The International Journal of Business Management and Technology, Volume 10 Issue 10 October 2026
ISSN: 2581-3889

Research Article Open Access

Operational Risk Governance Maturity and Financial Performance of Commercial Banks in Kenya

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Abstract: *This study examined the effect of operational risk governance maturity (ORGM) on the financial performance of commercial banks in Kenya, focusing on four dimensions: digital risk governance, board risk governance, risk culture and operational control. Anchored on Fraud Triangle, Systems and Stakeholder theories, it adopted a positivist, cross-sectional explanatory design covering the 2025 financial year. A disclosure-based ORGM index was built from the audited annual reports of 31 licensed banks and checked against a survey of bank risk officers (81.58% response rate; 77.4% agreement, κ = 0.61). Financial performance was measured by return on assets (ROA) and analysed using multiple linear regression. The model was significant (F = 6.76, p = 0.001) and explained 51% of the variation in ROA. Digital risk governance (β = 0.284, p = 0.006), board risk governance (β = 0.196, p = 0.029) and operational control (β = 0.221, p = 0.022) had significant positive effects, while risk culture was positive but not significant at the 5% level (β = 0.152, p = 0.068). Banks should convert governance structures into day-to-day practice, especially in digital monitoring and internal control, and regulators should give greater supervisory weight to how governance operates in practice.*

Keywords: Commercial banks, Financial performance, Kenya, Operational risk governance maturity, Return on assets

I. Introduction

Operational risk governance has become a central concern in global banking because of rapid digitisation, evolving cyber threats, regulatory complexity and heightened stakeholder expectations. Kenya's 38 licensed commercial banks operate in one of the most digitised financial systems in Sub-Saharan Africa, and the Central Bank of Kenya (CBK) reports that cyber fraud cases more than doubled between 2023 and 2024, from 153 to 353 incidents, with confirmed losses rising almost fourfold to KSh 1.59 billion [1]. Return on assets (ROA) remains one of the most widely used measures of institutional stability in banking, and mature operational risk governance is expected to improve it through lower operational losses, fewer fraud incidents, better use of resources and stronger business continuity [2, 3]. Banks are accordingly moving from compliance-oriented operational risk management towards integrated, maturity-based governance frameworks, because reactive and siloed approaches have proved insufficient against hybrid threats that combine insider vulnerabilities with external cyber exposure [4].

Research on operational risk governance maturity in Kenya is still at an early stage. Most studies examine isolated risk components such as fraud or cyber risk rather than governance maturity as an integrated, capability-based construct [5, 6]. They also tend to rely on either perceptual survey data or secondary financial statements considered in isolation, and international evidence, although broadly positive, is fragmented across markets and rarely tests digital risk governance, board risk governance, risk culture and operational control as distinct, simultaneously estimated predictors of performance [7, 8]. Industry evidence points the same way: converging operational, cyber and regulatory risks are putting pressure on traditional governance models [9].

This study addresses that gap. For the 2025 financial year it examines how each of the four ORGM dimensions independently influences the ROA of commercial banks in Kenya, combining a disclosure-based governance index with audited financial results and a validation survey of risk officers. The study makes three contributions: it treats governance maturity as a multidimensional capability rather than a single compliance score; it offers a replicable disclosure-based index suited to markets with limited data; and it gives bank managers and regulators evidence on which dimensions of governance maturity relate most strongly to profitability.

1.1 Objectives

The general objective was to examine the effect of operational risk governance maturity on the financial performance of commercial banks in Kenya. The specific objectives were to determine the effect of (i) digital risk governance, (ii) board risk governance, (iii) risk culture and (iv) operational control on financial performance.

II. Literature Review and Hypotheses

2.1 Theoretical review

No single theory explains how operational risk governance matures, because maturity involves individual conduct, organisational design and accountability to several stakeholders. The study therefore draws on three complementary theories.

Fraud Triangle Theory. Cressey [10] proposed that occupational fraud occurs when pressure, opportunity and rationalisation converge. Recent banking studies extend the framework: an augmented fraud model among 397 Bangladeshi bankers found that incentive, opportunity, rationalisation and organisational culture were significant predictors of fraudulent intention [11]; a fraud hexagon study of 35 Indonesian banks identified weak monitoring and director turnover as key contributors to fraud risk [12]; and a study of listed Indonesian banks found pressure and opportunity to be the strongest predictors of fraudulent reporting [13]. The theory is, however, largely individualistic and reactive and says little about how governance maturity can reduce opportunity systematically [14].

