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The Role of Human Resource Quality, Information Technology, and Internal Control Systems on Village Fund Management Accountability

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Abstract

This research investigates how human resource quality, information technology utilization, and internal control systems influence village fund management accountability, with spiritual intelligence as a moderating variable in Tigabinanga District, Karo Regency. Employing a quantitative methodology, primary data were collected from 133 village officials through saturated sampling. Analysis utilized descriptive statistics, validity-reliability testing, multiple linear regression, classical assumptions, and hypothesis testing via SPSS 25. Findings reveal that all three independent variables significantly enhance accountability. Spiritual intelligence strengthens the human resource quality-accountability relationship but weakens the effects of information technology and internal control systems, though insignificantly. Results provide practical implications for improving village financial governance through capacity building, technological optimization, and enhanced control mechanisms integrated with ethical values.

Keywords: Information technology, human resources, spiritual intelligence, internal control, village fund accountability, financial governance

Introduction

Village fund management represents a critical mechanism for achieving equitable development and enhancing community welfare (Amelia & Rahman, 2023). Effective governance requires transparent and accountable practices that directly impact rural quality of life (Chen et al., 2022). However, persistent challenges including inadequate human resource competencies, suboptimal technology adoption, fragile internal controls, and insufficient ethical frameworks continue hindering financial governance, particularly in Tigabinanga District, Karo Regency (Nugroho & Santoso, 2023). These issues have intensified given escalating village fund irregularities nationwide involving village heads and administrative personnel (Transparency International, 2022).

Addressing accountability gaps necessitates strengthening human resource capabilities, maximizing technological applications, and reinforcing internal control mechanisms (Davies & Wilson, 2023). These elements prove fundamental in establishing

accountable financial governance frameworks (Ibrahim & Hassan, 2022). Within this context, spiritual intelligence serves as a values-based moderator influencing relationships between these factors and accountability outcomes (Kumar & Patel, 2023). This study examines these three factors' impacts on village fund management accountability while exploring spiritual intelligence's moderating capacity.

The investigation employs quantitative methodologies utilizing primary data from village officials, analyzed through statistical techniques grounded in stewardship theory (Martinez & Thompson, 2022). Seven hypotheses test direct and moderating relationships among variables, with findings expected to contribute practical insights for enhanced village financial governance systems.

Literature Review

Theoretical Foundation: Stewardship Theory

This research applies stewardship theory, which posits that public organization managers—specifically village administrators—function as community stewards rather than self-interested actors, prioritizing organizational objectives including village development and community welfare (Donaldson & Davis, 1991; Schillemans & Bjurstrøm, 2020). Unlike agency theory emphasizing monitoring and control, stewardship theory assumes managers demonstrate intrinsic motivation toward responsible resource management aligned with stakeholder interests (Corbetta & Salvato, 2004; Hernandez, 2012).

Human Resource Quality

Human resource quality encompasses knowledge, competencies, experience, and professional attitudes among village officials (Anderson & Garcia, 2022). High-quality human resources enhance village fund management accountability through efficient task execution compliant with regulatory frameworks (Wijaya et al., 2023). Officials possessing adequate educational backgrounds, training exposure, and practical experience demonstrate superior capacity for accountable fund management aligned with established regulations (Lee & Kim, 2021). Consequently, the following hypothesis emerges:

H_1: Human resource quality positively influences village fund financial management accountability.

Information Technology Utilization

Information technology utilization involves implementing electronic systems and applications for data management, information processing, and decision support (Rahman & Sari, 2023). Technology facilitates reporting, recording, and monitoring village finances through platforms like Siskuedes (Village Financial System) (Nguyen et al., 2022). However, limited digital literacy and insufficient training result in suboptimal technology adoption among officials (Prasetyo & Wibowo, 2023). Therefore:

H_2: Information technology utilization positively influences village fund financial management accountability.

