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Nekitio Koya Lesaloi, Robert Kinanga &

Samson Kisirkoi

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Data Security and Perceived Payroll Performance in Bomet County Government, Kenya

[1*]Nekitio Koya Lesaloi, [2]Robert Kinanga & [3]Samson Kisirkoi

[1*]Master of Science in Human Resource Management Student, Department of Business Management, School of Business and Economics, Maasai Mara University, Kenya

[2]Department of Business Management, School of Business and Economics, Maasai Mara University, Kenya

[3]Department of Business Management, School of Business and Economics, Maasai Mara University, Kenya

***Corresponding author email: alexlesaloi35@gmail.com**

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Abstract

Payroll automation requires safeguards for sensitive employee and financial information. This study examined the association between data security and perceived payroll performance in Bomet County Government, Kenya, using the Technology Acceptance Model and Resource-Based View as interpretive perspectives. A descriptive survey targeted a census of 150 employees in human resource, finance and information technology functions. Of 109 returned questionnaires, 105 were complete and analysed. Data were collected using five-point Likert scales, with Cronbach's alpha coefficients of .873 for data security and .824 for payroll performance. Descriptive statistics, Pearson correlation and simple linear regression were used. Data security was positively associated with perceived payroll performance ($r = .700$, $p < .001$). The regression model accounted for 48.9% of the variance in performance scores ($R^2 = .489$), $F(1, 103) = 98.754$, $p < .001$. A one-unit higher security score was associated with a 0.771-unit higher performance score ($B = 0.771$; $\beta = .700$). The null hypothesis of no association was rejected. The findings support management review of access controls, security policies, physical safeguards and breach-response procedures. The cross-sectional, self-reported evidence does not establish causation.

Keywords: *Data security, payroll performance, payroll automation, payroll accuracy, county government, Bomet County*

1.0 Introduction

1.1 Background of the Study

Payroll management is increasingly shifting from manual records to automated information systems as organisations seek greater efficiency, accuracy and accountability in employee compensation. This transition forms part of the wider digitalisation of public administration, where data governance and shared digital infrastructure support service delivery (World Bank, 2022; Organisation for Economic Co-operation and Development [OECD], 2024). Automated payroll systems can support salary calculations, deductions, employee records and reporting (Ahmed *et*

al., 2023). Their use also concentrates sensitive personal and financial information, making data protection an important consideration in payroll administration.

Data security concerns the protection of information against unauthorised access, disclosure, alteration, loss and disruption. The National Institute of Standards and Technology (NIST, 2024) organises cybersecurity around governance, identification, protection, detection, response and recovery. Applied to payroll, these functions complement risk assessment, control activities and monitoring within the internal control framework of the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2013). Access restrictions, authentication, encryption, audit trails and backups provide distinct safeguards, while payroll-specific research also highlights the relevance of control arrangements to fraud prevention (Yusuf *et al*., 2023).

Across Africa, integrated personnel and payroll systems have been introduced to improve employee records, reduce payroll irregularities and strengthen accountability. Kaoje *et al*. (2020) examined payroll transparency in Nigeria, while Chima *et al*. (2019) reviewed implementation experiences in Kenya, Ghana and Nigeria, identifying progress alongside problems involving data quality, staff training and system functionality. Amofa and Abigail (2025) developed a conceptual account of digitalisation, internal audit capacity and payroll governance in sub-Saharan Africa. Together, these studies suggest that payroll digitalisation must be considered alongside the organisational controls that support it.

In Kenya, payroll administration is an important component of public financial management within the devolved system of government. The public financial management reform strategy identifies payroll automation and integration as reform priorities, while the public service payroll policy provides a policy context for payroll administration (Public Financial Management Reforms Secretariat, 2023; Ministry of Public Service, 2024). The Office of the Auditor-General (2025) also issued a special payroll management audit report for the County Executive of Bomet. This institutional context motivates an examination of how staff assessments of payroll data security relate to their assessments of payroll performance.