Systems Theory. Systems Theory [15, 16] views organisations as open systems of interdependent sub-systems. In banking, the human subsystem (staff, culture, decisions) and the technological subsystem (core platforms, mobile channels) reinforce one another, so insider actions can trigger or amplify cyber vulnerabilities. Work applying systems thinking has shown that the three lines of defence, risk culture and technology enablement are interdependent in determining resilience [17], that operational losses contribute materially to systemic risk among large US bank holding companies [18], and that governance maturity is the mechanism that coordinates interdependent risk domains [19]. The theory is highly abstract, however, and offers limited guidance on how maturity should be measured.

Stakeholder Theory. Freeman [20] argued that organisations should create value for all legitimate stakeholders rather than shareholders alone. Because banks generate significant externalities, a stakeholder orientation implies an ethical risk culture and board accountability. Evidence from Ghanaian banks links board expertise and stakeholder-oriented governance to lower operational risk [8]; corporate social performance has been shown to act as a risk-reducing factor that raises ROA and resilience [21]; and US banks legally required to consider broader stakeholder interests took less risk and held larger capital buffers [22]. The theory is normative rather than predictive, so competing interests do not always yield unambiguous governance decisions.

2.2 Empirical review

Evidence on the maturity–profitability link is consistently positive but methodologically uneven. In ten Turkish listed banks, higher enterprise risk management maturity was associated with significant gains in ROA and firm value and with lower insolvency risk, although maturity was captured as a binary or ordinal compliance score [7]. In Kenya, operational risk management practices have been found to have a significant positive effect on ROA, ROE and profit growth among banks in Nairobi City County [5], while mismanaged operational risk had a substantial negative effect on the ROA of listed banks between 2018 and 2023 [6]. At the industry level, legacy systems and gaps in oversight are cited as recurring sources of loss [9]. Internationally, banks whose chief risk officer reported to the board rather than the CEO achieved higher stock returns during the 2007–2008 crisis, whereas conventional governance variables such as board independence showed no consistent relationship with performance [23].

A related stream shows that governance and digital capability improve institutional functioning even before profit effects appear. Digitalisation lowers operational risk in Chinese listed firms by strengthening internal control quality [24]; integrating inter-risk dependencies lowered estimated capital requirements of Chinese commercial banks by about 10% [25]; and institutions that integrated non-financial risk management with operational risk governance achieved stronger analytics and lower compliance costs than siloed peers [26].

2.3 Research gap, conceptual framework and hypotheses

Three gaps remain. First, maturity is usually measured as a binary or ordinal compliance indicator rather than as a multidimensional index with separately tested sub-dimensions. Second, studies rarely decompose governance maturity into the specific dimensions that management can act upon. Third, Kenyan studies use survey data or financial statements in isolation rather than combining a disclosure-based index with audited results for a single, well-defined year. Fig. 1

shows the framework adopted: each of the four ORGM dimensions is hypothesised to influence ROA directly and independently, with no moderating or control variables, consistent with the four objectives. The study tested the following hypotheses, each stated in the alternative form.

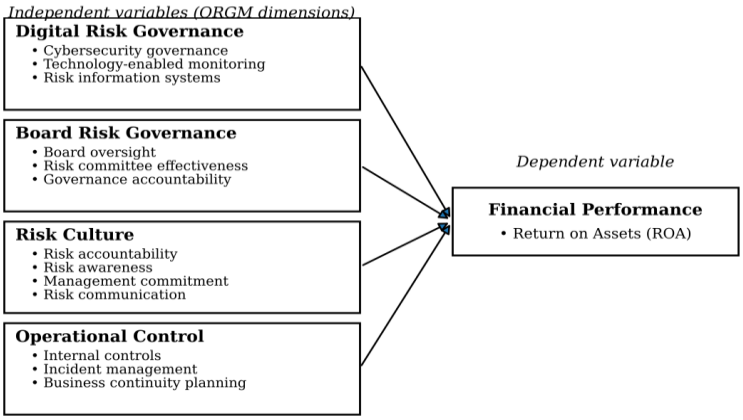


Fig. 1: conceptual framework

H1: Digital risk governance has a significant positive effect on the ROA of commercial banks in Kenya.

H2: Board risk governance has a significant positive effect on the ROA of commercial banks in Kenya.

H3: Risk culture has a significant positive effect on the ROA of commercial banks in Kenya.

H4: Operational control has a significant positive effect on the ROA of commercial banks in Kenya.

