Pisco Med Publishing

Human Resources Management and Services 2026, 8(4), 6415.
https://doi.org/10.18282/hrms6415

Article

Public administration rehabilitation through selected fourth industrial revolution technologies in South Africa: tackling systemic corruption

John Mamokhere[1,*]

[1] Research Administration and Development, University of Limpopo, Turfloop Campus, Sovenga 0727, South Africa.
*** Corresponding author:** John Mamokhere, johnmamokhere@gmail.com

CITATION

Mamokhere J. Public administration rehabilitation through selected fourth industrial revolution technologies in South Africa: tackling systemic corruption. Human Resources Management and Services. 2026; 8(4): 6415.
https://doi.org/10.18282/hrms6415

COPYRIGHT

Copyright © 2026 by author(s). *Human Resources Management and Services* is published by PiscoMed Publishing Pte Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.
https://creativecommons.org/licenses/by/4.0/

Abstract: Worldwide, fourth industrial revolution (4IR) tools are widely promoted for anti-corruption purposes, yet rigorous South African public-sector evaluations remain scarce. Thus, this study explores how 4IR can be used for governance rehabilitation in public administration. Public administration rehabilitation entails restoring, reforming, and modernising a government's civil service and bureaucratic institutions to address corruption, inefficiency, and poor service delivery. It involves rebuilding ethical standards, restructuring administrative powers, and strengthening institutional capacity so the state can serve the public effectively. This study focuses on phantom employee fraud, a persistent form of systemic corruption that undermines public sector governance, financial accountability, and service delivery in South Africa. The terms phantom employee and ghost employee are used interchangeably throughout this article to describe fictitious, deceased, duplicate, or otherwise ineligible individuals who continue to receive salaries from government payroll systems. This study examines the underlying causes of ghost employee fraud and explores how 4IR tools can transform payroll governance and strengthen fraud prevention within the South African public sector. A qualitative desktop research methodology was adopted. Thematic Content Analysis, guided by Braun and Clarke's six-phase framework, was employed to identify recurring themes. The findings reveal that ghost employee fraud is driven by weak internal controls, fragmented payroll systems, ineffective oversight, collusion, and poor consequence management. The study further demonstrates that artificial intelligence (AI)-enabled technologies, including predictive analytics, biometric verification, blockchain, integrated human resource management information systems, and AI-powered whistleblowing platforms, may enhance payroll integrity through real-time monitoring, automated verification, and proactive fraud detection. The study acknowledges that technology alone may not eradicate ghost employee fraud if governance institutions remain weak, political interference persists, or consequence management is ineffective.

Keywords: artificial intelligence; biometric verification; fraud; ghost employees; weak internal controls

1. Introduction

In this study context, systemic corruption involving phantom employee fraud (ghost workers) severely drains South Africa's public purse. Recent joint investigations driven by the Department of Public Service and Administration (DPSA) and National Treasury reveal that tackling these syndicates requires moving beyond manual oversight to AI-driven anomaly detection and automated cross-referencing (Mamokhere, 2025). Ghost workers are individuals who are recorded on a payroll but do not perform any actual work. In the public sector, this includes deceased employees, fictitious names, or duplicated records that continue drawing salaries. These irregularities often arise from fraudulent schemes, where collusion between

officials leads to the creation of false records for illicit gain, or from administrative errors embedded in outdated payroll systems. The result is a significant financial burden on government budgets, diverting funds away from critical public services such as health, education, and infrastructure. The persistence of ghost workers inflates salary bills, causes inefficiencies, and erodes public trust. Reports indicate that public institutions have lost hundreds of millions of rand due to ghost workers, which could otherwise have funded frontline service delivery. This makes the verification of public servants a vital mechanism for preserving fiscal discipline and enhancing government performance (DCM Corporate, 2025). Ghost workers are significantly affecting South Africa's public sector by depleting resources and undermining service delivery and budget integrity. These non-existent employees persist on payrolls due to fraud, administrative oversights, or weak controls, costing millions annually. To combat this, robust verification of public servants is essential for identifying and removing ghost workers, thus protecting public funds and ensuring resources are allocated to legitimate service providers. Moreover, effective verification fosters a culture of transparency and accountability, alongside ensuring compliance with privacy regulations. With advancements in digitisation, biometric technologies, and software tools, the South African public sector can modernise verification processes, enhance payroll accuracy, and rebuild trust in administration (DCM Corporate, 2025). However, the integration of AI-driven human resource management (HRM) practices must be approached cautiously to avoid perpetuating colonial legacies, systemic biases, and continued exclusion of genuine employees. Currently, AI technologies are aiding HR functions in South Africa, providing valuable insights for decision-making, mitigating biases, and improving employee experiences, while simultaneously addressing the issue of ghost employees through systematic corruption controls (Chilunjika et al., 2022; Shipalana, 2026).

This study is a follow-up to the one conducted by John Mamokhere in 2025 titled: "*Systemic Corruption in South African Government Departments: Ghost Employees - Where They Come from and Where They Are Going*" published in the Social Sciences and Education Research Review. The Fourth Industrial Revolution (4IR) has transformed how governments administer public services and combat corruption globally. With the integration of AI, big data analytics, blockchain technologies, and digital governance platforms, new opportunities have emerged to enhance transparency, accountability, and efficiency in public administration (Mkhize, 2026). Governments are leveraging these digital technologies to improve service delivery and reduce fraud. A prominent issue is phantom employees: fictitious individuals or former employees who remain on payroll without rendering services (Lessig, 2014; Mamokhere, 2025; WHO, 2020). This problem is especially prevalent in developing nations, where weak administrative controls enable payroll fraud (Ardigó and Chêne, 2017; Osborne and Gaebler, 1992). In South Africa, ghost employee fraud has become a significant indicator of systemic corruption within government departments, costing millions while denying qualified citizens employment opportunities (Mamokhere, 2025). Recent audits have highlighted instances of payroll fraud, revealing substantial sums paid to ghost employees across various governmental departments (Ryan, 2025). The socio-economic implications are severe, with South Africa facing a high unemployment rate of 32.9%, and youth unemployment exceeding 46% (Statistics South Africa, 2025). Diverting funds to non-existent employees undermines public trust and accountability, eroding ethical governance (Mamokhere, 2025). Traditional anti-corruption measures have proven

insufficient, prompting governments to utilise AI and digital technologies to bolster payroll integrity (Enokkaren et al., 2024). AI systems can analyse data for anomalies, monitor attendance, and verify employee records, while biometric and blockchain technologies provide innovative solutions to eliminate ghost employees (Enokkaren et al., 2024). The research gap identified in this study lies in the predominant reliance on traditional methodologies to combat phantom employee fraud in the existing literature. This study distinguishes itself by advocating for the integration and promotion of technological tools, thereby offering a novel perspective that contrasts with the conventional approaches previously utilised. The study further posits that AI-driven technologies are crucial in combating ghost employee fraud and enhancing ethical governance in South Africa. By examining the causes, impacts, and technological solutions for ghost employees, the research contributes to ongoing discussions about digital governance and public sector reform in the country.

1.1. Problem statement

Corruption remains one of the most persistent governance challenges confronting South Africa's public sector, undermining service delivery, public trust, and the efficient utilisation of public resources. National anti-corruption reports consistently identify the mismanagement of public funds and payroll fraud involving ghost (fictitious) employees as among the most frequently reported forms of corruption. According to Corruption Watch South Africa, approximately 25% of corruption reports relate to the mismanagement of public funds, including the payment of salaries to ghost employees, while other prevalent offences include fraud, nepotism, procurement irregularities, abuse of public resources, and maladministration (Mafunisa and Nyalungu, 2025). Ghost employee fraud occurs when salaries are paid to fictitious or non-existent employees, former employees who remain on the payroll, or individuals whose identities have been fraudulently created or manipulated within government payroll systems (Mamokhere, 2025). These schemes are often facilitated by weak internal controls, inadequate payroll verification processes, collusion between officials, and limited oversight. In South Africa, cases of payroll fraud have been reported across national, provincial and local government institutions, contributing to significant financial losses and diverting scarce public resources away from essential public services. The persistence of these irregularities has been repeatedly highlighted by the Auditor-General of South Africa (AGSA), whose audit reports continue to identify deficiencies in payroll management, weak consequence management, ineffective internal controls, and poor governance practices that create opportunities for payroll fraud (AGSA, 2024).

Systemic corruption in public administration poses a significant governance challenge, affecting accountability, service delivery, legitimacy, and public trust. In South Africa, corruption and procurement abuse are identified as structural barriers that distort public contracting, erode trust, and hinder the execution of public programs. While digital reforms are appealing as potential solutions, it is crucial to recognise that technology alone cannot eradicate corruption. Instead, Fourth Industrial Revolution (4IR) technologies can enhance transparency, traceability, and control when integrated into effective institutions and enforcement mechanisms. This article presents a variety of 4IR tools, with in-depth discussions on specific technologies deemed most relevant to combating corruption: blockchain, AI and machine learning (AI/ML), data analytics and open data, biometrics and secure authentication, and e-governance or digital workflow systems (Mkhize, 2025). For instance, ghost employee fraud in South Africa costs the state billions of rand annually. Key examples

include the Passenger Rail Agency of South Africa (PRASA) flagging around 3,000 ghost workers, the Mpumalanga Department of Education uncovering millions in irregular salary payouts, and recent National Treasury audits freezing thousands of suspicious state payroll entries (PSA, 2025).

Consequently, addressing ghost employee fraud has become a critical public administration priority, requiring stronger governance frameworks supported by digital technologies or tools such as biometric identity verification, AI, blockchain, and integrated human resource management systems to enhance payroll integrity, transparency, and accountability. Therefore, the study is underpinned by the following objectives:

- To investigate how selected 4IR technologies in the public sector can be utilised as tools for detecting phantom employee fraud in South Africa.
- To explore the prevalence of phantom employee fraud and how it emerges within the public sector in South Africa.
- To explore the opportunities offered by different 4IR technologies in addressing systemic corruption in public administration.
- To propose an effective AI-driven conceptual model as a solution for addressing phantom employee fraud in the public sector.