Internal Control System

Internal control systems comprise processes and structures designed to ensure organizational goal achievement, reliable reporting, and regulatory compliance (COSO, 2013; Patel & Shah, 2022). Village governments must implement these systems ensuring all fund management stages—from planning through accountability—proceed according to regulations (Turner & Brown, 2023). Control weaknesses, whether structural or operational, enable irregularities and fund misappropriation (Davis et al., 2021). Thus:

H_3: Internal control systems positively influence village fund financial management accountability.

Spiritual Intelligence

Spiritual intelligence represents the capacity for ethical behavior grounded in moral values and comprehending life's broader purpose (Emmons, 2000; King & DeCicco, 2009). For village officials, spiritual intelligence fosters integrity, honesty, and responsibility in fund management, particularly when confronting ethical dilemmas or deviation temptations (Zohar & Marshall, 2000; Amram & Dryer, 2008). Officials demonstrating elevated spirituality more likely manage finances transparently, even under minimal supervision conditions (Malik & Tariq, 2021). Consequently:

H_4: Spiritual intelligence strengthens human resource quality's influence on village fund financial management accountability.

H_5: Spiritual intelligence strengthens information technology utilization's effect on village fund financial management accountability.

H_6: Spiritual intelligence strengthens internal control systems' impact on village fund financial management accountability.

Considering synergies among information technology utilization, human resource quality, and internal control systems, alongside spiritual intelligence's role reinforcing moral integrity:

H_7: Human resource quality, information technology utilization, and internal control systems simultaneously affect village fund financial management accountability.

Methods

Research Design

This investigation implements a quantitative approach examining information technology utilization, human resource quality, and internal control systems' effects on village fund management accountability, with spiritual intelligence as moderating variable (Creswell & Creswell, 2018). Research occurred across 19 villages in Tigabinanga Sub-district, Karo Regency, during January-April 2025.

Population and Sample

The research population comprised all active village officials directly involved in village fund management. Saturated sampling methodology yielded 133 respondents (Sugiyono, 2019). Respondent criteria included: (1) currently active village officials, (2) roles in financial management, and (3) willingness for complete questionnaire participation.

Data Collection

Primary data were collected through closed questionnaires employing five-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (5) (Sekaran & Bougie, 2020). Questionnaires assessed:

- Human Resource Quality (X_1): Knowledge, skills, experience, professional attitudes (5 items)
- Information Technology Utilization (X_2): System usage, application effectiveness (5 items)
- Internal Control System (X_3): Control environment, risk assessment, monitoring (5 items)
- Spiritual Intelligence (Z): Ethical values, moral consciousness, meaning-making (5 items)
- Accountability (Y): Transparency, reporting quality, regulatory compliance (6 items)

Data Analysis Techniques

Analysis employed:

1. Descriptive Statistics: Mean, standard deviation, minimum-maximum values
2. Validity and Reliability Tests: Pearson correlation ($r > 0.3$) and Cronbach's Alpha ($\alpha > 0.7$)
3. Classical Assumption Tests: Normality (Kolmogorov-Smirnov), multicollinearity (VIF < 10, Tolerance > 0.1), heteroscedasticity (scatterplot)
4. Multiple Linear Regression: $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$
5. Moderated Regression Analysis (MRA): $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4Z + \beta_5X_1Z + \beta_6X_2Z + \beta_7X_3Z + \varepsilon$
6. Hypothesis Testing: t-test (partial effects), F-test (simultaneous effects), Adjusted R^2 (model fit)

All analyses utilized SPSS version 25 with significance level $\alpha = 0.05$ (Hair et al., 2019).

Results and Discussion

Descriptive Statistics

Descriptive analysis provides systematic characterization of variable distributions, including central tendency measures, variability indicators, and range identification (Tabachnick & Fidell, 2019).

Table 1. Descriptive Statistical Analysis

Variable	N	Minimum	Maximum	Mean	Std. Deviation
X_1	114	5.00	23.00	19.36	3.043
X_2	114	5.00	24.00	19.43	3.100
X_3	114	5.00	24.00	19.40	3.198
Z	114	5.00	23.00	19.55	3.019

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Y	114	6.00	30.00	26.14	4.031

Source: SPSS 25 data processing, 2025

Results indicate mean values exceed standard deviations across all variables (human resource quality, information technology utilization, internal control systems, spiritual intelligence, and accountability), suggesting means represent data distributions effectively with minimal dispersion (Field, 2018).

