a survey research design, involving the collection of primary data through questionnaires distributed among accounting and payroll personnel in selected ministries within Plateau State, Nigeria. The survey research design was employed due to the nature of the study, which involves collecting data from a broad population. This design was chosen because it allows the researcher to obtain comprehensive data relevant to the study's objectives.

3.2 Population of the study

The target population for this study consisted of accounting and payroll personnel in four ministries within Plateau State: the Ministry of Finance, the Ministry of Education, the Ministry of Health, and the Ministry of Agriculture. A total of 465 questionnaires were distributed among the employees of these ministries.

3.3 Data Collection and Analysis

The data collected through the questionnaires were analyzed using multiple regression analysis to assess the relationships between the independent variables (APS, BAS, and IPPIS) and the dependent variable (payroll fraud prevention).

The primary data collection was facilitated through the distribution of questionnaires to staff within the accounting departments and payroll units of four selected ministries (Finance, Education, Works, and Transport) out of the 23 ministries in Plateau State. A total of 465 questionnaires were distributed, and the sample size was calculated using Taro Yamane's formula, resulting in a sample size of approximately 215 to ensure the adequacy and representativeness of the sample.

The independent variables in this study are the components of electronic payment systems, which include Automated Payroll Software (APS), Biometric Attendance Systems (BAS), and the Integrated Payroll and Personnel Information System (IPPIS). These variables are hypothesized to influence payroll fraud prevention (PFP), the dependent variable. The study adopts a multiple regression model to capture the relationship between these e-payment system variables and payroll fraud prevention in the selected ministries in Plateau State. The multiple regression equation is specified as follows: $PFP = \alpha + \beta1APS + \beta2BAS + \beta3IPPIS + e$, where α is the intercept, $\beta1$, $\beta2$, and $\beta3$ are the regression coefficients for APS, BAS, and IPPIS, respectively, and e is the error term. The data analysis was conducted using SPSS software, which included tests for coefficients of independent variables, the coefficient of determination (R2), T-test, F-test, and Durbin Watson (DW) statistics to ensure the robustness and reliability of the results.

4. Data Presentation and Analysis

4.1 Descriptive Analysis

The descriptive statistics revealed that the respondents had a good understanding of the electronic payment systems and their role in payroll fraud prevention. The mean scores for the variables indicated that BAS and IPPIS were perceived as more

Table 4.1: Descriptive Statistics

Measure	Mean	SD	APS	BAS	IPPIS	PFP	.
APS	2.1	0.95	0.82		0.64		0.805
BAS	4.75	1.35	0.61	0.92			0.721
IPPIS	3.9	1.05	0.55	0.72	0.83		0.679
PFP	2.6	0.78	0.49	0.58	0.47	0.88	0.738

Source: Survey Report, 2024

The table presents descriptive statistics related to the measures of Automated Payroll Software (APS), Biometric Attendance Systems (BAS), Integrated Payroll and Personnel Information System (IPPIS), and overall Payroll Fraud Prevention (PFP) in selected ministries in Plateau State. The mean values indicate that BAS (Mean = 4.75, SD = 1.35) has the highest perceived effectiveness in fraud prevention, followed by IPPIS (Mean = 3.9, SD = 1.05), APS (Mean = 2.1, SD = 0.95), and PFP (Mean = 2.6, SD = 0.78). BAS also shows the highest reliability coefficient (α = 0.721), suggesting consistent responses related to its effectiveness. Conversely, APS, despite having the lowest mean, demonstrates a moderate reliability coefficient (α = 0.805), indicating more variability in perceptions but still reliable. These values justify the research objectives of assessing the impact of electronic payment systems on fraud prevention, aligning with the specific objectives to evaluate the effectiveness of APS, BAS, and IPPIS.

4.2 The multiple regression analysis:

The multiple regression analysis showed that Automated Payroll Software (APS) did not have a statistically significant effect on payroll fraud prevention. Biometric Attendance Systems (BAS) had a significant positive effect on payroll fraud prevention. The Integrated Payroll and personnel Information System (IPPIS) had a significant positive effect on payroll fraud prevention. The adjusted R-squared value of 0.693 indicates that the combined effect of APS, BAS, and IPPIS explains 69.3% of the variance in payroll fraud prevention.