2. Materials and methods

This study adopted a qualitative research methodology using a desktop research design to investigate systemic corruption in South Africa. A qualitative approach was considered appropriate because it facilitates an in-depth exploration and interpretation of public administration, 4IR and AI literature. The desktop research design enabled the researcher to synthesise evidence from a broad range of secondary sources without direct interaction with research participants. The study relied exclusively on secondary data obtained from rigorous peer-reviewed journal articles, academic books, conference proceedings, government reports, policy documents, audit reports, institutional publications, technical reports, newspaper articles, and credible online sources. The credibility of these sources was evaluated using criteria such as authority, relevance, currency, methodological rigour, and verifiability. Moreover, data triangulation was employed to ensure consistency and reduce bias by comparing findings across various sources. Emphasis was placed on literature on corruption, public administration, digital governance, AI, payroll fraud, ghost employees, blockchain technology, biometric verification, and public financial management in both South African and international contexts.

2.1. Data collection

Data were collected through a literature review of electronic databases and academic search engines, including Google Scholar, ResearchGate and Google. Search terms included “ghost employees” (“phantom employees”), “payroll fraud”, “systemic corruption”, “AI in public administration”, “digital governance”, “blockchain technology”, “biometric payroll systems”, “predictive analytics”, “public sector corruption”, and “South Africa”. Only publications directly addressing payroll fraud, corruption, AI applications in governance, digital transformation, public sector accountability, and related governance reforms were included. The review considered eligible publications dated between 1991 and 2026, reflecting the chronological range of the literature underpinning the study. Foundational theoretical and methodological publications were retained irrespective of age, while greater emphasis was placed on recent literature, particularly publications from 2020 to 2026, to capture contemporary

developments in AI, digital governance, payroll fraud and public-sector human resource management. **Table 1** below reflects the date range of eligible publications considered in this study.

Table 1. Date Range of Cited Studies

Period	In-text and referenced studies	Relevance
1991–1999	Hood (1991)	Foundational NPM theory
2000–2009	Braun & Clarke (2006)	Thematic analysis methodology
2010–2019	Lessig (2014); Ardigó & Chêne (2017)	Institutional corruption and governance
2020–2022	WHO (2020); Elgohary & Abdelazyz (2020); Mbuh et al. (2020); Corruption Watch (2021); Braun & Clarke (2022); Habib et al. (2022); Chilunjika et al. (2022); Adelakun (2022); ACFE (2022)	Ghost workers, AI, HRM, blockchain, corruption and methodology
2023–2024	Sharma et al. (2023); AGSA (2024); Ayodeji (2024); Enokkaren et al. (2024)	AI, compliance, payroll fraud and public-sector governance
2025–2026	Mamokhere (2025); PSA (2025); Ryan (2025); Faba (2025); Mafunisa & Nyalungu (2025); Ali & Mustafa (2025); DCM Corporate (2025); Shipalana (2026); Mkhize (2025,2026); Mashilo (2026)	Current South African evidence and emerging AI/digital solutions

This study has cited 42 publications dating from 1991 to 2026. The oldest reference is Hood (1991), while the newest references are from 2026, including Mashilo (2026), Shipalana (2026) and Mkhize (2026). The cited studies have been sufficient and have validated the study objectives.

2.2. Data analysis

The data were analysed using Thematic Content Analysis (TCA), a widely recognised qualitative analytical technique for identifying, organising, analysing, and interpreting recurring patterns of meaning within textual data (Braun and Clarke, 2006, 2022). TCA was considered appropriate because it enables the systematic examination of documentary evidence while allowing themes to emerge inductively from the literature. The method was particularly suitable for this study because it facilitated the identification of governance failures associated with ghost employee fraud and the exploration of AI-driven digitalisation tools that could strengthen payroll integrity, accountability, and public sector governance. The analysis followed the six phases of thematic analysis proposed by Braun and Clarke (2006, 2022), as illustrated in **Figure 1**.

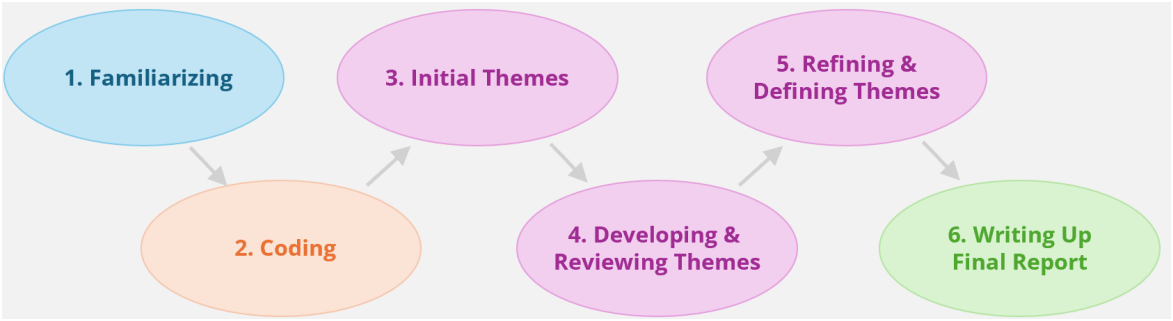


Figure 1. Six Phases of Thematic Content Analysis (Braun and Clarke, 2022)

Phase 1: Familiarisation with the data

The researcher repeatedly reviewed all selected documents to gain a comprehensive understanding of the literature while recording preliminary observations relating to ghost employee fraud, governance failures, payroll management, institutional weaknesses, digital transformation, and AI in public administration. This process facilitated immersion in the data and provided the foundation for systematic coding.

Phase 2: Generating initial codes

Relevant sections of the documentary evidence were coded systematically to identify recurring concepts and significant governance issues. Initial codes included ghost employees, payroll fraud, systemic corruption, weak internal controls, collusion, fragmented payroll systems, poor accountability, political interference, biometric verification, AI, blockchain technology, predictive analytics, digital governance, integrated Human Resource Management Information Systems, transparency, and governance. The study coded 42 documents comprising peer-reviewed articles, books, government reports, policy documents, audit reports, and credible online sources. Coding was conducted manually by the researcher through systematic reading and identification of recurring concepts, words, phrases, and relevant information. A structured coding framework was developed to organise the identified concepts, which were subsequently compared, grouped, and refined into broader categories and themes. The analysis was conducted by one researcher, with reflexive consideration of personal assumptions and potential interpretive bias throughout the coding and theme-development process. To enhance credibility, the researcher repeatedly reviewed the coded material and themes against the original documents to ensure that interpretations remained grounded in the source data.

Phase 3: Initial themes

Conceptually related codes were grouped into broader thematic categories to identify meaningful patterns across the literature. Codes associated with weak oversight, corruption, fragmented payroll systems, and ineffective consequence management were integrated under the broader theme of institutional governance failures, while codes relating to AI, blockchain technology, biometric verification, predictive analytics, integrated payroll systems, and digital governance were grouped under the theme of AI-driven digitalisation for payroll integrity and fraud prevention. Additional themes emerged concerning international best practices, legislative and institutional reforms, and public-private collaboration in combating payroll fraud.

Phase 4: Developing and reviewing themes

The preliminary themes were reviewed and refined by comparing evidence across academic literature, government reports, audit reports, policy documents, and institutional publications. This iterative process ensured internal coherence, eliminated overlapping concepts, and confirmed that each theme accurately reflected the documentary evidence while remaining aligned with the research objectives and the New Public Management (NPM) theoretical framework.

Phase 5: Refining and defining themes

Each refined theme was clearly defined, interpreted, and linked to the objectives of the study. The final themes explained the emergence of ghost employee fraud within South Africa's public sector, the governance and socio-economic implications of payroll fraud, international experiences in combating ghost employees, the

transformative role of AI-driven digitalisation, and the legislative and institutional reforms required to strengthen payroll governance. These themes also reflected the core principles of NPM by demonstrating how technology can improve efficiency, accountability, transparency, performance, and service delivery within the public sector.

Phase 6: Writing up final report

The final phase involved integrating the themes into coherent narratives supported by empirical evidence from the reviewed literature. The findings were interpreted in relation to the NPM theoretical framework and existing scholarship to explain how AI-enabled technologies, including predictive analytics, biometric verification, blockchain technology, integrated HRMIS, and AI-powered payroll intelligence systems, can transform payroll governance, reduce ghost employee fraud, strengthen financial accountability, and promote ethical and transparent public administration in South Africa (Braun and Clarke, 2006). This final synthesis formed the basis for the study's results, discussion, conclusions, and policy recommendations.

2.3. Inclusion and exclusion criteria

To ensure that the literature used in this study was relevant, credible and appropriate for answering the research objectives, explicit inclusion and exclusion criteria were applied during the selection of sources. **Table 2** summarises the criteria used to screen the documents, covering the publication period, geographical focus, subject relevance, type of publication, evidence on ghost employees, methodological relevance, language and accessibility. Sources were retained only where they met the inclusion criteria and were sufficiently credible and informative to support the thematic content analysis described in Section 2.2.

Table 2. Inclusion and Exclusion Criteria

Criterion	Inclusion Criteria	Exclusion Criteria
Publication period	Publications dated between 1991 and 2026, as reflected in the eligible references used in the study.	Publications outside the 1991–2026 period, unless they are not part of the reference base or are irrelevant to the study objectives.
Geographical focus	Studies and reports focusing on South Africa, with relevant international studies from Africa and other countries included for comparative purposes.	Studies with no relevance to public-sector governance, payroll fraud, corruption, HRM or digital technologies.
Subject relevance	Literature addressing ghost/phantom employees, payroll fraud, corruption, public administration, HRM, AI, digital governance, blockchain, biometric verification, predictive analytics, HRMIS and public-sector accountability.	Literature unrelated to the study's research objectives or focusing exclusively on unrelated forms of fraud or private-sector issues.
Type of publication	Peer-reviewed journal articles, academic books, conference proceedings, government reports, policy documents, audit reports, institutional/technical reports, and credible online sources.	Sources lacking credibility, methodological rigour, relevance, or sufficient information to support the study.

Continuation Table:

Criterion	Inclusion Criteria	Exclusion Criteria
Evidence on ghost employees	Sources providing evidence on the causes, prevalence, detection, prevention or consequences of ghost/phantom employees and payroll fraud.	Sources that do not provide evidence or discussion relevant to ghost employees or payroll integrity.
Methodological relevance	Sources containing sufficient conceptual, empirical, documentary or policy evidence to support thematic content analysis.	Sources with insufficient information, unclear provenance, or inadequate evidence for meaningful thematic analysis.
Language	Publications available in English, allowing consistent interpretation and analysis.	Publications in languages for which reliable interpretation was not available.
Accessibility	Sources that were accessible in full text or contained sufficient information for extraction and analysis.	Sources for which relevant information could not be accessed or verified.