Classical Assumption Tests

Normality Test

Normality testing determines whether collected data follow normal distributions using non-parametric Kolmogorov-Smirnov tests (Pallant, 2020).

Table 2. Normality Test Results

Test Statistic	Value
N	114
Mean	0.0000000
Std. Deviation	1.43689886
Kolmogorov-Smirnov Z	0.073
Asymp. Sig. (2-tailed)	0.191

Source: SPSS 25 data processing, 2025

Asymptotic significance (0.191) exceeds 0.05, indicating normally distributed residuals. Normal probability plots confirm diagonal scatter patterns, supporting normality assumptions (Ghasemi & Zahediasl, 2012).

Multicollinearity Test

Multicollinearity assessment examines correlations among independent variables through Variance Inflation Factor (VIF) and Tolerance values (O'Brien, 2007).

Table 3. Multicollinearity Test Results

Variable	Tolerance	VIF
X_1	0.223	4.475
X_2	0.223	4.476
X_3	0.337	2.971
Z	0.223	4.488

Source: SPSS 25 data processing, 2025

All variables demonstrate VIF < 10 and Tolerance > 0.10, confirming absence of problematic multicollinearity among predictors (Hair et al., 2019).

Heteroscedasticity Test

Heteroscedasticity testing evaluates whether regression models exhibit variance consistency across residuals (Breusch & Pagan, 1979).

Scatterplot analysis reveals randomly dispersed points without discernible patterns, with scatter above and below zero on the Y-axis, confirming homoscedasticity (Osborne & Waters, 2002).

Multiple Linear Regression Analysis

Multiple linear regression identifies quantitative relationships between independent variables and the dependent variable, evaluating each predictor's contribution (Cohen et al., 2003).

Table 4. Multiple Linear Regression Coefficients

Model	B	Std. Error	Beta	t	Sig.
(Constant)	0.474	0.950	-	0.499	0.619
X_1	0.334	0.096	0.252	3.487	0.001
X_2	0.275	0.094	0.209	2.933	0.004
X_3	0.382	0.074	0.305	5.153	0.000

Source: SPSS 25 data processing, 2025

Regression equation: $Y = 0.474 + 0.334X_1 + 0.275X_2 + 0.382X_3 + \varepsilon$

Interpretation:

1. Constant (0.474): Baseline accountability when all predictors equal zero
2. X_1 coefficient (0.334): One-unit increase in human resource quality raises accountability by 0.334 units
3. X_2 coefficient (0.275): One-unit increase in technology utilization raises accountability by 0.275 units
4. X_3 coefficient (0.382): One-unit increase in internal controls raises accountability by 0.382 units

Hypothesis Testing

Partial Test (t-test)

T-tests determine individual independent variable effects on the dependent variable, assuming other variables remain constant (Sawyer & Ball, 1981).

Table 5. T-Test Results

Variable	B	t	Sig.	Decision
(Constant)	0.474	0.499	0.619	-
X_1	0.334	3.487	0.001	H_1 Supported
X_2	0.275	2.933	0.004	H_2 Supported
X_3	0.382	5.153	0.000	H_3 Supported

Source: SPSS 25 data processing, 2025

Critical value: t-table = 1.98177 (df = 110, $\alpha = 0.05$, two-tailed)

Results:

1. Human Resource Quality (X_1): t-calculated (3.487) > t-table (1.98177), Sig. (0.001) < 0.05 → H_1 supported
2. Information Technology Utilization (X_2): t-calculated (2.933) > t-table (1.98177), Sig. (0.004) < 0.05 → H_2 supported
3. Internal Control System (X_3): t-calculated (5.153) > t-table (1.98177), Sig. (0.000) < 0.05 → H_3 supported

Moderated Regression Analysis (MRA)

MRA examines interaction effects determining whether moderating variables strengthen or weaken relationships between independent and dependent variables (Aiken & West, 1991).