1.2 Statement of the Problem

Payroll automation offers tools for processing salaries, maintaining employee records and generating reports, but its operational value depends partly on how sensitive information is handled (Ahmed *et al*., 2023). Unauthorised access, inappropriate changes or loss of payroll records could disrupt salary calculations, deductions and reconciliation. In Bomet County, the special payroll management audit provides a relevant accountability context for examining payroll administration (Office of the Auditor-General, 2025). However, the existence of an audit does not establish that data security caused payroll difficulties; the relationship requires separate empirical examination.

The reviewed literature approaches payroll security through different questions and settings. Nakeng *et al*. (2021) examined adoption of cloud-based payroll systems in South African state-owned enterprises, while Sukoco and Anggara (2022) developed an encryption application in an Indonesian retail setting. Other work addresses cloud payroll feasibility, blockchain applications and payroll non-compliance rather than the same relationship within a Kenyan county government (Zhao & Rabiei, 2023; Giri *et al*., 2023; Atheru & Gichohi, 2025). The present study contributes contextual evidence by examining the association between staff perceptions of data security and payroll key performance indicators in Bomet County Government.

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1.3 Objective of the Study

The objective of the study was to examine the association between data security and perceived payroll key performance indicators in Bomet County Government, Kenya.

1.4 Research Hypothesis

H_{01}: Data security is not significantly associated with perceived payroll key performance indicators in Bomet County Government, Kenya.

2.0 Literature Review

This section presents an examination of the theoretical and empirical literature. It further extends the underlying discourse by examining the concepts informing the study, as elucidated by the conceptual framework.

2.1 Theoretical Review

2.1.1 Technology Acceptance Model

Davis (1989) developed the Technology Acceptance Model (TAM) to explain acceptance and use of information technology through perceived usefulness and perceived ease of use. These perceptions inform users' attitudes and intentions towards using a system. TAM2 extended this account through social influence and cognitive instrumental processes, including job relevance and output quality (Venkatesh & Davis, 2000). TAM3 further examined determinants such as computer self-efficacy, external support and organisational interventions (Venkatesh & Bala, 2008).

TAM offers an interpretive perspective on how payroll users assess system usefulness and usability, rather than a direct theory of data security. Security may provide a contextual condition for confidence in handling sensitive payroll information, but this proposed pathway was not estimated in the present study. Turner *et al*. (2010) reviewed the relationship between TAM measures and actual technology use, reinforcing the need to distinguish acceptance measures from observed behaviour. Accordingly, this study uses TAM to contextualise staff perceptions without claiming to test its full acceptance pathway.

2.1.2 Resource-Based View

The Resource-Based View (RBV) explains differences in organisational performance through the resources and capabilities available to organisations and how they are deployed. Barney (1991) argues that valuable, rare, imperfectly imitable and non-substitutable resources can support sustained competitive advantage. In information systems research, this perspective emphasises the contribution of technology when combined with complementary organisational resources (Wade & Hulland, 2004). For public institutions, the relevant application concerns effective resource use and reliable service delivery rather than competitive advantage alone.

Payroll data security can be understood as a capability combining technical infrastructure, staff knowledge and established procedures. Access controls, encryption and backups provide technological safeguards, while responsibilities, training and incident-response arrangements support their use. RBV therefore offers a rationale for examining the relationship between security

capability and payroll performance, consistent with the complementary-resource argument of Wade and Hulland (2004). The present study does not establish the rarity or inimitability of these resources, and its regression should not be interpreted as a comprehensive test of RBV.

2.2 Empirical Review

Nakeng *et al*. (2021) investigated the adoption of cloud-based enterprise resource planning payroll systems in South African state-owned enterprises. Using qualitative evidence from interviews, observations and document reviews, they identified considerations including security, privacy, policy, cost, compliance, data-centre location and management support. Their adoption focus helps explain why security matters during system implementation. However, adoption evidence does not directly quantify the association between staff-rated security practices and payroll performance within a Kenyan county government.

Sukoco and Anggara (2022) developed a web-based application to protect payroll data at Mangga Dua Store in Kebumen, Indonesia, where salary records had been stored in unprotected spreadsheets. The application used the Advanced Encryption Standard 128-bit cipher to encrypt and decrypt employee salary data. The study demonstrated application functionality rather than an observed improvement in payroll performance. Its retail setting also differs from public-sector payroll administration.