The criteria are consistent with the manuscript's stated methodology, which indicates that the study relied on secondary sources, including peer-reviewed articles, books, conference proceedings, government reports, policy documents, audit reports, institutional publications, technical reports, newspaper articles and credible online sources. The manuscript specifically states that only publications directly addressing payroll fraud, corruption, AI applications in governance, digital transformation, public-sector accountability and related governance reforms were included, while sources lacking credibility, relevance or methodological rigour were excluded.

2.4. Trustworthiness and credibility

To improve the trustworthiness and credibility of the findings, data triangulation was employed by comparing evidence across multiple academic, governmental, and institutional sources. The use of diverse documentary evidence strengthened the reliability of the findings while reducing the potential for bias associated with relying on a single source. Since the study relied entirely on publicly available secondary data and did not involve human participants, primary data collection, or animal subjects, formal ethical approval was not required. Nevertheless, the research adhered to recognised ethical principles by maintaining academic integrity, accurately representing evidence, avoiding plagiarism, and appropriately acknowledging all sources through proper citation and referencing.

3. Theoretical framework

The NPM theory provides an appropriate theoretical lens for understanding how AI-driven technologies can strengthen public sector governance and address ghost employee fraud in South Africa. Emerging in the late 1970s and gaining prominence during the 1980s, NPM advocates for the application of private-sector management principles within public administration to improve efficiency, accountability, transparency, and performance (Hood, 1991; Osborne and Gaebler, 1992). The theory arose in response to criticisms that traditional public administration was characterised by excessive bureaucracy, rigid procedures, poor performance,

weak accountability, and inefficient use of public resources. NPM therefore promotes results-oriented management, decentralisation, innovation, performance measurement, digital transformation, customer-oriented service delivery, and stronger financial management as mechanisms for enhancing public sector effectiveness (Pollitt and Bouckaert, 2017).

One of the central assumptions of NPM is that governments should utilise modern management techniques and technological innovations to improve organisational performance and minimise waste and corruption. This principle aligns closely with the objectives of the present study, which seeks to examine how AI-driven digitalisation can detect and prevent ghost employee fraud within South Africa's public sector. Ghost employee fraud represents a significant deviation from the principles of NPM because it reflects weak internal controls, ineffective financial management, poor accountability, fragmented payroll systems, and limited performance oversight. The continued payment of salaries to fictitious employees demonstrates institutional inefficiency and the inability of existing administrative systems to safeguard public resources, thereby undermining value for money and service delivery (Mashilo, 2026).

From an NPM perspective, digital technologies provide practical tools for improving organisational efficiency and strengthening governance. AI, predictive analytics, biometric authentication, blockchain technology, robotic process automation, and integrated Human Resource Management Information Systems enable governments to automate payroll verification, detect fraudulent transactions in real time, analyse large volumes of administrative data, and enhance financial accountability. These technologies support one of the core principles of NPM, performance-based management, by replacing manual, reactive auditing processes with continuous monitoring, automated decision support, and evidence-based management. AI-driven payroll intelligence systems can identify duplicate identity numbers, multiple salary payments, payments to deceased employees, irregular attendance patterns, and suspicious payroll transactions before financial losses occur, thereby improving operational efficiency and reducing opportunities for corruption (Enokkaren et al., 2024). Furthermore, NPM emphasises accountability, transparency, and managerial responsibility, all of which are essential for combating ghost employee fraud. AI-enabled digital governance platforms strengthen these principles by creating electronic audit trails, generating real-time management reports, and facilitating continuous oversight by institutions such as the Auditor-General South Africa, the DPSA, and the Public Service Commission. Technologies such as blockchain further reinforce accountability by creating immutable payroll records that cannot be altered without authorisation, while biometric verification ensures that only verified employees receive salaries. These innovations have the potential to reduce opportunities for payroll manipulation and enhance trust in public financial management systems.

However, while NPM provides a strong foundation for understanding the role of technology in improving public sector efficiency, it has also been criticised for placing excessive emphasis on managerial efficiency and market-oriented reforms at the expense of democratic accountability, equity, and public value (Denhardt and Denhardt, 2015). Technology alone cannot get rid of ghost employee fraud if governance institutions remain weak, political interference persists, or consequence management is ineffective. AI systems require high-quality data, skilled personnel,

adequate funding, robust cybersecurity, and strong ethical and legal frameworks to operate effectively. Consequently, digital technologies should be viewed as complementary governance tools rather than standalone solutions to corruption. NPM theory is considered well suited to this study because it explains how AI-driven digitalisation can modernise public administration by improving efficiency, strengthening payroll management, enhancing transparency, reducing corruption, and promoting accountability. The theory supports the argument that integrating AI, biometric verification, predictive analytics, blockchain technology, and interoperable HR and payroll systems can transform payroll governance from a reactive, audit-based approach into a proactive, data-driven system capable of preventing ghost employee fraud while improving the overall performance and integrity of South Africa's public sector.

4. Results and discussion

4.1. How phantom employee fraud emerges in the public sector

The phantom worker problem arises from deliberate fraud, administrative challenges, and systemic weaknesses. It often involves collusion to create fake employee records, complicating detection without rigorous verification. Administrative errors due to poor data management and outdated records exacerbate the issue. Additionally, the absence of secure, standardised third-party employment confirmation processes allows for manual confirmations that are error-prone and time-consuming. These flaws create a conducive environment for ghost workers, underscoring the necessity for robust, automated verification tools for public servants (DCM Corporate, 2025). However, employees incorrectly flagged by an AI-based system would remain protected under applicable HR policies, labour legislation, and public-service procedures. Such employees may request review and correction of employment records, lodge a formal grievance or appeal, and seek restoration of withheld salary where the flag is found to be erroneous. Departments would be expected to follow relevant DPSA policies, disciplinary and grievance procedures, and principles of procedural fairness, with human officials responsible for verifying and resolving disputed cases. In South Africa, automated systems or AI can never replace statutory human-centric compliance. The legal framework includes the Protection of Personal Information Act (POPIA), which mandates human review for decisions with legal consequences, and the Labour Relations Act (LRA), which ensures that adverse actions are fair and justified. For government employees, compliance with the DPSA guidelines and the Public Service Act is essential for lawful decision-making. Employees' remedies for incorrect flags include initiating formal grievances through departmental processes, demanding corrections of inaccurate data in accordance with POPIA, and seeking back pay due to unwarranted salary withholding, which violates the Basic Conditions of Employment Act (BCEA). Ultimately, technology serves as an administrative tool, with accountability resting on human management. Ghost-worker fraud is a significant issue within public administration that highlights vulnerabilities in personnel management systems. The following analysis outlines the intricate processes involved in the insertion of fictitious employees into government payroll systems, specifically the Personnel and Salary (PERSAL) system, as described by the DPSA in 2025. The process of incorporating a ghost worker into the Persal system necessitates the

involvement of at least three colluding officials:

Data inputter

The first actor is the data inputter, who is responsible for entering fraudulent employee details. This individual might create a fictional identity or manipulate existing records of deceased or retired workers to facilitate fraud.

Authoriser

The second key player is the authoriser, typically positioned in a supervisory role. This person approves fraudulent entries, circumventing established verification protocols intended to prevent such misdeeds.

Sign-Off official

The final participant is the sign-off official, usually a manager or senior official. This individual is tasked with endorsing payroll reports and may exploit shared login credentials or circumvent oversight mechanisms to mask the fraudulent activity.

This multi-layered approval framework, originally designed to avert fraud, is compromised by colluding personnel, inadequate biometric or physical verification processes, and the reliance on paper-based systems that are susceptible to manipulation. Furthermore, there have been instances where ghost workers have been tied to criminal syndicates operating within government departments, facilitating the illicit transfer of salaries into private bank accounts. The Public Service Accountability (PSA) has aptly characterised ghost-worker fraud as a "shocking misuse of public funds" and a "gross violation of financial accountability" (PSA, 2025).

4.2. International perspective on ghost employee fraud

Ghost employee fraud is a global public sector governance challenge that undermines financial accountability, service delivery, and public trust by allowing salaries to be paid to fictitious, deceased, or ineligible employees (Mbuh et al., 2020). The persistence of this form of payroll fraud is largely attributed to weak internal controls, fragmented payroll systems, inadequate employee verification, poor record management, and collusion among officials (Stanciu, 2012; WHO, 2020). In South Africa, ghost employee fraud has become a systemic governance problem affecting national, provincial, and local government institutions. Notable cases include the identification of more than 10,000 ghost employees in the Limpopo Department of Education, over R200 million in fraudulent payroll claims at Polokwane Municipality and the Passenger Rail Agency of South Africa (PRASA), ghost employees uncovered in provincial health departments, and fraudulent UIF/TERS claims involving fictitious employees (AGSA, 2024; Corruption Watch, 2021; Ryan, 2025). Similar experiences have been reported internationally. Kenya identified 19,467 ghost workers through the Kenya Human Resource Information System (KHRIS), Tanzania eliminated approximately 10,000 ghost employees through nationwide biometric verification and payroll audits, while Nigeria removed 23,846 fictitious employees after implementing the Integrated Personnel and Payroll Information System (IPPIS) supported by biometric verification and data analytics (Enokkaren et al., 2024; Olive-Twist, 2025). **Table 3** below reflects countries that have experienced phantom employee fraud.