III. Research Methodology

3.1 Research design

The study adopted a positivist, quantitative, cross-sectional explanatory design using primary and secondary data. An explanatory design is appropriate for examining associative or causal relationships [27], and a cross-sectional design suits a study of governance maturity and performance at a single point in time, the 2025 financial year. No time-series or panel component was included. A structured questionnaire was also administered in the same banks and year to validate the disclosure-based index against practitioners' own assessments.

3.2 Population, sample and data

The target population was the 38 commercial banks licensed by the CBK in 2025. A census approach was applied to banks with complete, publicly available audited FY2025 financial statements and notes; 31 banks met this criterion and seven were excluded because complete disclosures could not be obtained. Each sampled bank contributed one observation. Secondary data came from audited annual reports and CBK publications, and the validation questionnaire was administered to one knowledgeable respondent per bank, preferably the Head of Risk Management or Chief Risk Officer.

3.3 Measurement of variables

The ORGM Index was constructed from ten disclosure indicators in each bank's FY2025 annual report, each scored 1 if disclosed and 0 otherwise: board risk committee, chief risk officer, operational risk framework, enterprise risk management framework, cybersecurity governance, internal control systems, Basel compliance, operational resilience framework, technology-enabled risk monitoring, and risk culture or training programmes. Scores of 0–3 indicate low maturity, 4–7 moderate and 8–10 high maturity. The indicators were grouped into four sub-dimensions (digital risk governance, board risk governance, risk culture and operational control), each expressed on a 0–10 scale. Financial performance was measured by ROA, computed as net profit after tax divided by total assets for FY2025, multiplied by 100, from audited results. ROA was the sole dependent variable because complete and comparable FY2025 figures were available for all sampled banks.

3.4 Data analysis

Data were analysed using descriptive statistics, Pearson correlation and multiple linear regression estimated by ordinary least squares. Because each bank contributes a single observation, panel estimators and the Hausman test were not required. The empirical model was stated as follows:

$$ROA_i = \beta_0 + \beta_1 DRG_i + \beta_2 BRG_i + \beta_3 RC_i + \beta_4 OC_i + \varepsilon_i \quad (1)$$

where ROA_i is the return on assets of bank *i*; DRG, BRG, RC and OC are its digital risk governance, board risk governance, risk culture and operational control sub-scores; β_0 is the constant; β_1 to β_4 are coefficients; and ε is the error term. Multicollinearity, heteroscedasticity and normality of residuals were tested using the variance inflation factor (VIF), the Breusch-Pagan test and the Shapiro-Wilk test respectively.

3.5 Validation of the ORGM index

Each bank's disclosure-based maturity band (low, moderate or high) was compared with the band derived from its risk officer's questionnaire responses, rescaled to the same 0–10 range. Agreement was assessed using percentage agreement and Cohen's kappa, which adjusts for chance agreement, and was interpreted following Landis and Koch [28]. The survey score was used only for validation and was not substituted for the disclosure-based index in the regression.

3.6 Ethical considerations

The study used publicly available audited reports and a validation questionnaire. Respondents gave informed, voluntary consent and the confidentiality of individuals and institutions was protected. Data were used solely for academic purposes and reported without manipulation. Research authorisation was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) and ethical approval from the university.

IV. Results and Discussion

4.1 Response rate and reliability

Questionnaires were distributed to 38 banks and 31 were completed and returned, a response rate of 81.58%, above the 70% level generally regarded as satisfactory [29]. Internal consistency was assessed with Cronbach's alpha, for which 0.70 or above is acceptable [30]. As Table 1 shows, all four constructs exceeded this threshold.

Table 1: Reliability statistics

Construct	Cronbach's alpha
Digital Risk Governance	0.86
Board Risk Governance	0.84
Risk Culture	0.81
Operational Control	0.88

Source: Survey data (2026).

4.2 Descriptive statistics

Respondents rated statements on a five-point Likert scale. Table 2 summarises the overall survey means and the disclosure-based indices. Overall means for digital risk governance (3.36), board risk governance (3.27), risk culture (3.31) and operational control (3.30) indicate moderate agreement that the relevant practices exist. Within each dimension, formal structures scored highest (a mean of 3.87 for documented cybersecurity policies, board review of the risk profile, senior management tone and documented internal controls), while operational follow-through scored lower and was more dispersed (means of 3.00 to 3.39 for monitoring-data use, risk-committee follow-up, disciplinary action, day-to-day integration of risk and incident records). Banks therefore appear to have prioritised establishing frameworks over embedding them in daily decisions, consistent with weak integration between monitoring technology and decision-making reported among Kenyan banks [31].