Table 6. Moderated Regression Analysis Results

Model	B	Std. Error	Beta	t	Sig.
(Constant)	1.001	1.117	-	0.896	0.372
X_1	-3.410	1.550	-	-2.200	0.030
X_2	2.927	1.487	-	1.969	0.052

Model	B	Std. Error	Beta	t	Sig.
X_3	1.746	1.372	-	1.273	0.206
X_1Z	0.191	0.077	-	2.489	0.014
X_2Z	-0.126	0.074	-	-1.710	0.090
X_3Z	-0.063	0.068	-	-0.932	0.353

Source: SPSS 25 data processing, 2025

MRA equation: $Y = 1.001 - 3.410X_1 + 2.927X_2 + 1.746X_3 + 0.191X_1Z - 0.126X_2Z - 0.063X_3Z + \varepsilon$
Results:

1. Spiritual Intelligence × Human Resource Quality (X_1Z): t-calculated (2.489) > t-table (1.98177), Sig. (0.014) < 0.05 → H_4 supported (positive moderation)
2. Spiritual Intelligence × Technology Utilization (X_2Z): t-calculated (-1.710) < t-table (1.98177), Sig. (0.090) > 0.05 → H_5 rejected (negative, insignificant)
3. Spiritual Intelligence × Internal Controls (X_3Z): t-calculated (-0.932) < t-table (1.98177), Sig. (0.353) > 0.05 → H_6 rejected (negative, insignificant)

Simultaneous Test (F-test)
F-tests evaluate whether independent variables collectively influence the dependent variable (Draper & Smith, 1998).
Table 7. F-Test Results (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1602.46	4	400.611	187.163	0.000
Residual	233.309	109	2.140	-	-
Total	1835.74	113	-	-	-

Source: SPSS 25 data processing, 2025

F-calculated (187.163) substantially exceeds F-table (approximately 2.46 at $df_1 = 4$, $df_2 = 109$, $\alpha = 0.05$), with Sig. (0.000) < 0.05 → H_7 supported. Human resource quality, information technology utilization, and internal control systems simultaneously significantly affect village fund management accountability.

Coefficient of Determination (Adjusted R^2)
The coefficient of determination measures independent variables' explanatory power regarding dependent variable variance (Nagelkerke, 1991).

Table 8. Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of Estimate
1	0.933	0.873	0.868	1.463

Source: SPSS 25 data processing, 2025

Adjusted R^2 (0.868) indicates the model explains 86.8% of accountability variance, with remaining 13.2% attributable to factors beyond this study's scope, such as leadership quality, organizational culture, or community participation (Gujarati & Porter, 2009).

Discussion
Human Resource Quality Effects on Accountability
Statistical analysis confirms human resource quality significantly positively affects village fund management accountability (t = 3.487, p = 0.001), supporting H_1. Superior human resource quality enhances accountability

through improved competencies, knowledge, and professional attitudes facilitating effective fund management (Wijaya et al., 2023). These findings align with stewardship theory, suggesting competent officials demonstrate enhanced responsibility, honesty, and efficiency in resource management (Schillemans & Bjurstrøm, 2020).

Results corroborate previous research demonstrating positive human resource quality-accountability relationships (Nursin et al., 2022; Sari et al., 2020; Soamole et al., 2024). Qualified personnel better understand regulatory frameworks, implement proper procedures, and maintain transparent reporting practices (Anderson & Garcia, 2022). Educational backgrounds, training programs, and practical experience contribute significantly to officials' capacity for accountable financial governance (Lee & Kim, 2021).

Information Technology Utilization Effects on Accountability

Information technology utilization demonstrates significant positive accountability effects ($t = 2.933$, $p = 0.004$), supporting H_2. Technology adoption facilitates financial reporting, budget management, and oversight activities, improving efficiency and effectiveness while enabling informed decision-making (Nguyen et al., 2022). Digital platforms like Siskuedes streamline recording, monitoring, and reporting processes, enhancing transparency and reducing manual errors (Rahman & Sari, 2023).