Table 3. International Perspective on Ghost Employee Fraud

Country	Scale of Ghost Employee Fraud	Selected Cases	Intervention/ Best Practice	Outcomes	Lessons for South Africa
South Africa	Ghost employee fraud has been reported across national, provincial and local government institutions, exposing weaknesses in payroll administration, internal controls, identity verification and governance. Cases involve fictitious employees, fake identity documents, fraudulent overtime claims and payments to former or deceased employees.	Limpopo Department of Education (2013): More than 10,000 ghost employees identified during payroll verification. Polokwane Municipality (2014–2022): 44 officials linked to fake identity documents and over R200 million in fraudulent overtime and payroll claims. North-West Provincial Government (2022): Biometric audit uncovered payroll irregularities amounting to approximately R15 million. PRASA (2022): "Operation Ziveze" launched following approximately R200 million in fraudulent salary payments. Gauteng Department of Health (2025): Staff verification exercise identified 60–66 ghost employees, resulting in frozen salaries and disciplinary investigations. UIF/TERS investigations (2020–2024):the Special Investigating Unit(SIU) investigations uncovered fraudulent claims involving fictitious employees in the Eastern Cape and Free State.	Payroll audits, forensic investigations, biometric employee verification, physical staff verification campaigns, SIU investigations, Hawks investigations, disciplinary processes and payroll cleansing initiatives.	Although thousands of irregular records have been removed and several investigations initiated, recurring incidents indicate that payroll fraud remains a systemic governance challenge requiring sustainable digital reforms rather than periodic clean-up exercises.	Modernise PERSAL through integration with biometric identity verification, AI-enabled anomaly detection, blockchain-based audit trails and continuous payroll monitoring linked to the National Population Register.(NPR)
Kenya	The Public Service Commission identified 19,467 ghost workers in 2023.	National public service payroll verification.	Implementation of the Kenya Human Resource Information System (KHRIS) integrating payroll, HR management and biometric registration.	Significant reduction in payroll fraud and substantial savings in government expenditure.	Develop a fully integrated national Human Resource Information System linked to payroll and identity verification.

Continuation Table:

Country	Scale of Ghost Employee Fraud	Selected Cases	Intervention/ Best Practice	Outcomes	Lessons for South Africa
Tanzania	Approximately 10,000 ghost workers identified during a nationwide audit in 2016.	National payroll verification ordered by President John Magufuli.	Nationwide physical verification combined with cross-checking against national identity databases.	Annual savings estimated at US$64.8 million while improving payroll integrity.	Institutionalise periodic nationwide employee verification supported by digital identity management.
Nigeria	Approximately 23,846 ghost workers removed from the federal payroll in 2016.	Federal government payroll reforms.	Introduction of the Integrated Personnel and Payroll Information System (IPPIS) supported by biometric verification and data analytics.	Significant reduction in payroll leakages and improved payroll accountability.	Use AI, machine learning and predictive analytics to detect payroll anomalies automatically.
Ghana	Thousands of unverified and irregular employee records identified through payroll audits.	Public service and education sector payroll verification.	Electronic salary validation, biometric registration and integration with the National Identification System.	Improved payroll accuracy and elimination of numerous fictitious employees.	Continuous payroll verification linked to the national identity system enhances transparency.
Uganda	Payroll audits revealed fictitious employees, duplicate records and payments to deceased employees.	Public service payroll reform programme.	Integrated Personnel and Payroll System (IPPS) combined with biometric verification.	Improved payroll governance and reduced payroll fraud.	Centralised HR and payroll systems reduce opportunities for payroll manipulation.
India	Payroll fraud and duplicate employee identities reported across several state governments.	Government employee verification linked to Aadhaar.	Biometric identity authentication integrated with payroll administration.	Significant reduction in duplicate identities and payroll leakages.	National biometric identity systems strengthen payroll authentication.

Internationally, Ghana, Uganda, India and Brazil have strengthened payroll governance through integrated Human Resource Information Systems (HRIS), biometric identity verification, AI, and continuous payroll monitoring to improve transparency and accountability (ACFE, 2022). These international experiences

demonstrate that sustainable solutions require more than periodic audits and disciplinary action; they demand integrated digital payroll systems, real-time employee verification, AI-enabled fraud detection, and robust governance frameworks. Consequently, South Africa can draw important lessons from these international best practices by modernising PERSAL, integrating it with the NPR and biometric identity systems, and leveraging AI-driven payroll analytics to strengthen payroll integrity, reduce fraud, and enhance public sector governance (AGSA, 2024; Mamokhere, 2025).

4.3. Legislative and institutional reforms for combating ghost employee fraud

Several legislative frameworks in South Africa provide a legal foundation for preventing, detecting, investigating, and prosecuting ghost employee fraud in the public sector. The Prevention and Combating of Corrupt Activities Act (PRECCA) 12 of 2004 criminalises fraudulent activities, abuse of public office, and corruption associated with the creation or maintenance of ghost employees. The Public Finance Management Act (PFMA) 1 of 1999 and the Municipal Finance Management Act (MFMA) 56 of 2003 require accounting officers to implement effective financial controls, maintain accurate payroll records, prevent financial misconduct, and investigate payroll irregularities, thereby reducing opportunities for ghost employee fraud. The Protected Disclosures Act (PDA) 26 of 2000 encourages whistleblowing by protecting employees who report payroll fraud and other corrupt practices from occupational retaliation. The Prevention of Organised Crime Act (POCA) 121 of 1998 enables the investigation, prosecution, and confiscation of assets derived from organised payroll fraud schemes, while the Public Service Act 103 of 1994 promotes ethical conduct, accountability, and proper human resource management to minimise opportunities for the appointment and payment of fictitious or unauthorised employees. Together, these legislative frameworks strengthen governance, financial accountability, and institutional integrity in combating ghost employee fraud across the South African public sector (Corruption Watch, 2015).

The growing prevalence of ghost employee fraud in South Africa highlights the urgent need for comprehensive legislative, institutional, and technological reforms to strengthen payroll governance and protect public resources. Existing anti-fraud mechanisms have proven insufficient to address the systemic weaknesses that allow fictitious employees to remain on government payrolls, resulting in significant financial losses, weakened service delivery, and declining public confidence in state institutions (Enokkaren et al., 2024). Consequently, reforms should extend beyond periodic payroll audits and disciplinary interventions by introducing stronger legislative provisions that impose stricter penalties for payroll fraud, mandate biometric employee verification across all public institutions, and require the adoption of integrated digital payroll management systems. These reforms should be supported by increased public investment in modern information and communication technologies, AI, biometric authentication, and employee capacity-building to improve payroll integrity, enhance transparency, and strengthen accountability. Furthermore, achieving sustainable success will require collaborative partnerships among government departments, oversight institutions, organised labour, the private sector, and civil society to implement innovative digital solutions, share technical expertise, and promote a culture of ethical governance (PSA, 2025). Drawing on international best practices, South Africa has an opportunity to modernise its public administration through AI-driven payroll monitoring, real-time employee

verification, predictive fraud analytics, and integrated human resource information systems. Equally, these reforms would not only reduce ghost employee fraud but also contribute to a more transparent, accountable, and merit-based public service capable of restoring public trust and improving the efficient utilisation of public resources.

4.4. 4IR technological tools for detection of phantom employee fraud records in public administration

South African evidence highlights a notable discrepancy between the conceptual potential and the rigorously evaluated outcomes of anti-corruption measures in public-sector settings. Recommended 4IR tools for anti-corruption reform include blockchain, AI/ML, data analytics, open data, biometrics, IoT-enabled monitoring, and e-governance systems. These tools enhance aspects such as transparency, traceability, auditability, and fraud detection, rather than directly eliminating corruption (Mkhize, 2025). There are current verification tools in South Africa's public sector employment systems, such as PERSAL, internal and Auditor-General audits, and physical verification campaigns. However, these traditional mechanisms are limited by legacy systems and manual processes. Digital verification tools are gaining recognition for integrating with payroll systems to ensure accurate employee information. Biometric technologies, such as fingerprint and facial recognition, play a crucial role in validating identities and reducing ghost workers. Digital employee confirmation software complements this by securely managing verification requests with privacy protections. Advanced tools, including data analytics and integrated software, enhance ghost worker management, automate confirmations, and ensure compliance with privacy laws, ultimately improving operational efficiency and transparency in payroll management (DCM Corporate, 2025). Digitalisation pertains to the incorporation of digital technologies within organisational procedures, governance structures, and service delivery methods to enhance efficiency, effectiveness, and accountability (Mamokhere, 2025; Mkhize, 2026).

In the realm of public administration, digitalisation includes e-government initiatives, digital records management systems, applications of AI, cloud computing, blockchain technologies, and tools for data analytics that support operations in the public sector. AI encompasses computer systems that can execute tasks normally requiring human intelligence, such as learning, reasoning, recognising patterns, making decisions, and solving problems (Enokkaren et al., 2024). Within the public sector, AI technologies are increasingly employed to uncover fraud, automate repetitive administrative tasks, analyse extensive datasets, predict risks, and improve public service delivery. The integration of AI in public administration presents several advantages. First, AI boosts operational efficiency by automating monotonous tasks and alleviating administrative burdens. Second, AI promotes transparency by creating auditable digital records that enhance accountability. Third, AI fortifies fraud detection through machine learning algorithms that can detect suspicious activities that might not be easily recognised through traditional methods (Enokkaren et al., 2024).

AI effectively detects complex fraud patterns but needs high-quality data and expertise. Blockchain provides secure payroll records but is costly and requires readiness. Biometric systems enhance identity verification, though they raise privacy issues. Predictive analytics can identify potential payroll fraud with historical data, subject to data quality and algorithmic bias. Integrated payroll systems improve efficiency by linking HR and financial databases, necessitating strong interoperability and governance (Ali and Mustafa, 2025). Dealing with ghost employee fraud

requires innovative solutions beyond traditional auditing, including the use of AI and digitalisation to enhance payroll integrity and eliminate fraud.

4.4.1. Promote public–private partnerships to fight fraud

Strengthening collaboration between the public and private sectors presents a significant opportunity to enhance the prevention, detection, and eradication of ghost employee fraud in South Africa. Given the increasing sophistication of payroll fraud, government institutions should establish strategic partnerships with private-sector organisations that possess expertise in AI, cybersecurity, data analytics, digital forensics, cloud computing, and fraud risk management. These collaborations can support the development of AI-driven payroll management systems capable of continuously monitoring employee databases and automatically identifying anomalies such as duplicate identity numbers, multiple salary payments to the same bank account, payments to deceased individuals, fictitious employees, and unusual payroll patterns. Machine learning algorithms can analyse historical payroll data to detect suspicious trends and predict high-risk transactions before fraudulent payments are processed, while robotic process automation (RPA) can automate employee verification and payroll reconciliation processes. Similarly, blockchain technology can provide immutable payroll records and transparent audit trails, making it significantly more difficult for payroll information to be manipulated without detection. However, such partnerships should operate within a robust governance framework that clearly defines accountability, data ownership, cybersecurity standards, and compliance with the Protection of Personal Information Act (POPIA) to safeguard sensitive employee information and prevent data misuse. Through responsible public-private collaboration, government can leverage private-sector innovation to modernise legacy payroll systems such as PERSAL, strengthen internal controls, and improve payroll integrity while maintaining public accountability (PSA, 2025).