Cloud-based payroll research addresses system feasibility, effectiveness and implementation from several perspectives. Zhao and Rabiei (2023) considered the feasibility of cloud-based human resource payroll management, while Choudhary *et al*. (2023) examined cloud computing in payroll management. Aina and Odun-Ayo (2025) focused on the design, implementation and deployment of a cloud-based payroll application. These studies provide useful technological context, but their different research questions and settings limit direct comparison with the present county-level survey.

Blockchain research provides a further perspective on payroll security and record integrity. Ahmed and Shakir (2023) reviewed blockchain applications in payroll, while Giri *et al*. (2023) examined blockchain-based payroll management. Devaraju (2021) discussed secure and compliant cross-border payroll processing in multinational organisations. These contributions identify potential technical approaches, but they do not establish the size of the relationship between the security perceptions and payroll performance perceptions measured in this study.

Yusuf *et al*. (2023) examined payroll systems and fraud-prevention controls within a public sector department in Malaysia. Their focus on payroll personnel and existing control arrangements makes the study relevant to public administration, although fraud prevention differs from the broader performance construct used here. Across the reviewed literature, adoption studies, application-development studies and governance research address related but distinct outcomes. The current study therefore adds evidence on the association between perceived security and perceived payroll performance in a specific devolved government setting.

2.3 Conceptual Framework

The conceptual framework treats data security as the explanatory variable and perceived payroll key performance indicators as the outcome variable. Security items cover access restrictions,

encryption, password protection, physical safeguards, backups, information retrieval, compliance, security policies and breach-response arrangements. The payroll performance scale includes timeliness, accuracy, deductions and benefits, error resolution, usability, technology use, attendance-system integration, communication, responsiveness and trust in payroll handling. Because these were questionnaire ratings, the framework concerns respondents' assessments rather than independently audited security controls or administrative payroll outcomes.

3.0 Research Methodology

3.1 Research Design and Population

The study adopted a descriptive, cross-sectional survey design to examine staff assessments of data security and payroll performance in Bomet County Government. The stated target population comprised 150 employees involved in payroll administration and support across the Human Resource, Finance and Information Technology departments. All 150 employees were targeted through an attempted census. The final analysis used 105 complete questionnaires.

3.2 Data Collection and Instrument Quality

Primary data were collected through a structured questionnaire administered physically and through Google Forms. Responses were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with 15 data security items and 10 payroll performance items. The instrument was pre-tested with 11 employees of neighbouring Narok County Government, who were excluded from the main study, and content review was undertaken by the supervisors. Cronbach's alpha coefficients were .873 for data security and .824 for payroll performance, exceeding the .70 internal-consistency threshold discussed by Hair *et al*. (2019).

The reported Kaiser–Meyer–Olkin measure was .839 and Bartlett's test of sphericity was significant ($\chi^2 = 336.627$, $p < .001$). These statistics concern the suitability of an item correlation matrix for factor analysis. They do not, by themselves, establish the dimensionality or discriminant validity of the two scales (Hair *et al*., 2019).

Table 1: Reliability Statistics

Variable	Number of Items	Cronbach's Alpha
Data Security	15	.873
Payroll Key Performance Indicators	10	.824

Source: Research Data (2025)

3.3 Data Analysis and Ethical Considerations

Data were edited, coded and analysed using the Statistical Package for the Social Sciences (SPSS). Frequencies, percentages, means and standard deviations summarised the responses, while Pearson correlation and simple linear regression examined the association between the study variables. Regression interpretation requires attention to linearity, residual normality, homoscedasticity and independence of errors (Field, 2018). The hypothesis was tested at the 5% significance level using the following model:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

In this model, Y represents the perceived payroll performance score, β_0 is the intercept, β_1 is the data security coefficient, X_1 represents the data security score and ε is the error term. The null hypothesis was rejected when $p < .05$.

Ethical approval and authorisation were obtained through Maasai Mara University, participation was voluntary and based on informed consent, and respondents' identities were not recorded.

4.0 Results and Discussion

4.1 Response Rate and Respondents' Profile

Of the 150 questionnaires distributed, 109 were returned, giving a gross response rate of 72.7%. Four questionnaires were incomplete on the study variables, leaving 105 usable responses, equivalent to 70.0% of the stated target population. Among respondents, 52.4% held a bachelor's degree and 33.3% had between five and ten years of work experience. These participation figures describe the achieved sample but do not, by themselves, exclude non-response bias (Fincham, 2008).

