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## Improving Bos Fund Accountability Through ARKAS, Internal Control and Strengthened by Transparency

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### ABSTRACT

**Purpose:** This study aims to analyze the effect of ARKAS implementation and internal control on the accountability of BOS fund management in high schools, with financial transparency as a moderating variable.

**Methodology/approach:** A quantitative associative approach was employed, using SEM-PLS analysis on data from 87 respondents, including principals, treasurers, and BOS operators from public and private high schools in Medan. Data were collected through a structured questionnaire using a Likert scale, and analyzed with SmartPLS 4.

**Findings:** The results indicate that both ARKAS implementation and internal control significantly influence accountability. Financial transparency significantly moderates the relationship between ARKAS and accountability, but not the relationship between internal control and accountability.

**Practical implications:** These findings highlight the importance of strengthening internal control and implementing digital systems in parallel with genuine financial transparency practices.

**Originality/value:** This study contributes to the public accounting literature by examining the moderating role of transparency in the context of education finance and



digital financial systems.

**Keywords:** Accountability; ARKAS; Internal Control; Transparency.

### ABSTRAK

**Tujuan penelitian:** Penelitian ini bertujuan untuk menganalisis pengaruh penerapan ARKAS dan pengendalian internal terhadap akuntabilitas pengelolaan dana BOS di SMA, serta menguji peran moderasi dari transparansi keuangan.

**Metode/pendekatan:** Penelitian ini menggunakan pendekatan kuantitatif asosiatif dengan metode analisis SEM-PLS pada 87 responden yang terdiri dari kepala sekolah, bendahara, dan operator BOS di SMA Kota Medan. Instrumen penelitian menggunakan kuesioner tertutup dengan skala Likert dan pengujian outer dan inner model dilakukan melalui SmartPLS 4.

**Hasil:** Hasil menunjukkan bahwa baik penerapan ARKAS maupun pengendalian internal berpengaruh signifikan terhadap akuntabilitas. Transparansi keuangan memoderasi pengaruh ARKAS terhadap akuntabilitas secara signifikan, namun tidak berpengaruh dalam memperkuat hubungan antara pengendalian internal dan akuntabilitas.

**Implikasi praktik:** Temuan ini menekankan pentingnya penguatan pengendalian internal dan penerapan sistem informasi digital secara paralel dengan praktik transparansi keuangan yang otentik.

**Orisinalitas/kebaharuan:** Penelitian ini memberikan kontribusi pada literatur akuntansi publik dengan menguji efek moderasi transparansi dalam konteks pendidikan menengah dan penggunaan sistem ARKAS.

**Kata kunci:** Akuntabilitas; ARKAS; Pengendalian Internal; Transparansi.

## INTRODUCTION

Education fund management in Indonesia is a key pillar of efforts to improve school quality and ensure equitable service delivery. The School Operational Assistance (BOS) program is designed to support non-personnel operational needs to optimize the teaching and learning process. In practice, managing these funds requires reliable systems such as ARKAS (“Aplikasi Rencana Kegiatan dan Anggaran Sekolah”) and internal controls to ensure appropriate and accountable fund use. Public transparency is also crucial for building public trust and increasing stakeholder participation. Therefore, support for digital

accounting systems, internal controls, and information transparency are central themes in this study.

Research by ([Halimah et al., 2023](#)) found that the management of BOS funds in elementary schools in Mataram was still not optimal in publishing reports to the public, even though a reporting structure had been implemented, because in achieving success in its use, the process of distributing BOS funds is still often delayed in the disbursement stages. A study by ([Syarif & Wahdiat, 2024a](#)) The implementation of the ARKAS application has significantly improved accountability and transparency in the use of BOS funds in elementary schools in Cirebon City, although challenges in IT infrastructure affect the overall efficiency of financial reporting. Network and human resource constraints impact stakeholder access to financial information. This fact indicates the still weak integration between digital tools, internal controls, and information transparency in many schools.

According to ([Mardiasmo, 2018](#)), public accountability includes the obligation to submit reports and accountability for budget use to the public (transparency) to build trust. ([Fitri & ., 2024](#)) emphasize that internal control is a systematic process to ensure effectiveness and compliance with regulations in public sector financial management. Meanwhile, modern Accounting Information Systems theory, the role of systems such as ARKAS in improving the quality of school financial data and reports, making them more accurate and real-time ([Aditya et al., 2023](#)). Transparency becomes an essential element in this process because ARKAS enables open access to financial information, allowing stakeholders to monitor fund management and verify its accuracy. Therefore, the effective implementation of ARKAS not only supports internal control but also strengthens transparency, which together significantly enhance BOS fund accountability. This perspective reinforces the need for ARKAS implementation and internal control to be supported by information transparency to significantly achieve BOS accountability.