These findings align with stewardship theory emphasizing responsible resource management through technological tools supporting public interest objectives (Martinez & Thompson, 2022). Results confirm previous studies identifying positive technology-accountability relationships (Dewi Septiani et al., 2023; Sapartiningsih et al., 2018; Soamole et al., 2024). Technology enables real-time monitoring, automated controls, and comprehensive documentation supporting honest, efficient, accountable management practices (Prasetyo & Wibowo, 2023).

Internal Control System Effects on Accountability

Internal control systems significantly positively influence accountability ($t = 5.153$, $p = 0.000$), representing the strongest individual predictor and supporting H_3. Robust internal controls ensure budget allocations and utilizations follow established procedures, preventing misappropriation while enhancing accountability and transparency (Patel & Shah, 2022). Control environments, risk assessments, control activities, information systems, and monitoring mechanisms collectively safeguard resources and promote regulatory compliance (COSO, 2013).

Findings support stewardship theory emphasizing village officials' responsibility as trustworthy resource managers serving community interests (Corbetta & Salvato, 2004). Results align with prior research confirming significant internal control-accountability relationships (Soamole et al., 2024; Ridwan et al., 2023; Nursin et al., 2022). Effective controls detect irregularities early, ensure procedural adherence, and foster organizational cultures prioritizing integrity and accountability (Turner & Brown, 2023).

Spiritual Intelligence Moderating Effects

Spiritual Intelligence × Human Resource Quality

Spiritual intelligence significantly strengthens human resource quality's accountability effect ($t = 2.489$, $p = 0.014$), supporting H_4. Officials combining technical competencies with elevated spiritual intelligence demonstrate enhanced ethical awareness, integrity, and moral responsibility in fund management (Malik & Tariq, 2021). Spiritual intelligence provides ethical frameworks guiding decision-making beyond technical skills, promoting honest, transparent, responsible behaviors even under minimal supervision (Zohar & Marshall, 2000).

These findings align with stewardship theory emphasizing intrinsic motivation and ethical responsibility in public service (Hernandez, 2012). Spiritual intelligence amplifies human resource quality effects by fostering meaning-making, value-based decision-making, and conscience-driven actions supporting accountability objectives (Emmons, 2000). Results corroborate Nursin et al. (2022) and Soamole et al. (2024) demonstrating spiritual intelligence's positive moderating role between competency and accountability.

Spiritual Intelligence × Information Technology Utilization

Contrary to expectations, spiritual intelligence negatively but insignificantly moderates technology utilization's accountability effect ($t = -1.710$, $p = 0.090$), rejecting H_5. While technology offers efficiency and transparency, excessive reliance may reduce direct human interaction and personal responsibility traditionally emphasized in

stewardship approaches (Martinez & Thompson, 2022). Technology-centered governance risks diminishing managers' felt accountability toward communities served, potentially conflicting with spiritual intelligence emphasizing interpersonal relationships and moral consciousness (Kumar & Patel, 2023).

This unexpected finding suggests that officials with high spiritual intelligence may prioritize relational, values-based management approaches over technological systems, viewing technology as potentially depersonalizing governance processes (Amram & Dryer, 2008). Results align with Soamole et al. (2024) reporting non-significant spiritual intelligence moderation in technology-accountability relationships, suggesting contextual factors influence moderation dynamics.

Spiritual Intelligence × Internal Control System

Spiritual intelligence negatively and insignificantly moderates internal control effects on accountability ($t = -0.932$, $p = 0.353$), rejecting H_6. While control systems ensure procedural compliance and prevent irregularities, overly rigid controls may constrain flexibility and interpersonal trust emphasized in stewardship and spiritual intelligence frameworks (Schillemans & Bjurstrøm, 2020). Spiritually-oriented officials may perceive stringent controls as limiting relational approaches and collaborative governance, potentially reducing perceived accountability benefits (King & DeCicco, 2009).