4.2 Descriptive Statistics on Data Security

Respondents rated their agreement with 15 statements on payroll data security. The results are presented in Table 2.

Table 2: Descriptive Statistics on Data Security

Statement	SD f (%)	D f (%)	N f (%)	A f (%)	SA f (%)	M	Std. dev.
The data security of our payroll system is adequate	0 (0.0)	4 (3.8)	16 (15.2)	42 (40.0)	43 (41.0)	4.18	0.830
Our payroll system cannot be compromised due to lack of data security	4 (3.8)	8 (7.6)	23 (21.9)	51 (48.6)	19 (18.1)	3.69	0.978
Only authorised persons gain access to our payroll system	4 (3.8)	4 (3.8)	4 (3.8)	28 (26.7)	65 (61.9)	4.40	0.998
The level of encryption of our payroll system prevents any form of manipulation	0 (0.0)	4 (3.8)	31 (29.5)	43 (41.0)	27 (25.7)	3.89	0.832
The passwords used in our payroll system are well protected	0 (0.0)	0 (0.0)	20 (19.0)	43 (41.0)	42 (40.0)	4.21	0.739
Physical access to our payroll system by unauthorised persons is adequately controlled	8 (7.6)	12 (11.4)	19 (18.1)	44 (41.9)	22 (21.0)	3.58	1.163
The control system for payroll data is well protected	0 (0.0)	4 (3.8)	20 (19.0)	50 (47.6)	31 (29.5)	4.03	0.796
The backup system of our payroll is adequate	0 (0.0)	3 (2.9)	20 (19.0)	56 (53.3)	26 (24.8)	3.99	0.769
There is no possibility of losing any information in our payroll system	0 (0.0)	4 (3.8)	39 (37.1)	39 (37.1)	23 (21.9)	3.77	0.831
Payroll information can be retrieved easily from our archives	0 (0.0)	0 (0.0)	27 (25.7)	59 (56.2)	19 (18.1)	3.92	0.663

Statement	SD f (%)	D f (%)	N f (%)	A f (%)	SA f (%)	M	Std. dev.
Our payroll system meets all data protection compliance standards	0 (0.0)	4 (3.8)	34 (32.4)	44 (41.9)	23 (21.9)	3.81	0.818
Our payroll system undergoes frequent audits for conformity to compliance standards	0 (0.0)	8 (7.6)	23 (21.9)	47 (44.8)	27 (25.7)	3.89	0.876
Data privacy should be a higher priority for organisations	0 (0.0)	4 (3.8)	15 (14.3)	24 (22.9)	62 (59.0)	4.36	0.872
My organisation has strong data security policies in place	0 (0.0)	12 (11.4)	38 (36.2)	43 (41.0)	12 (11.4)	3.52	0.839
There is a clear protocol to follow in case of a data breach	0 (0.0)	11 (10.5)	34 (32.4)	44 (41.9)	16 (15.2)	3.61	0.869

Note: SD = strongly disagree; D = disagree; N = neutral; A = agree; SA = strongly agree; n = 105. Source: Research Data (2025)

Respondents generally rated logical access safeguards favourably, with authorised access recording the highest mean (M = 4.40, SD = 0.998) and 88.6% selecting agree or strongly agree. Password protection was also rated favourably (M = 4.21, SD = 0.739), while 81.0% agreed that overall payroll data security was adequate (M = 4.18, SD = 0.830). These perceptions are relevant to the security and control concerns discussed by Nakeng *et al*. (2021) and Yusuf *et al*. (2023). The statement that data privacy should receive higher priority also scored highly (M = 4.36, SD = 0.872), but expresses a preference and should not be read as evidence of an implemented safeguard.

Lower ratings concerned formal security policies (M = 3.52, SD = 0.839), physical access control (M = 3.58, SD = 1.163) and breach-response protocols (M = 3.61, SD = 0.869). Agreement on these items was 52.4%, 62.9% and 57.1%, respectively, indicating less favourable assessments than for logical access restrictions. Neutral responses concerning information loss (37.1%) and compliance with data protection standards (32.4%) also suggest uncertainty among some respondents. These differences identify areas for management assessment across the protective, response and recovery functions described by NIST (2024), rather than establishing verified deficiencies.