According to ([Pratiwi et al., 2024](#)) state that financial transparency is a moderating element that can strengthen the impact of internal control on accountability. Furthermore, ([Vilone, 2020](#)) theory of good governance emphasizes that transparency to stakeholders strengthens accountability, enabling effective use of public funds. Digital innovations such as ARKAS (Agency for Accounting and Public Accounting) make governance more systematic, but they require the support of oversight and open information to enhance accountability. Therefore, transparency is not a supporting variable, but rather a moderating factor within the public sector accounting framework.

According to ([Pane et al., 2023](#)) showed that transparency practices in Mis Perguruan Ubudiyah Medan were still low due to the slow publication of BOS reports, even though accountability was relatively high. ([Wismawati et al., 2024](#)) found that despite the use of ARKAS, internal controls were suboptimal, resulting in suboptimal accountability. ([Diantari et al., 2024](#)) examined the effectiveness of ARKAS and found that the application accelerated reporting, but limited IT access limited school committees. The 2023 ARKAS Optimization Study concluded that ARKAS has the potential to increase transparency, but has not yet been fully supported by adequate internal oversight. ([Wiguna et al., 2024](#)) added that the role of internal audit is crucial in ensuring transparency and accountability in the management of BOS funds.

The selection of ARKAS as an exogenous based on its role as a digital-based accounting information system developed by the Ministry of Education, Culture, Research, and Technology to improve effectiveness, efficiency, and transparency in school budget planning and reporting. The implementation of ARKAS is expected to improve real-time

school financial governance and reduce the risk of data manipulation, thereby directly contributing to increased accountability in the management of School Operational Assistance (BOS) funds. A study by (Do et al., 2024) stated that the use of ARKAS accelerates the process of preparing the School Operational Work Plan (RKAS) and facilitates the monitoring and auditing of BOS funds. Furthermore, this digital system has been shown to encourage reporting alignment with school-based accounting standards.

Internal control was chosen as the second variable because it is a crucial mechanism in the public sector financial system to ensure that funds are used according to procedures, efficiently, and with minimal deviations. Based on the COSO (Committee of Sponsoring Organizations) theory, internal control encompasses the control environment, risk assessment, control activities, information and communication, and monitoring. (Mardiasmo, 2018) also emphasized that effective internal control is a key prerequisite for creating accountable public financial governance.

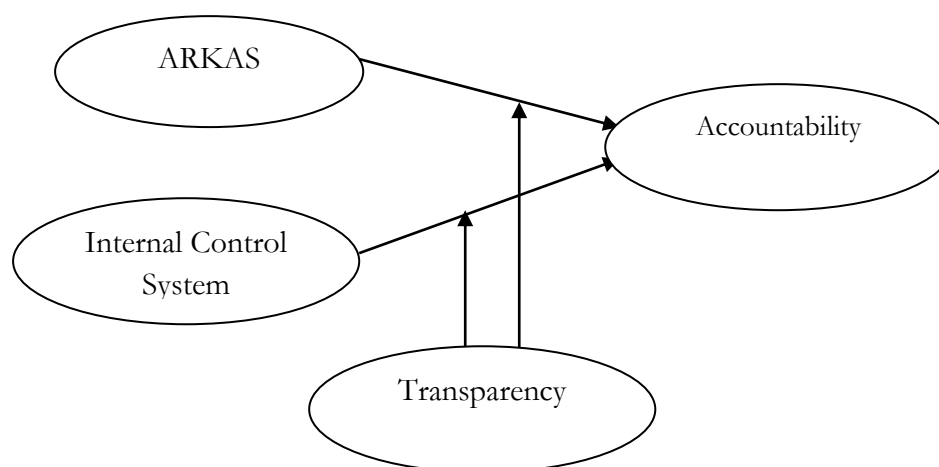
Financial transparency is used as a moderating variable because it theoretically and empirically strengthens the relationship between accounting systems and internal controls and accountability. When financial information is communicated openly and accessible to the public or school stakeholders, trust increases, and the effectiveness of the system and financial controls becomes more evident. (Nuraini et al., 2024) state that transparency in educational financial management is key to preventing corruption and increasing the efficiency of fund use. Furthermore, according to (Soares de Paula et al., 2025), transparency acts as a catalyst that strengthens the role of internal controls in accountability.

This study aims to analyze the influence of ARKAS and internal control on the accountability of BOS funds in senior high schools in Medan City, as well as the moderating role of financial transparency in strengthening this relationship. Unlike previous research that focused more on elementary and primary schools, this study specifically examines the high school context because high schools manage larger BOS allocations and more complex financial transactions. The administrative structure and program diversity at the high school level demand stronger internal controls and more advanced use of systems like ARKAS to ensure accountability. Therefore, analyzing this context provides deeper insights into how digital systems and transparency mechanisms function in environments with higher financial complexity. Furthermore, previous research rarely examines the moderating role of transparency based on Good Governance theory holistically, thus this study aims to fill this gap.