In addition, South Africa should modernise its anti-corruption reporting mechanisms by transforming the National Anti-Corruption Hotline into an AI-enabled digital whistleblowing platform. Rather than relying solely on telephone reporting, the platform should integrate web portals, mobile applications, and secure digital channels that allow employees and citizens to anonymously report suspected ghost employees, payroll fraud, and related corruption. AI and Natural Language Processing (NLP) technologies could automatically categorise complaints, identify recurring fraud patterns, prioritise high-risk cases, and detect links between multiple reports involving the same departments, officials, or payroll records. AI-powered analytics could further integrate whistleblower reports with payroll databases, biometric verification systems, and human resource information systems to verify allegations in real time and flag suspicious transactions for immediate investigation. Interactive dashboards could provide authorised oversight institutions, including the AGSA, SIU, and the Public Service Commission (PSC), with real-time monitoring of investigations, case progression, and emerging fraud hotspots. Such an integrated AI-driven reporting ecosystem would contribute to improving the speed of fraud detection, strengthening transparency and accountability, enhancing whistleblower protection, reducing financial losses associated with ghost employees, and supporting evidence-based decision-making in the fight against payroll fraud within South Africa's public sector.

4.4.2. Internal audit automation

AI is revolutionising internal auditing by potentially enhancing data processing

capabilities, allowing auditors to analyse large datasets swiftly and accurately. Traditional manual auditing methods are increasingly being replaced by AI systems that support full population testing, continuous monitoring, and real-time insights. This transition dramatically improves the detection of fraud and inefficiencies, thereby increasing the reliability and quality of audit findings. One of the key advantages of AI is its ability to automate repetitive audit tasks, such as data entry, transaction matching, and reconciliations. This automation enables auditors to concentrate on more complex issues, such as risk evaluation and governance. Such a shift not only boosts efficiency but also empowers audit functions to deliver more valuable insights to management. Moreover, AI tools facilitate continuous monitoring of financial and operational activities, providing alerts for unusual patterns in real-time, which enhances proactive risk management. This capability allows organisations to address potential issues promptly, mitigating significant financial or operational risks (Adelakun, 2022). Additionally, AI strengthens regulatory compliance by integrating compliance frameworks, automating tracking and reporting processes, and minimising human error. This alignment helps organisations keep up with relevant regulations and quickly adapt to compliance updates. Despite these advantages, challenges such as data quality, accuracy, and the transparency of AI models remain. Maintaining human expertise alongside AI is essential for effective auditing (Ayodeji, 2024). This study posits that while AI enhances efficiency and compliance monitoring in internal auditing, successful implementation demands careful management of data integrity, transparency, and ethical algorithm usage, alongside ensuring that auditors have the necessary skills to supervise AI applications.

4.4.3. Real-time biometric authentication

Biometric technologies leverage unique physical characteristics such as fingerprints, facial recognition, iris scans, and voice patterns to verify individual identities. Biometric payroll systems ensure that only employees who have been physically authenticated receive their salaries and benefits. Countries such as Nigeria, Kenya, and Ghana have effectively employed biometric verification systems to identify and eliminate thousands of ghost employees from public sector payrolls, resulting in substantial financial savings (Enokkaren et al., 2024; Olive-Twist, 2025). In South Africa, the adoption of biometric attendance and payroll verification systems across government departments could mitigate the risk of payroll fraud. These systems would provide real-time confirmation of employee existence and attendance, thereby preventing the creation of fictitious employee records. Additionally, it is crucial to link these systems with the Department of Home Affairs (DHA). PSA (2025) indicates that to enhance verification processes, the state must implement mandatory in-person verification for all public servants, supported by biometric identification methods such as fingerprints and facial recognition. This approach aligns with the Portfolio Committee's recommendation for face-to-face audits to ensure that "the names on the payroll correspond to individuals who truly exist". Moreover, cross-referencing payroll data with records from the DHA, the South African Revenue Service, and the South African Qualifications Authority is essential for verifying employee identities and qualifications.

4.4.4. AI-driven predictive analytics

Tools such as AI-powered payroll systems and predictive analytics are revolutionising public administration by providing advanced capabilities to identify and mitigate corruption, particularly by detecting ghost employee fraud. Traditional

payroll systems, which rely on manual checks and audits, are prone to errors and manipulation. In contrast, AI systems can analyse extensive employee and financial data in real time, detecting irregularities and suspicious activity more effectively. These systems use machine learning algorithms to continuously monitor payroll records, attendance, and other datasets, identifying anomalies such as duplicate identification numbers, unauthorised payments, and discrepancies in employment records (Enokkaren et al., 2024). Predictive analytics enhances fraud detection by enabling proactive risk assessment through statistical modelling and historical data analysis. By learning from past fraud cases, AI can flag potential fraudulent transactions, allow early intervention, and prevent financial losses. Integrating AI with various governmental databases, including tax and pension records, facilitates automated cross-validation of employee information, further minimising payroll fraud risks (Enokkaren et al., 2024). Continuous AI monitoring ensures that suspicious activity is detected promptly, triggering immediate alerts to managers and auditors about unusual transactions. Additionally, AI supports strategic workforce planning by analysing employment data to improve staffing efficiency and reduce inefficiencies. Tools such as dashboards provide real-time insights into payroll integrity and workforce management, enhancing transparency and accountability (Adelakun, 2022). From an anti-corruption standpoint, AI can reinforce the effectiveness of oversight agencies by automating data analysis, enabling them to focus on high-risk cases (Adelakun, 2022). The integration of AI and predictive analytics marks a substantial shift in public sector governance, aiming to reduce instances of fraud, enhance financial accountability, and ultimately build public trust in government institutions, particularly in countries such as South Africa, where corruption poses serious challenges to socio-economic development.

4.4.5. AI-powered 24/7 whistleblower chatbot for public sector fraud reporting

One innovative intervention for combating ghost employee fraud in South Africa is the development of a 24/7 AI-powered whistleblower chatbot that enables public servants and citizens to report suspected payroll fraud anonymously while ensuring the complete protection of whistleblowers' identities. Unlike traditional fraud reporting mechanisms, which often rely on telephone hotlines, office hours, or manual reporting processes, an AI-enabled chatbot would provide continuous, real-time access through multiple digital platforms, including WhatsApp, Microsoft Teams, Telegram, government websites, and dedicated mobile applications. This would potentially lower barriers to reporting by allowing individuals to submit allegations at any time without fear of victimisation, intimidation, or retaliation. The chatbot should incorporate AI and Natural Language Processing (NLP) to interact conversationally with whistleblowers, ask structured follow-up questions, classify the nature of reported fraud, assess the level of risk, and automatically generate case files for investigation. Using machine learning algorithms, the system could identify recurring fraud patterns, detect links between multiple complaints involving the same officials or departments, and prioritise high-risk cases for immediate investigation. Furthermore, integrating the chatbot with government payroll systems such as PERSAL, the DHA NPR, biometric databases, and Human Resource Management Information Systems would enable automated verification of allegations and real-time identification of anomalies such as duplicate identity numbers, payments to deceased employees, duplicate bank accounts, fictitious employee records, and unusual payroll transactions.

A critical feature of the system should be the protection of whistleblower

anonymity through end-to-end encryption, secure cloud infrastructure, anonymised reporting protocols, and compliance with the Protected Disclosures Act 26 of 2000, the POPIA 4 of 2013, and the Cybercrimes Act 19 of 2020. The chatbot should avoid collecting personally identifiable information unless voluntarily disclosed and should generate anonymous tracking reference numbers that allow whistleblowers to monitor the progress of their cases without revealing their identities. AI-driven dashboards could simultaneously provide oversight institutions such as the AGSA, the Special Investigating Unit, the Public Service Commission, the DPSA, and the Public Protector with real-time analytics on fraud trends, investigation status, departmental risk profiles, and emerging corruption hotspots. By combining secure anonymous reporting with AI-powered fraud analytics, predictive risk modelling, and automated case management, a 24/7 whistleblower chatbot could strengthen transparency, improve early fraud detection, accelerate investigations, protect whistleblowers from retaliation, and support the eradication of ghost employee fraud while fostering ethical governance and accountability within South Africa's public sector (Mkhize, 2026; Enokkaren et al., 2024).

4.4.6. Integrated human resource and payroll systems

One of the major causes of ghost employee fraud is the fragmentation of payroll and human resource management systems. The lack of integration between departments often creates information silos that enable fraudulent records to remain undetected (Mamokhere, 2025). An integrated Human Resource Management Information System (HRMIS) would allow government departments to maintain centralised employee databases linked to payroll systems, tax records, pension funds, and national identity databases. Such integration would facilitate real-time verification of employee status and reduce opportunities for manipulation. The issue of ghost employee fraud in the South African public sector arises significantly from fragmented payroll, human resources, and employee verification systems. This lack of integration among government departments leads to information silos, hindering the timely detection of fraudulent records. To tackle this, incorporating AI with the DHA's NPR can enhance payroll integrity and accountability. The NPR contains crucial verified citizen records, facilitating real-time identity verification through the integration of HRMIS and payroll systems. AI can compare employee records to the NPR, identifying discrepancies such as duplicate identities or deceased individuals receiving salaries. This automated verification aims to curb payroll manipulation and identity fraud. AI analytics can monitor payroll databases continuously, detecting unusual patterns indicative of ghost employees, such as shared banking details or irregular attendance. Real-time alerts from AI systems can prompt immediate investigations, unlike traditional periodic audits, thus potentially preventing substantial losses. Moreover, AI can automate employee life-cycle management by notifying relevant departments about changes in employees' statuses, ensuring timely updates in payroll records. Periodic reconciliation with Home Affairs databases and pensions data can enhance transparency and minimise collusion risks among officials. Biometric verification is another intersection of AI and Home Affairs; the use of fingerprint and facial recognition technologies can authenticate employees, making it difficult for fictitious identities to be part of the payroll. Finally, AI-driven predictive analytics can help identify public entities at risk of payroll fraud, enhancing the oversight capabilities of institutions such as the AGSA and DPSA. Integrating AI with the DHA's NPR could revolutionise public sector human resource management in South Africa, promoting transparency, accountability, and ethical governance while

potentially reducing ghost employee prevalence. The initiative promises substantial financial savings and potential job creation along with improved public service delivery and restored confidence in government.