Table 2: Descriptive statistics

Variable	N	Mean	SD	Min	Max
Survey: Digital Risk Governance (1–5)	31	3.36	1.06	–	–
Survey: Board Risk Governance (1–5)	31	3.27	1.10	–	–
Survey: Risk Culture (1–5)	31	3.31	1.09	–	–
Survey: Operational Control (1–5)	31	3.30	1.06	–	–
ORGM Index (0–10)	31	5.42	1.87	2.00	9.00
Digital Risk Governance score (0–10)	31	5.31	1.94	1.50	9.00
Board Risk Governance score (0–10)	31	5.14	1.98	1.30	8.80

Variable	N	Mean	SD	Min	Max
Risk Culture score (0–10)	31	5.20	1.91	1.60	8.70
Operational Control score (0–10)	31	5.18	2.02	1.40	9.10
Return on Assets (%)	30	4.13	6.37	-4.40	33.16

Source: Survey data and annual reports (2026). ROA is reported for 30 banks because one bank's reported figures produced an implausible ROA and were excluded.

Banks recorded moderate ORGM maturity on average (5.42 out of 10). Mean ROA was 4.13% with wide dispersion (SD = 6.37%), ranging from a loss of 4.40% at the weakest bank to 33.16% at a small foreign-subsidiary bank with an unusually thin asset base, which reflects the heterogeneity of Kenya's tiered banking sector.

4.3 Correlation analysis

Table 3 shows that ROA was positively correlated with all four ORGM dimensions. The correlations were strongest for digital risk governance ($r = 0.52$, $p < 0.01$), followed by operational control ($r = 0.47$, $p < 0.01$) and board risk governance ($r = 0.44$, $p < 0.01$), with a weaker association for risk culture ($r = 0.35$). The independent variables were moderately correlated with one another, but none of these coefficients exceeded 0.80, so multicollinearity was not a serious concern.

Table 3: Pearson correlation matrix

Variable	ROA	DRG	BRG	RC	OC
ROA	1.00				
Digital Risk Governance (DRG)	0.52**	1.00			
Board Risk Governance (BRG)	0.44**	0.51**	1.00		
Risk Culture (RC)	0.35	0.46**	0.43**	1.00	
Operational Control (OC)	0.47**	0.49**	0.45**	0.40	1.00

Note: n = 30; ** $p < 0.01$. Source: Researcher's computation (2026).

4.4 Diagnostic tests

The diagnostic tests supported the ordinary least squares specification. The mean VIF of 1.58 indicated no serious multicollinearity (all values below 5); the Breusch-Pagan test ($\chi^2 = 5.62$, $p = 0.229$) did not reject homoscedasticity; and the Shapiro-Wilk test ($W = 0.96$, $p = 0.187$) did not reject normality of residuals.

4.5 Regression results and hypothesis testing

Table 4 presents the regression results. The model was statistically significant ($F(4, 25) = 6.76$, $p = 0.001$). The R^2 of 0.51 shows that the four ORGM dimensions jointly explained about 51% of the variation in ROA ($R = 0.714$), and the adjusted R^2 of 0.43 shows that the model retains substantial explanatory power after accounting for the number of predictors and the small sample.

Table 4: Regression results (dependent variable: ROA)

Variable	β	Std. error	t-statistic	p-value
Constant	1.842	0.612	3.010	0.004
Digital Risk Governance (DRG)	0.284	0.098	2.898	0.006
Board Risk Governance (BRG)	0.196	0.087	2.253	0.029
Risk Culture (RC)	0.152	0.081	1.877	0.068
Operational Control (OC)	0.221	0.093	2.376	0.022
R^2 / Adjusted R^2	0.51 / 0.43			
F-statistic (4, 25)	6.76			0.001

Note: n = 30. Source: Researcher's computation (2026).