4.3 Descriptive Statistics on Payroll Key Performance Indicators

Respondents also rated ten statements on payroll performance. The results are summarised in Table 3.

Table 3: Descriptive Statistics on Payroll Key Performance Indicators

Statement	Agree (%)	Mean	Std. Dev.
Payroll is consistently processed on time by the HR department	84.8	4.14	0.894
My pay is accurately calculated each pay period	73.3	4.03	0.748
Deductions and benefits are correctly reflected in my payslip based on legal provisions	81.0	4.07	0.770
HR quickly resolves payroll errors when they occur	81.0	4.03	0.839

Statement	Agree (%)	Mean	Std. Dev.
Due to data security, I trust the HR team to handle payroll reliably	65.7	3.84	0.805
Our payroll system is easy to use and understand	67.6	3.51	1.003
HR uses technology effectively to manage payroll operations	65.7	3.78	0.744
Payroll integration with time-tracking or attendance systems is effective	77.1	4.07	0.946
HR clearly communicates payroll policies and procedures	73.3	3.92	0.861
HR responds promptly to payroll-related inquiries	65.7	3.91	0.941

Note: Agree (%) combines agree and strongly agree responses; n = 105. Source: Research Data (2025)

Timely payroll processing received the highest performance rating (M = 4.14, SD = 0.894), with 84.8% of respondents agreeing. Accuracy-related items were also rated favourably: correct deductions and benefits had a mean of 4.07, while accurate pay calculations and prompt error resolution each had a mean of 4.03. Ease of system use received a lower rating (M = 3.51, SD = 1.003), as did effective technology use (M = 3.78, SD = 0.744) and trust in payroll handling attributed to data security (M = 3.84, SD = 0.805). These staff assessments are broadly consistent with the combination of payroll benefits and implementation challenges discussed by Chima *et al*. (2019), but were not independently verified against payroll records.

4.4 Correlation Analysis

Pearson correlation analysis was conducted to establish the strength and direction of the relationship between data security and payroll key performance indicators. The results are presented in Table 4.

Table 4: Correlation between Data Security and Payroll Key Performance Indicators

Variable	Data Security	Payroll KPIs
Data Security	1	
Payroll Key Performance Indicators	.700**	1

*Note: ** Correlation is significant at the .01 level (2-tailed); n = 105. Source: Research Data (2025)*

The results in Table 4 indicate a strong, positive association between the data security and perceived payroll performance scores ($r = .700$, $p < .001$). Respondents who rated data security more favourably also tended to rate payroll performance more favourably. This association does not establish temporal change or a causal effect of security controls.

4.5 Regression Analysis and Hypothesis Testing

Simple linear regression was conducted to examine the association between data security and perceived payroll key performance indicators and to test the null hypothesis. The model summary, analysis of variance and regression coefficients are presented in Tables 5, 6 and 7.

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Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.700	.489	.484	.387

Note: Predictor: (Constant), Data Security. Source: Research Data (2025)

The results in Table 5 indicate that the simple regression model accounted for 48.9% of the observed variance in perceived payroll performance scores (R^2 = .489; adjusted R^2 = .484). The remaining variance was not explained by this model and may reflect omitted variables, measurement error and other sources of variation. These statistics do not establish how much variance is attributable to any specific unmeasured factor.

Table 6: Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	p
Regression	14.755	1	14.755	98.754	< .001
Residual	15.390	103	0.149		
Total	30.145	104			

Note: Dependent variable: Payroll Key Performance Indicators. Source: Research Data (2025)

The analysis of variance in Table 6 indicates that the simple regression model was statistically significant, $F(1, 103) = 98.754$, $p < .001$. This tests the null hypothesis that the population slope is zero; it does not, by itself, establish model adequacy or a causal relationship.