4.4.7. Blockchain technology

Blockchain technology is a decentralised digital ledger that records transactions securely across a distributed network of computers. Because information is linked in chronological blocks and verified by network consensus rather than a central authority, it creates a highly secure, tamper-proof, and transparent record of asset ownership or data (Habib et al., 2022). Furthermore, Habib et al. (2022) indicate that blockchain is "a distributed database or public ledger of all transactions or digital events performed and shared among participating parties". Blockchain technology offers a secure, transparent system that is extremely resistant to outages, as well as an auditable method of recording transactions or any digital interaction. The use of this technology in the commercial industry is still some years away. As a result, today's decision-makers across sectors and business functions should pay attention and begin studying this technology's potential uses. Blockchain technology offers additional opportunities for enhancing payroll transparency and accountability. Blockchain creates immutable digital records that cannot be altered without authorisation, making it difficult for corrupt officials to manipulate employee information. The use of blockchain in public sector payroll management can improve record integrity, facilitate audits, and strengthen public confidence in government systems (Mkhize, 2026). Blockchain technology addresses the issue of "ghost employees", fictitious, deceased, or non-existent workers on payrolls, in the public sector through immutable record-keeping, biometric-linked digital identities, and the use of smart contracts for wage disbursements. Traditional payroll systems are vulnerable to manipulation by corrupt officials due to centralised databases; however, blockchain establishes a distributed ledger that ensures that once an employee's verified data is input, it cannot be altered or deleted without leaving a permanent audit trail. This visibility allows various government departments, such as Treasury and Home Affairs, to query and view records simultaneously, making unauthorised payroll entries easily detectable. To combat the creation of fictional identities, a blockchain framework links each employee profile with verified biometric data, including fingerprints and facial recognition, ensuring that only living, verified individuals can be added to the system. Cryptographic authentication serves as a safeguard against the inclusion of fake IDs or deceased individuals (Faba, 2025). As posited in Faba (2025), blockchain can enhance transparency in public sector payrolls, securing South African Social Security Agency (SASSA) and Road Accident Fund (RAF) payments and eliminating ghost employees. Blockchain is particularly effective for managing procurement records, contract trails, and tamper-proof documentation, although much of the existing literature is more conceptual than outcome-focused (Alotaibi et al., 2025).

4.4.8. E-governance, internet of things (IoT), and digital workflow systems

E-governance, IoT and digital workflow systems can reduce administrative malpractice by limiting manual discretion, standardising decision-making, replacing vulnerable paper-based processes with auditable digital records, and reducing reliance on unofficial intermediaries. Rule-based workflows can apply consistent eligibility and processing criteria, while automated case allocation and role-based access can reduce opportunities for preferential treatment and unauthorised intervention. Digital audit trails further enhance accountability by recording user actions, timestamps and

workflow changes, making irregularities easier to detect and investigate. However, digitalisation does not eliminate malpractice entirely, as its effectiveness depends on institutional readiness, digital skills, infrastructure, system integrity, cybersecurity and effective oversight (Mangai and Ayodele, 2025). Thus, well-designed digital workflows primarily reduce opportunities for manipulation and discretion while strengthening transparency, traceability and accountability in public administration. Consequently, e-governance and digital workflows can serve as foundational "first-move" reforms by creating the digital infrastructure required for more advanced interventions such as analytics, authentication, IoT-enabled monitoring and automated auditing.

4.5. Perceived challenges in implementing AI for combating ghost employees in the public sector

The implementation of AI in public human resource management presents several institutional, technological and regulatory challenges that may limit its effectiveness in detecting and preventing ghost employees. Many public institutions continue to rely on outdated payroll and human resource information systems that are not easily compatible with modern AI, biometric and digital verification technologies. Poor-quality, incomplete or inconsistent employee records can further reduce the accuracy of automated verification processes. These challenges may be more pronounced in rural and under-resourced public institutions where inadequate digital infrastructure, limited internet connectivity and insufficient access to biometric technologies can affect real-time employee verification. In addition, the implementation and maintenance of AI systems require substantial financial resources and specialised technical skills. Public institutions may therefore experience difficulties in acquiring appropriate technologies, integrating them with existing systems and developing the capacity required for their effective operation. A phased implementation strategy, supported by infrastructure development, staff training and continuous technical support, is consequently important for ensuring that AI-based verification systems contribute meaningfully to the reduction of ghost employees (Chilunjika et al., 2022; DCM Corporate, 2025; Elgohary and Abdelazyz, 2020).

Beyond technological and financial constraints, the use of AI in public administration raises important concerns relating to employee trust, privacy, accountability and fairness. Public-sector employees and managers may resist AI-based verification because of concerns about increased monitoring, potential job displacement or uncertainty about how automated systems make decisions. Algorithmic bias also presents a significant risk, particularly where inaccurate or incomplete administrative data may result in legitimate employees being incorrectly identified as ghost employees. Such errors could have serious consequences for employees' salaries, employment status and reputation. Furthermore, the processing of employees' personal and biometric information must be consistent with the requirements of the POPIA, which places responsibilities on institutions regarding the lawful and responsible handling of personal information. Effective implementation therefore requires more than simply introducing new technology. Public institutions need clear governance frameworks, transparent procedures, appropriate safeguards for employee data, human oversight of automated decisions and meaningful engagement with employees and other stakeholders. Building institutional capacity and public-sector trust is essential to ensuring that AI is used as a supportive administrative tool rather than as a replacement for accountable human decision-making (Sharma et al., 2023; DCM Corporate, 2025).

5. Discussion

The study demonstrates that ghost employee fraud is a deeply entrenched form of systemic corruption within South Africa's public sector, driven by weak governance, fragmented payroll systems, inadequate employee verification, poor internal controls, and collusion among public officials rather than isolated administrative failures (AGSA, 2024; Mamokhere, 2025). The findings reveal that South Africa continues to experience widespread payroll fraud across national, provincial, and local government institutions, with notable cases including more than 10,000 ghost employees identified in the Limpopo Department of Education, over R200 million lost through fraudulent payroll and overtime claims at Polokwane Municipality, approximately R200 million in fraudulent salaries uncovered at PRASA, R15 million in payroll irregularities detected in the North West Provincial Government, and 60–66 ghost employees identified during the Gauteng Department of Health's 2025 staff verification exercise (PSA, 2025; Ryan, 2025; AGSA, 2024). These findings are reinforced by Corruption Watch (2021), which reports that approximately 25% of corruption complaints in South Africa relate to the mismanagement of public funds, including payments to ghost employees, while Statistics South Africa (2025) reports an unemployment rate of 32.9% and youth unemployment exceeding 46%, illustrating how payroll fraud diverts scarce public resources that could otherwise create employment opportunities and improve service delivery. The comparative analysis further demonstrates that countries such as Kenya (19,467 ghost workers), Tanzania (approximately 10,000 ghost workers), and Nigeria (23,846 ghost workers) have achieved significant reductions in payroll fraud through integrated Human Resource Information Systems, biometric authentication, AI-enabled analytics, and digital payroll verification (Enokkaren et al., 2024; Olive-Twist, 2025). Consequently, the study argues that AI, predictive analytics, biometric verification, blockchain technology, integrated HRMIS, and AI-driven payroll intelligence systems offer transformative opportunities for South Africa to shift from reactive fraud investigations to proactive, real-time fraud prevention. However, the effectiveness of these technologies depends on complementary institutional reforms, including stronger legislative frameworks, political commitment, cybersecurity, adequate funding, technical capacity, interdepartmental data integration, and robust consequence management (Mkhize, 2026; Enokkaren et al., 2024).

The findings can also be understood through the principles and limitations of NPM. The persistence of ghost employee fraud, despite existing payroll controls and audit mechanisms, reflects weaknesses in performance management, accountability, financial control and value-for-money principles that are central to NPM (Hood, 1991; Ezeh and Olekwara, 2025). The persistence of ghost employee fraud exposes a fundamental tension within NPM. This reflects a tension between managerial autonomy and rigorous oversight. When public sector organizations focus too heavily on treating citizens as customers and outsourcing services, they often neglect the internal financial controls and ethical infrastructure needed to prevent corruption (Mamokhere, 2025; Ezeh and Olekwara, 2025). The identified potential of AI, predictive analytics, biometric verification, blockchain and integrated HRMIS to enable continuous monitoring and proactive fraud detection is consistent with NPM's emphasis on efficiency, measurable performance, managerial accountability and technological innovation (Oyedokun et al., 2025; Thusi and Mamokhere, 2024). However, the findings also demonstrate an important limitation of NPM, which implies that improving administrative efficiency through technology does

not necessarily resolve deeper institutional and governance failures. Fragmented systems, collusion, weak consequence management, political interference, inadequate skills and poor-quality data can undermine technological interventions even where sophisticated digital tools are available (Panarese et al., 2026). Moreover, an excessive focus on efficiency and automated performance management may overlook equity, procedural fairness, privacy and public value, particularly where legitimate employees may be incorrectly flagged by automated systems. The findings therefore suggest that AI-driven reform should complement, rather than replace, accountable human oversight, ethical governance and institutional controls (Kayyali, 2026). In this context, the study extends the NPM perspective by demonstrating that technological efficiency must be balanced with transparency, fairness, legal compliance and public accountability for digital transformation to contribute meaningfully to public-sector rehabilitation.

6. The AI-driven public administration rehabilitation conceptual framework for combating ghost employee fraud (AI-PARF)

This conceptual framework aligns with the study findings and the NPM theoretical framework, which connects technological innovation with efficiency, accountability, transparency, performance and improved public-sector management. The framework is presented in **Figure 2** below.

The AI-PARF was inductively developed from the themes identified through the thematic content analysis and subsequently interpreted through the principles of NPM. The thematic analysis identified institutional governance failures, technological opportunities for payroll integrity, legislative and institutional reforms, and the need for stronger accountability and oversight as interconnected dimensions of the ghost employee fraud problem. These findings were translated into nine interconnected components of the framework. The first component, systemic governance vulnerabilities, reflects the identified root causes of ghost employee fraud, including weak internal controls, fragmented payroll systems, inadequate oversight, collusion, inadequate employee verification, political interference and poor consequence management. The second component positions ghost employee fraud as the central problem, with financial losses, budget leakage, weak service delivery and erosion of public trust representing its major consequences. The third component, AI-driven digitalisation interventions, was derived from evidence concerning predictive analytics, biometric verification, integrated HRMIS, blockchain, AI-enabled whistleblowing and automated monitoring as mechanisms for strengthening payroll integrity.