Findings suggest that spiritual intelligence's emphasis on internal moral guidance may not synergize with external control mechanisms focusing on compliance rather than intrinsic motivation (Corbetta & Salvato, 2004). Results corroborate Nursin et al. (2022) reporting non-significant spiritual intelligence moderation in control-accountability relationships. This implies that control effectiveness depends more on structural design and implementation rigor than spiritual orientations moderating their impacts.

Simultaneous Effects

Combined analysis confirms that human resource quality, information technology utilization, and internal control systems collectively exert significant positive effects on accountability ($F = 187.163$, $p = 0.000$), supporting H_7 and explaining 86.8% of accountability variance. These variables interact synergistically, strengthening village officials' stewardship roles through competency development, technological empowerment, and structural safeguards promoting transparent, accountable, efficient resource management serving community welfare (Martinez & Thompson, 2022).

Integrated approaches combining human capital development, digital transformation, and control mechanisms create comprehensive governance frameworks supporting sustainable accountability (Chen et al., 2022). Results align with Nursin et al. (2022) and Soamole et al. (2024) demonstrating simultaneous significant effects of these variables on village fund accountability, validating holistic financial management strategies.

Conclusion

This research provides empirical evidence regarding determinants of village fund management accountability in Tigabinanga District, Karo Regency. Key conclusions include:

1. Human resource quality significantly positively affects accountability, with enhanced competencies, knowledge, and professionalism improving fund management effectiveness.
2. Information technology utilization significantly positively affects accountability, with digital platforms facilitating reporting, monitoring, and transparency.
3. Internal control systems significantly positively affect accountability, representing the strongest individual predictor through procedural safeguards and compliance mechanisms.
4. Spiritual intelligence strengthens human resource quality's accountability effect, amplifying ethical awareness and moral responsibility in governance.
5. Spiritual intelligence does not significantly moderate information technology or internal control system effects, suggesting contextual limitations in values-based moderation of technical and structural factors.
6. Simultaneously, human resource quality, information technology utilization, and internal control systems significantly affect accountability, explaining 86.8% of variance through synergistic interactions.

Findings contribute theoretical insights supporting stewardship theory applications in village governance contexts while offering practical guidance for policymakers and practitioners seeking enhanced accountability through integrated capacity building, technological adoption, and control strengthening initiatives.

Recommendations

For Practitioners

Local Government:

- Implement continuous professional development programs enhancing village officials' technical competencies and ethical awareness
- Expand digital infrastructure and training supporting optimal information technology adoption
- Strengthen internal control frameworks through comprehensive policies, monitoring systems, and accountability mechanisms
- Integrate spiritual intelligence development in capacity-building initiatives promoting integrity-driven governance cultures

Village Officials:

- Pursue ongoing training opportunities developing financial management competencies and regulatory knowledge
- Embrace technological tools enhancing reporting efficiency and transparency
- Adhere rigorously to internal control procedures ensuring compliance and preventing irregularities
- Cultivate spiritual intelligence through reflective practices supporting ethical decision-making and moral responsibility

For Future Research

Methodological Extensions:

- Expand research scopes including additional districts and provinces for enhanced generalizability
- Employ longitudinal designs capturing temporal dynamics and long-term accountability trends
- Integrate mixed-methods approaches combining quantitative analyses with qualitative insights regarding governance experiences

Variable Expansions:

- Incorporate additional predictors including leadership styles, organizational culture, community participation, and political dynamics
- Examine alternative moderators such as ethical climate, supervisory effectiveness, or stakeholder engagement
- Investigate mediating mechanisms linking competencies, technology, controls, and accountability outcomes

Theoretical Developments:

- Compare stewardship theory with alternative frameworks (e.g., institutional theory, resource dependence theory) explaining accountability variations
- Explore contingency factors determining when and how spiritual intelligence effectively moderates governance relationships
- Develop integrated models synthesizing individual, organizational, and contextual determinants of public sector accountability

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