Table 7: Regression Coefficients

Model	B	Std. Error	Beta	t	p
(Constant)	1.116	0.285		3.912	< .001
Data Security	0.771	0.078	.700	9.937	< .001

Note: Dependent variable: Payroll Key Performance Indicators. Source: Research Data (2025)

The coefficients in Table 7 yield the following fitted model:

$$Y = 1.116 + 0.771X_1$$

The data security coefficient was positive and statistically significant (B = 0.771, SE = 0.078, β = .700, t = 9.937, $p < .001$). A one-unit higher data security score was associated with a 0.771-unit higher perceived payroll performance score. The null hypothesis of no association was therefore rejected at the 5% significance level. The intercept of 1.116 represents the prediction at a security score of zero, which falls outside the stated five-point scale and has no direct substantive interpretation here.

4.6 Discussion of Findings

The study identified a strong positive association between data security and perceived payroll performance in Bomet County Government. This extends the focus of adoption and design studies to staff assessments of payroll outcomes. Security and privacy have been examined in cloud payroll adoption (Nakeng *et al*., 2021), while Zhao and Rabiei (2023) considered cloud-based

payroll management. The present model accounted for approximately half of the variance in respondents' payroll performance scores, although it did not establish that security improvements caused better payroll outcomes.

The observed association is compatible with the importance of payroll controls discussed by Yusuf *et al*. (2023). Encryption and traceability offer possible technical mechanisms for protecting payroll information, as illustrated by Sukoco and Anggara (2022) and Giri *et al*. (2023). However, the present survey did not test these mechanisms or demonstrate reductions in fraud, processing delays or payroll errors. Its contribution concerns the relationship between staff-rated security and staff-rated payroll performance.

The findings can be interpreted through TAM and RBV, but they do not directly test either theory. TAM concerns perceived usefulness, perceived ease of use and technology acceptance (Davis, 1989; Venkatesh & Bala, 2008); the present regression did not estimate these pathways. RBV provides a complementary interpretation in which security infrastructure, procedures and staff capabilities may support organisational performance (Barney, 1991; Wade & Hulland, 2004). Lower ratings for security policies, physical access control and breach protocols identify areas for further assessment rather than proof of objectively inadequate controls.

The cross-sectional design and self-reported measures limit interpretation to an association between staff perceptions of security and payroll performance. Shared measurement methods, non-response, omitted organisational factors and overlapping item content may affect the estimated relationship. In particular, the trust item explicitly attributes payroll reliability to data security, while the privacy-priority item measures a preference rather than an implemented control. The single-county setting also limits generalisability, and administrative records were not used to verify staff assessments.

5.0 Conclusions

Data security was positively associated with perceived payroll performance in Bomet County Government. The simple regression model accounted for 48.9% of the observed variance in payroll performance scores. Respondents who assessed security more favourably also tended to report more favourable payroll outcomes. The findings support management attention to payroll security, while the design does not establish that strengthening security alone will improve payroll performance.

Respondents rated logical access restrictions and password protection more favourably than formal security policies, physical access control and breach-response protocols. These differences identify priorities for management review and verification. They should be interpreted as staff perceptions rather than an audit of the county's security capability.

6.0 Recommendations

6.1 Recommendations for Policy and Practice

Bomet County Government should review and strengthen its payroll data security policy, particularly the areas receiving lower staff ratings. The Human Resource, Finance and Information Technology departments should jointly clarify access responsibilities, information-handling procedures, retention arrangements and backup requirements. Management should establish and

communicate clear procedures for recognising, reporting and responding to suspected payroll data breaches. These actions should form part of routine payroll governance and staff training, consistent with the governance and response functions described by NIST (2024).

County management should assess physical access to payroll servers, workstations and records alongside role-based access permissions and audit-trail reviews. The Information Technology function should coordinate recovery testing and security assessments, while payroll managers should monitor accuracy, timeliness, access exceptions and incident follow-up. A periodic joint review should identify corrective actions, responsible officers and implementation deadlines. These are practical governance recommendations rather than interventions whose effectiveness was established by the survey.

6.2 Suggestions for Further Research

Future research should examine multiple county governments to assess whether the observed association varies across institutional settings. Longitudinal and mixed methods studies should combine questionnaire responses with payroll error rates, processing times and audit outcomes to strengthen temporal interpretation and reduce dependence on perceptions. Further studies could examine staff digital competence, management support and system usability. The costs and operational implications of additional security controls also warrant investigation.

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