Digital risk governance had a positive and significant coefficient ($\beta = 0.284$, $p = 0.006$) and the largest effect, so H1 was supported. Board risk governance ($\beta = 0.196$, $p = 0.029$) and operational control ($\beta = 0.221$, $p = 0.022$) were also positive and significant, supporting H2 and H4. Risk culture had a positive coefficient ($\beta = 0.152$) that was not significant at the 5% level ($p = 0.068$), so H3 was not supported at the conventional threshold. The estimated model was:

$$ROA = 1.842 + 0.284DRG + 0.196BRG + 0.152RC + 0.221OC \quad (2)$$

4.6 Discussion

The findings support the proposition that operational risk governance maturity is a significant determinant of bank financial performance. The positive effect of digital risk governance is consistent with evidence that digitalisation strengthens internal control quality and reduces operational risk [24]. Given the descriptive finding that cybersecurity policies were well established while monitoring-data use was weaker, banks appear to gain most from digital governance where structures are matched by consistent operational use of monitoring information. The significant effect of board risk governance corroborates work showing that board-level accountability, rather than generic oversight alone, is associated with stronger outcomes [23, 8], and the lower scores for risk-committee follow-through suggest that the quality, and not merely the existence, of board risk structures drives the effect.

Risk culture showed a positive but only marginally significant effect. This is consistent with the Fraud Triangle emphasis on the gap between stated expectations and consistent frontline behaviour, and with the weaker descriptive scores for disciplinary follow-through. It also suggests, in line with Systems Theory, that culture may operate as an enabling condition for the other dimensions rather than as an independent driver of ROA. The significant effect of operational control is consistent with the Basel principles for operational resilience [2] and with evidence linking stronger control and incident-management practices to lower losses and improved efficiency [25].

Agreement between the disclosure-based and survey-based ORGM bands was 77.4% ($\kappa = 0.61$), which is substantial [28] and supports the credibility of the index, although a meaningful minority of banks' disclosed maturity did not match practitioners' internal assessment, a divergence consistent with the Stakeholder Theory caution that disclosure quality does not always mirror substantive practice. The unexplained variation in ROA indicates that performance is also shaped by institutional and market factors outside the deliberately focused four-variable model.

V. Conclusion

The study concludes that operational risk governance maturity, treated as a multidimensional capability, is a significant determinant of the financial performance of commercial banks in Kenya. Digital risk governance, board risk governance and operational control each independently and significantly predicted ROA, while risk culture showed a positive but weaker association. Maturity across the sector is uneven: formal structures such as policies, board oversight routines and documented controls are comparatively well established, but the practices that translate them into daily behaviour, including technology-enabled monitoring, risk-committee follow-through, disciplinary consistency and business-continuity testing, are less developed. Disclosure-based measurement is convenient and applicable to the whole population of banks but gives only a partial view of actual maturity, and should be triangulated with primary evidence where feasible.

For bank management, the results point to closing the gap between governance structure and practice: integrating monitoring outputs into risk decisions, tracking implementation of risk-committee recommendations, embedding risk-conscious behaviour in everyday decisions, and testing business continuity plans regularly. For regulators, supervisory expectations could place more weight on operational rather than merely structural dimensions of maturity, for example by requiring evidence of committee follow-through and continuity testing frequency in line with Basel operational resilience principles, and by periodically triangulating self-disclosures with independent assessments.

The study has several limitations. The disclosure-based ORGM sub-scores and validation-survey results reported here remain provisional pending completion of disclosure coding of each bank's FY2025 annual report, whereas the ROA figures come directly from published results. The validation survey used one respondent per bank. The design is cross-sectional and confined to one financial year, so the findings describe associations in 2025 and not persistent causal effects, and the small sample limits statistical power. ROA was the only performance measure. Future research should extend the index to all 38 licensed banks and to multiple years, test additional indicators such as return on equity and the efficiency ratio, and use qualitative case studies to explain why some banks with mature structures still suffer elevated operational losses.

Acknowledgements

The authors thank the risk officers who completed the validation questionnaire and the Co-operative University of Kenya for supporting this research.

References

[1] Central Bank of Kenya, *Kenya financial sector stability report* (Nairobi: Central Bank of Kenya, 2025).

[2] Basel Committee on Banking Supervision, *Principles for operational resilience* (Basel: Bank for International Settlements, 2021).

[3] P.S. Rose and S.C. Hudgins, *Bank management and financial services* (10th ed., New York: McGraw-Hill, 2021).

[4] Basel Committee on Banking Supervision, *Sound practices for the management and supervision of operational risk* (Basel: Bank for International Settlements, 2023).

[5] V.M. Kamau, *Operational risk management practices and financial performance of commercial banks in Nairobi City County, Kenya*, doctoral diss., Kenyatta University, Nairobi, 2025.

[6] M.S. Malalu and C. Njoka, *Financial risks and financial performance of commercial banks listed in Nairobi Securities Exchange, Kenya*, Kenyatta University, Nairobi, 2025.