The fourth component, continuous verification and fraud detection, translates the technological findings into an operational process involving identity validation, payroll cross-checking, anomaly detection, fraud-risk alerts and real-time monitoring. The fifth component, human oversight and response, reflects the finding that technological alerts require human investigation, case assessment, corrective action and disciplinary processes. The sixth component, strengthened governance and payroll integrity, captures the expected institutional effects of improved transparency, accountability, ethical leadership and internal control. The seventh component represents the anticipated public administration rehabilitation outcomes, including protection of public funds, improved financial accountability, enhanced institutional integrity, restored public trust and improved service delivery. These technological and institutional components are supported by two cross-cutting dimensions: enabling

conditions, including adequate infrastructure, funding, technical skills, cybersecurity, data governance and employee buy-in; and governance, legal and ethical safeguards, including legislative compliance, data protection, human rights, ethical AI and independent oversight. The resulting framework therefore represents a synthesis of the empirical themes and literature into an integrated pathway from governance vulnerabilities, through technological and human interventions, to strengthened payroll integrity and public administration rehabilitation. Technologies should be supported by strong laws, data protection, trained employees, ethical leadership and effective oversight. When these elements work together, government can protect public funds, reduce corruption, strengthen accountability, improve service delivery and restore public trust.

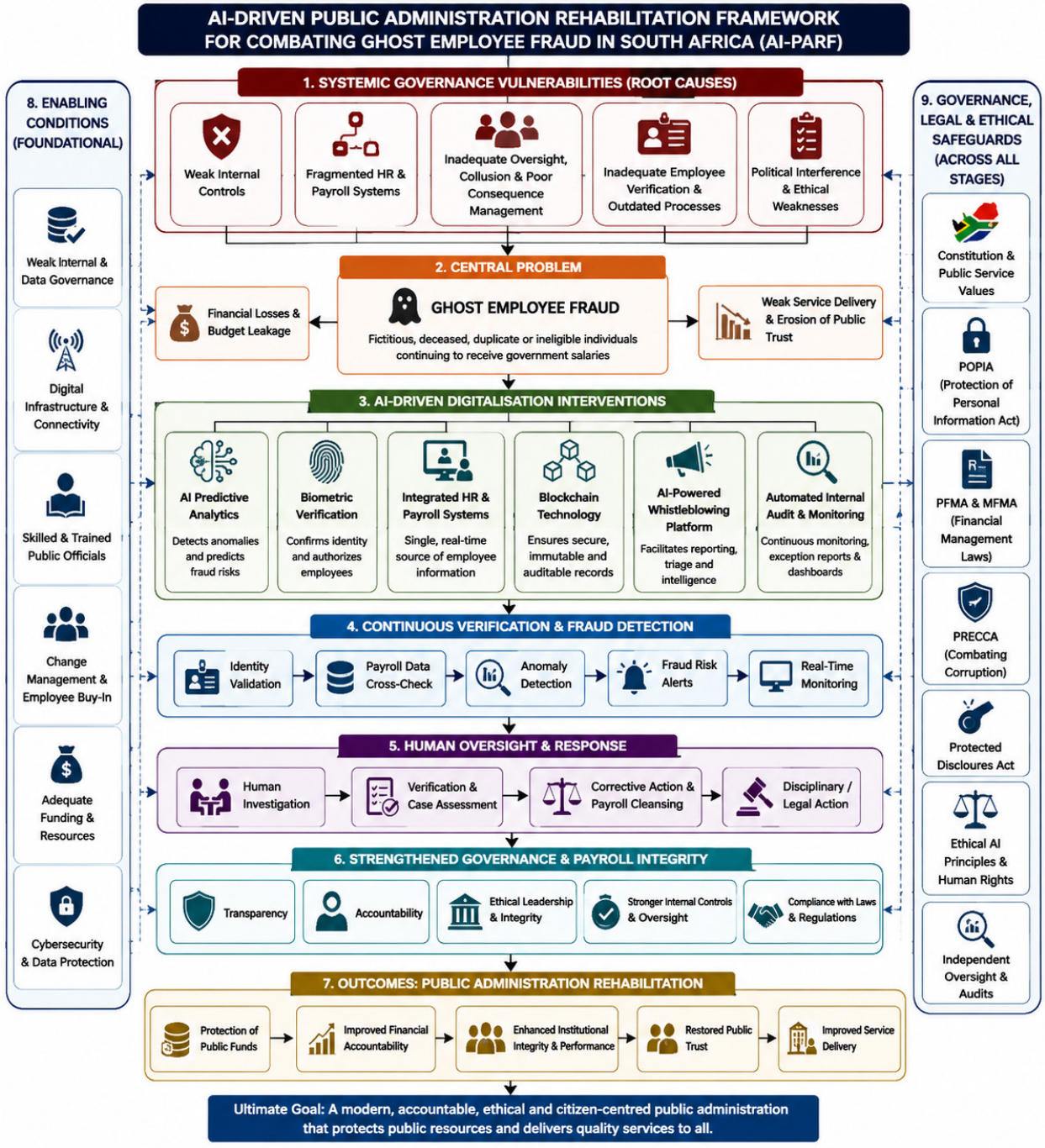


Figure 2. Conceptual Framework on AI-PARF

7. Contribution of the study to the field of human resource management and public administration

This study contributes to Human Resources Management and Public Administration by demonstrating how AI-driven digitalisation can strengthen employee verification, payroll integrity, fraud detection, accountability, and workforce management through the integration of HRMIS, biometric verification, predictive analytics, and blockchain technologies. For HRM, the study highlights the importance of integrated and accurate employee records and proactive monitoring to prevent ghost employees and improve workforce governance, while for Public Administration, it provides the AI-PARF as a practical approach to improving efficiency, transparency, ethical governance, financial accountability, and service delivery. The study further implies that successful digital transformation requires skilled personnel, strong institutional and legislative frameworks, data protection, ethical leadership, human oversight, and effective consequence management, confirming that technology should complement rather than replace accountable human decision-making. Lastly, the study has implications for workforce planning, HR information systems, employee record integrity, payroll administration, employee lifecycle management, HR auditing, digital HR governance, organisational trust, and the professional responsibilities of HR managers.

8. Limitations and future studies

This study is limited by its qualitative research methodology and reliance on secondary data sources, which restrict the extent to which the findings can be empirically tested and generalised across different institutional and administrative contexts. The study primarily synthesises existing literature and evidence to develop and refine a conceptual understanding of how digital interventions can strengthen accountability and reduce administrative malpractice. Future studies should therefore undertake empirical research using primary data from relevant public-sector institutions and stakeholders to validate the findings and assess their applicability in practice. Mixed-methods approaches combining qualitative insights with quantitative evidence could provide a more comprehensive understanding of the relationships between digital transformation, administrative processes, accountability and malpractice. In addition, future research should empirically test the proposed conceptual model, examine the effectiveness of individual digital interventions, and assess the institutional, technological and contextual factors that may influence their implementation and outcomes.

9. Conclusion and strategic recommendations

In the digital financial environment, the urgency for advanced technologies to combat fraud is escalating. Financial institutions and public sectors face heightened risks from cyberattacks and data breaches, leading to potential financial losses and regulatory penalties. Traditional fraud prevention methods are increasingly insufficient against modern threats. Consequently, organisations are adopting cutting-edge technologies like AI and blockchain. AI may excel at processing data and detecting patterns, enabling real-time identification of fraudulent transactions through machine learning and predictive analytics. AI/ML technologies are essential for anomaly detection, corruption-risk indicators, fraud screening, and extensive monitoring in procurement and financial controls. Data analytics can

bolster oversight, yet access to open data remains inconsistent in South Africa, with limited evidence for real-time dashboard utility. Biometric systems and stronger authentication measures have been implemented in grants and identity-linked systems; however, the evidence regarding their effectiveness in reducing issues like ghost beneficiaries or insider fraud is insufficient. E-governance and digital workflows can mitigate paper-based manipulations, streamline service delivery, and enhance compliance. Nonetheless, their implementation faces challenges, including skill shortages, infrastructural limitations, outdated systems, and inadequate institutional readiness. These evolving technologies serve as both reactive and proactive measures for safeguarding financial institutions and their clients. This study finds that phantom employee fraud remains one of the most pervasive manifestations of systemic corruption within South Africa's public sector, undermining financial sustainability, service delivery, and public confidence in government institutions. The study establishes that payroll fraud is primarily driven by weak governance structures, fragmented payroll systems, inadequate employee verification, ineffective internal controls, and collusion among public officials. Drawing on the principles of NPM, the findings demonstrate that AI-driven and digital technologies could offer a transformative approach to strengthening public sector governance through enhanced efficiency, transparency, accountability, and performance. Technologies such as AI, biometric verification, blockchain, predictive analytics, integrated human resource management information systems, and AI-enabled whistleblowing platforms have the potential to shift payroll management from reactive auditing to proactive, real-time fraud prevention. However, technology alone cannot eliminate ghost employee fraud. Sustainable success requires strong political commitment, effective legislative and institutional reforms, ethical leadership, skilled personnel, adequate investment in digital infrastructure, and robust cybersecurity. Integrating these technological innovations with sound governance reforms may contribute significantly to safeguarding public resources, improving payroll integrity, and promoting ethical, transparent, and accountable public administration in South Africa.

The overarching conclusion is that technology should be integrated into governance reforms. Factors such as political will, audit quality, accountability, legal enforcement, cyber resilience, and public trust notably influence outcomes beyond mere digitisation. The study recommends that the South African government modernise public sector payroll management by integrating AI, biometric identity verification, blockchain technology, and interoperable Human Resource Management Information Systems with the DHA's NPR to enable continuous real-time employee verification. Government should also institutionalise AI-powered predictive analytics and automated payroll monitoring to detect fraudulent transactions before financial losses occur. Furthermore, a secure 24/7 AI-enabled whistleblower platform should be established to facilitate anonymous reporting of ghost employee fraud while protecting whistleblowers' identities through compliance with the Protected Disclosures Act and the Protection of Personal Information Act. Finally, these technological reforms should be supported by stronger legislative frameworks, enhanced internal controls, regular payroll audits, capacity-building initiatives, and firm consequence management to ensure that digital transformation translates into improved governance, reduced corruption, and more efficient utilisation of public resources.