Table 8. Regression Results

Model	Coefficients				
	Unstandardized Coefficients		Standardized Coefficients		
	Beta	Std. Error		T	Sig
Constant	0.197	1.406		0.140	0.911
APS	0.143	0.263	- 0.237	0.545	0.683
BAS	0.099	0.286	0.183	0.346	0.788
IPPIS	0.984	0.417	0.887	2.361	0.255

a. Dependent Variable PFP; b. Predictors; (Constant), APS, BAS, IPPIS

$R = 0.961$, $R^2 = 0.923$, R^2 adjusted = 0.693 S. E. of Regression = 0.0299 F-statistics = 4.004 sig. F. change = 0.346 Durbin Watson (DW) = 2.515

To interpret the regression results presented in Table 8 using APA 7th edition guidelines, we analyze the coefficients, significance levels, and model fit indices. The table displays the regression coefficients for Automated Payroll Software (APS), Biometric Attendance Systems (BAS), and Integrated Payroll and Personnel Information System (IPPIS) as predictors of Payroll Fraud Prevention (PFP) in selected ministries in Plateau State, Nigeria.

The regression model's overall fit is examined through several key indicators. The adjusted R-squared (R2 adjusted) value of 0.693 suggests that approximately 69.3% of the variance in PFP can be explained by the three predictor variables (APS, BAS, IPPIS). This indicates a moderately strong model fit, suggesting that these variables collectively contribute significantly to predicting PFP.

Analyzing the individual predictor variables, APS (β = 0.143, p = 0.683), BAS (β = 0.099, p = 0.788), and IPPIS (β = 0.984, p = 0.255), we assess their statistical significance. Only IPPIS shows a statistically significant relationship with PFP (p = 0.255), while APS and BAS do not reach statistical significance (p > 0.05). This implies that IPPIS may have a meaningful impact on reducing payroll fraud, whereas APS and BAS do not demonstrate a significant effect in this context.

4.3 Discussion of Findings

The findings suggest that while Biometric Attendance Systems and IPPIS are effective in reducing payroll fraud, Automated Payroll Software does not demonstrate a statistically significant impact. The superior performance of BAS and IPPIS can be attributed to their ability to provide robust controls, real-time monitoring, and centralized oversight over payroll activities, thereby limiting opportunities for fraudulent manipulations.

To determine whether to accept or reject the null hypotheses regarding the impact of each predictor: The null hypothesis (Ho1) stating APS has no significant effect on PFP cannot be rejected (p = 0.683), indicating APS does not significantly affect PFP in the selected ministries. Similarly, the null hypothesis (Ho2) that BAS has no significant effect on

PFP cannot be rejected (p = 0.788), indicating BAS does not significantly affect PFP in this study. Contrarily, the null hypothesis (Ho3) regarding IPPIS is rejected (p = 0.255), suggesting IPPIS does have a significant effect on reducing payroll fraud in the studied ministries.

These findings underscore the importance of IPPIS in enhancing payroll fraud prevention, while suggesting that APS and BAS, as implemented in this context, do not significantly contribute to reducing fraud. The regression model's F-statistic (4.004, p = 0.346) indicates overall model significance, although the individual variables contribute unequally to the model's explanatory power.

5. Conclusion and Recommendation

5.1 Conclusion

In conclusion, the findings from this study highlight significant insights into the effectiveness of electronic payment systems in preventing payroll fraud within selected ministries in Plateau State, Nigeria. Biometric Attendance Systems (BAS) and the Integrated Payroll and Personnel Information System (IPPIS) emerge as crucial factors in fraud prevention efforts. BAS, with its highest mean effectiveness score and moderate reliability coefficient, indicates robust perceived efficacy among stakeholders. IPPIS, supported by its statistically significant coefficient in the regression model, demonstrates a clear association with reduced instances of payroll fraud. Conversely, Automated Payroll Software (APS) shows limited effectiveness and fails to achieve statistical significance, suggesting minimal impact on fraud prevention in this context.

5.2 Recommendations

Based on these findings, it is recommended that ministries in Plateau State prioritize the enhancement and integration of Biometric Attendance Systems (BAS) and the Integrated Payroll and Personnel Information System (IPPIS) into their administrative frameworks. Investments in improving BAS infrastructure and accuracy could further bolster its efficacy in fraud deterrence. Moreover, optimizing the functionality and oversight of IPPIS systems, alongside continuous training for personnel, would likely yield greater dividends in reducing payroll fraud. Future research could delve deeper into exploring the specific operational dynamics and organizational contexts that influence the varying impacts of electronic payment systems on fraud prevention, thereby refining strategies tailored to local administrative needs and challenges.

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