[7] M.Ç. Akbaş, Measuring the impact of enterprise risk management on performance, value, and risk indicators of Borsa Istanbul XBANK companies with data mining prediction models, *Humanities and Social Sciences Communications, 11*(1), 2024, 1-19.

[8] B.S. Ofori, A. Padi, and A. Musah, Corporate governance effectiveness and operational risk of banks, *Discover Global Society, 3*(1), 2025, Article 23.

[9] Aon, *Adapting to disruption: How financial institutions are reframing risk* (Aon, 2025).

[10] D.R. Cressey, *Other people's money: A study of the social psychology of embezzlement* (Glencoe, IL: Free Press, 1953).

[11] M.T. Hossain, M. Asaduzzaman, R. Jahan, A. Hossain, and I. Mainuddin, Predicting bankers' fraudulent behavior using fraud star theory, *Journal of Financial Crime*, 2025 (advance online publication).

[12] I.D. Pamungkas, M. Oktafiyani, P.A. Swatyayana, R. Kurniawati, A.A. Putri, and M.A.A. Alfared, Can corporate governance structures reduce fraudulent financial reporting in the banking sector? Insights from the fraud hexagon framework, *Journal of Risk and Financial Management, 18*(12), 2025, Article 698.

[13] R. Ricardo and R. Suhendah, The effect of the fraud triangle in detecting fraudulent financial reporting in Indonesian banking sector companies, *International Journal of Application on Economics and Business, 1*(3), 2023, 1307-1317.

[14] P. Roffia and M. Poffo, Revisiting the fraud triangle in corporate frauds: Towards a polygon of elements, *Journal of Risk and Financial Management, 18*(3), 2025, Article 156.

[15] L. von Bertalanffy, *General system theory: Foundations, development, applications* (New York: George Braziller, 1973).

[16] F.E. Kast and J.E. Rosenzweig, General systems theory: Applications for organisation and management, *Academy of Management Journal, 15*(4), 1972, 447-465.

[17] E. van der Westhuizen, Navigating operational risk: Developing criteria for operational risk management maturity in the wake of COVID-19, *Journal of Governance Risk Management Compliance and Sustainability, 5*(1), 2025, 41-54.

[18] A.N. Berger, F. Curti, A. Mihov, and J. Sedunov, Operational risk is more systemic than you think: Evidence from US bank holding companies, *Journal of Banking & Finance, 143*, 2022, 106619.

[19] N. Moden, T. Campanile, C. W. CBE, and C. Richardson, Why today's banking CRO must be master of many trades, *EY Global Bank Risk Management Survey*, August 2025.

[20] R.E. Freeman, *Strategic management: A stakeholder approach* (Cambridge: Cambridge University Press, 2010).

[21] E. Bruno, F. Pistolesi, and E. Teti, Cybersecurity policy, ESG and operational risk: A virtuous relationship to improve banks' performance, *International Review of Economics & Finance, 99*, 2025.

[22] W.S. Leung, W. Song, and J. Chen, Does bank stakeholder orientation enhance financial stability? *Journal of Corporate Finance, 56*, 2019, 38-63.

[23] M. Schmid, G. Sabato, and V. Aebi, Risk management, corporate governance, and bank performance in the financial crisis, SSRN working paper, 2011.

[24] Q. Yin, Y. Wang, D. Song, F. Lai, B. Collins, and H. Guo, The impact of digitalisation on operational risk: An organizational information processing perspective, *International Journal of Production Economics, 276*, 2024, 109369.

[25] W. Xie, J. He, F. Huang, and J. Ren, Operational risk assessment of commercial banks' supply chain finance, *Systems, 13*(2), 2025, Article 76.

[26] PwC, *Global banking risk study: Managing risk in a world of accelerating change* (PwC, 2025).

[27] J.W. Creswell and J.D. Creswell, *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed., Thousand Oaks, CA: Sage, 2018).

[28] J.R. Landis and G.G. Koch, The measurement of observer agreement for categorical data, *Biometrics, 33*(1), 1977, 159-174.

[29] D.A. Dillman and L.M. Christian, *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed., Hoboken, NJ: Wiley, 2014).

[30] J.C. Nunnally and I.H. Bernstein, *Psychometric theory* (3rd ed., New York: McGraw-Hill, 1994).

[31] P. Macharia, L. Wanjiru, and K. Otieno, Technology-enabled risk monitoring and decision-making integration in Kenyan commercial banks, *African Journal of Finance and Management, 14*(2), 2025, 88-104.