Author contributions: Conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing—original draft preparation,

review and editing, visualization, supervision, project administration: JM. All authors have read and agreed to the published version of the manuscript.

Funding: None.

Ethical approval: Not applicable.

Informed consent statement: Not applicable.

Data availability statement: The data are embedded in this manuscript. However, for any inquiries related to this manuscript, the corresponding author will provide the information upon reasonable request.

Conflict of interest: The authors declare no conflict of interest

References

[1] Adelakun BO (2022). The impact of AI on internal auditing: Transforming practices and ensuring compliance. Finance & Accounting Research Journal. 4(6): 350–370. https://doi.org/10.51594/farj.v4i6.1316.

[2] Ali A, Mustafa K (2025). The Role of AI and Blockchain Technology in Strengthening Fraud Prevention Strategies in Finance. Berlin: ResearchGate. https://doi.org/10.13140/RG.2.2.11202.29126.

[3] Alotaibi EM, Issa H, Codesso M (2025). Blockchain-based conceptual model for enhanced transparency in government records: A design science research approach. International Journal of Information Management Data Insights. 5(1): 100304. https://doi.org/10.1016/j.jjimei.2024.100304.

[4] Ardigó IN, Chêne M (2017). Corruption. In: Service Delivery Topic Guide. New York, USA. Available at: https://knowledgehub.transparency.org/assets/uploads/topic-guides/Topic-Guide-Service-Delivery.pdf.

[5] Association of Certified Fraud Examiners (ACFE) (2022). Fraud-resources. Available at: https://www.acfe.com/fraud-resources.

[6] Auditor-General of South Africa (AGSA) (2024). Consolidated general report on local government audit outcomes 2023–24. Pretoria: AGSA.

[7] Ayodeji A (2024). Artificial Intelligence in Enhancing Regulatory Compliance and Risk Management. ResearchGate, June. https://doi.org/10.13140/RG.2.2.20915.44326.

[8] Braun V, Clarke V (2006). Using thematic analysis in psychology. Qualitative Research in Psychology. 3(2): 77–101. https://doi.org/10.1191/1478088706qp063oa.

[9] Braun V, Clarke V (2022). Conceptual and design thinking for thematic analysis. Qualitative Psychology. 9(1): 3. https://psycnet.apa.org/doi/10.1037/qup0000196.

[10] Chilunjika A, Intauno K, Chilunjika SR (2022). Artificial intelligence and public sector human resource management in South Africa: Opportunities, challenges and prospects. SA Journal of Human Resource Management. 20: 1972. https://doi.org/10.4102/sajhrm.v20i0.1972.

[11] Corruption Watch (2015). Corruption and the Law in South Africa: A Quick Reference Guide. Johannesburg: Corruption Watch. https://www.corruptionwatch.org.za/wp-content/uploads/2015/06/corruption-watch-corruption-and-the-law-in-sa.pdf.

[12] Corruption Watch (2021). Corruption Watch Local Government Sectoral Report. August 2021. Johannesburg: Corruption Watch. Available at: https://www.corruptionwatch.org.za/wp-content/uploads/2021/08/CW-local-govt-sectoral-report-August2021.pdf.

[13] DCM Corporate (2025). Impact of Public Servant Verification on Ghost Workers. https://www.dcmcorporate.co.za/impact-of-public-servant-verification-on-ghost-workers/.

[14] Denhardt JV, Denhardt RB (2015). The New Public Service: Serving, not steering (4th ed.). London: Routledge.

[15] Elgohary E, Abdelazyz R (2020). The impact of employees' resistance to change on implementing e-government systems: An empirical study in Egypt. The Electronic Journal of Information Systems in Developing Countries. 86(6): e12139. https://doi.org/10.1002/isd2.12139.

[16] Enokkaren SJ, Kendyala R, Kurma J, et al. (2024). Artificial Intelligence (AI)-Based Advance Models for Proactive Payroll Fraud Detection and Prevention. International Journal of Machine Learning, AI & Data Science Evolution. 1(1): 1–11. https://doi.org/10.63665/ijmlaidsey1f1a001.

[17] Ezeh C, Olekwara RT (2025). Ghost worker syndrome and public sector productivity in Kogi State civil service: A 21st century malaise. International Journal of Research and Scientific Innovation. 12(8): 874–889. https://doi.org/10.51244/IJRSI.2025.120800075.

[18] Faba Y (2025). How blockchain could end public sector fraud. Johannesburg: Mail & Guardian. https://mg.co.za/thought-leader/2025-03-28-how-blockchain-could-end-public-sector-fraud/.

[19] Habib G, Sharma S, Ibrahim S, et al. (2022). Blockchain Technology: Benefits, Challenges, Applications, and Integration of Blockchain Technology with Cloud Computing. Future Internet. 14(11): 341. https://doi.org/10.3390/fi14110341.

[20] Hood C (1991). A public management for all seasons? Public Administration. 69(1): 3–19. https://doi.org/10.1111/j.1467-9299.1991.tb00779.x.

[21] Kayyali M (2026). AI in Public Administration: Transforming Governance and Public Services. In: Modernizing Public Administration With New Digital Advancements (pp. 153–180). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-1484-6.ch006.

[22] Lessig L (2014). Institutional Corruption Defined. Journal of Law, Medicine and Ethics. 41(3): 553–555. https://doi.org/10.1111/jlme.12063.

[23] Mafunisa MJ, Nyalungu RE (2025). The Role of Ethical Leadership in Promoting Professionalism in South African Local Government. IAHRW International Journal of Social Sciences Review. 13(7):1515-1519.

[24] Mamokhere J (2025). Systemic Corruption In South African Government Departments: Ghost Employees - Where They Come From and Where They Are Going. Social Sciences and Education Research Review. 12(2): 137–145. https://doi.org/10.5281/zenodo.17870678.

[25] Mangai MS, Ayodele AA (2025). Reimagining public service delivery: Digitalising initiatives for accountability and efficiency. Administrative Sciences. 15(12): 1-37. https://doi.org/10.3390/admsci15120477.

[26] Mashilo O (2026). Here's how Home Affairs plans to crack down on ghost workers. Johannesburg: The Citizen. https://www.citizen.co.za/news/south-africa/heres-how-home-affairs-plans-to-crack-down-on-ghost-workers/.

[27] Mbuh PE, Nchang ND, NdiIsoh AV, et al. (2020). Employee fraud: an empirical review of ghost workers. Int. J. Innov. Res. Adv. Stud. 7: 119–125.

[28] Mkhize N (2025). Plans without action? Politics and institutional challenges of anti-corruption reforms in the BRICS countries. Journal of Economic Criminology. 1-12. https://doi.org/10.1016/j.jeconc.2025.100197.

[29] Mkhize PL (2026). Knowledge management in the digital age: A systematic review of fourth industrial revolution technologies and sustainable transformation. South African Journal of Information Management. 28(1): a2083. https://doi.org/10.4102/sajim.v28i1.2083.

[30] Olive-Twist A (2025). Ghost workers haunt Kenyan state. Available at: https://mg.co.za/news/africa/2025-12-11-ghost-workers-haunt-kenyan-state/.

[31] Osborne D, Gaebler T (1992). Reinventing Government: How the Entrepreneurial Spirit is Transforming the Public Sector. London: Addison-Wesley.

[32] Oyedokun GE, Babatunde AO, Kennedy C, et al. (2025). Enhancing Internal Control and Fraud Detection in Small and Medium Enterprises through Digital Technology Adoption: Empirical Evidence from Nigeria. Multidisciplinary Journal of Management Sciences (MJMS). 8(2): 114–135. https://doi.org/10.5281/zenodo.19148107.

[33] Panarese P, Grasso MM, Solinas C (2026). Algorithmic bias, fairness, and inclusivity: A multilevel framework for justice-oriented AI. AI & SOCIETY. 41(4): 2803–2825. https://doi.org/10.1007/s00146-025-02451-2.

[34] Pollitt C, Bouckaert G (2017). Public Management Reform: A Comparative Analysis – Into the Age of Austerity (4th ed.). Oxford: Oxford University Press.

[35] PSA (2025). Laying ghosts to rest: Addressing the challenge of ghost workers in South Africa's public service. https://www.psa.co.za/docs/default-source/psa-documents/psa-opinion/ghost-workers-discussion-paper-sf.pdf?sfvrsn=e60a54b2_2.

[36] Ryan C (2025). How many ghost workers are there in the government? 3 June 2025. Moneyweb. https://www.moneyweb.co.za/news/south-africa/how-many-ghost-workers-are-there-in-government/.

[37] Sharma A, Sharma D, Bansal R (2023). Challenges of Adopting Artificial Technology in Human Resource Management Practices. In: The Adoption and Effect of Artificial Intelligence on Human Resources Management. Editors: Pallavi Tyagi, Naveen Chilamkurti, Simon Grima, Kiran Sood, Balamurugan Balusamy. UK: Emerald Publishing Limited.

[38] Shipalana ML (2026). Artificial intelligence technology as an innovative strategy to curb maladministration in the South

African Public Sector. Gender and Behaviour, 24(2):25322-25335.

[39] Stanciu V (2012). Fraud, a growing problem, can we mitigate it? Analele Ştiinţifice ale Universităţii «Alexandru Ioan Cuza» din Iaşi. Ştiinţe economice. 59(1): 79–94.

[40] Statistics South Africa (2025). South Africa's Youth in the Labour Market: A Decade in Review. Pretoria: StatsSA. Available at: https://www.statssa.gov.za/?p=18398.

[41] Thusi X, Mamokhere J (2024). The state of public service delivery in South African local government after 30 years of democracy: Challenges and mitigation strategies. The USV Annals of Economics and Public Administration. 24(2(40)): 239–249. https://doi.org/10.4316/aepa.2024.24.2(40).239-249.

[42] World Health Organisation (WHO) (2020). Findings from a rapid review of literature on ghost workers in the health sector: towards improving detection and prevention. Available at: https://utoronto.scholaris.ca/server/api/core/bitstreams/5547f0b5-93b1-40ad-b004-1a2e34cd03cc/content.