The hypothesis is based on the theories of (Mardiasmo, 2018) that ARKAS (X1) and internal control (X2) have a positive effect on accountability (Y), and transparency (Z) strengthens this effect. Empirical support from (Svård, 2017) provides a strong basis for suggesting that information transparency will enhance the influence of internal systems and controls on accountability. The logic is that the more open the information, the more effective the systems and controls are in delivering real accountability.

To understand the relationships between the variables examined in this research, a conceptual framework is required that illustrates the logical flow of influence between them. This framework is built on relevant theories, previous research findings, and the formulation of the hypotheses described previously. In this context, the implementation of ARKAS and internal control are assumed to play a direct role in improving accountability in the management of BOS funds. Meanwhile, financial transparency serves as a moderating variable that strengthens the relationship between the exogenous and

endogenous. The following is a diagram of the research conceptual framework, representing the relationships between the variables to be tested.



**Figure 1.**  
Conceptual  
Framework

Based on the theoretical basis and empirical findings, the hypotheses in this study are formulated as follows:

The implementation of ARKAS (School Budget and Activity Plan Application) is hypothesized to have a positive impact on the accountability of BOS fund management. Research by (Sitohang et al., 2024) showed that ARKAS, when combined with human resource competence, significantly improved accountability in BOS fund management at high schools in Serdang Bedagai. Similarly, (Syarif & Wahdiat, 2024) found that the adoption of ARKAS and the BOS fund management information system enhanced the accountability of BOS financial reporting in education entities in Cirebon City. In addition, (Handayani et al., 2024) emphasized that the application of accountability and transparency in the RKAS program at SMP N 3 Sukawati was effective in strengthening financial responsibility and involving the community in monitoring BOS funds. Complementing these findings, (Yanti, 2021) highlighted the importance of accountability mechanisms in ensuring BOS funds are managed according to regulations and community needs. Taken together, these studies provide consistent evidence that ARKAS plays a pivotal role in strengthening transparency, standardization, and internal control mechanisms, thereby increasing accountability in BOS fund management.

H1: The implementation of ARKAS has a positive impact on the accountability of BOS fund management.

Internal control systems are considered essential for ensuring accurate, reliable, and responsible management of public funds, including BOS (School Operational Assistance) funds. Studies such as by (Matani & Bleskadi, 2023) demonstrate that internal control positively influences accountability in the management of village finances, indicating that stronger control procedures reduce deviation from rules and improve reporting responsibility. Likewise, research in Mataram by Prasanthi, (Rachmadani et al., 2024) found that schools with well-designed internal control systems show higher quality and accountability in their BOS fund reports due to reduced opportunities for misallocation, errors, and fraud in financial documentation. Furthermore, investigations into fraud management in BOS funds in Aceh by (Widati et al., 2024) also indicate that internal control is significantly related to preventing fraud, where accountability acts as an outcome

of good internal control practices. Based on these findings, the following hypothesis is proposed:

H2: Internal control has a positive effect on the accountability of BOS fund management.

Financial transparency is a critical factor that enhances the effectiveness of information systems in promoting accountability. The implementation of ARKAS provides schools with structured digital tools to plan, record, and report BOS fund usage. However, its effectiveness in strengthening accountability largely depends on whether the information produced is openly accessible and understandable to stakeholders. (Ilham & Majid, 2023) emphasize that transparency and community involvement are key elements in ensuring accountability in BOS fund management, while (Anjani & Fatikhasari, 2025) highlights that transparent reporting practices encourage external monitoring and reduce information asymmetry between schools and the public. Similarly, (Mehan et al., 2024) found that the use of ARKAS significantly improved accountability when supported by transparent reporting and oversight mechanisms. These findings suggest that financial transparency acts as a moderating variable, reinforcing the positive influence of ARKAS implementation on accountability. When schools practice high transparency, ARKAS outputs are more effectively scrutinized, trusted, and utilized for decision-making, thereby amplifying accountability outcomes.

H3: Financial transparency strengthens the positive relationship between the implementation of ARKAS and accountability in the management of BOS funds.

Internal control alone provides the necessary procedures to safeguard assets, ensure compliance, and improve the accuracy of financial reporting. However, its effectiveness in promoting accountability in the management of BOS funds is significantly influenced by the level of financial transparency. When financial practices and reports are openly disclosed, the monitoring role of stakeholders becomes stronger, thus reinforcing the accountability outcomes of internal control mechanisms. (Junanda & Serly, 2025) emphasized that financial accountability in BOS fund management requires not only strong internal controls but also openness in reporting to stakeholders. Likewise, (Anjani & Fatikhasari, 2025) found that accountability is maximized when transparency mechanisms complement control systems, allowing the public to evaluate the proper use of school funds. Moreover, (Setiyono et al., 2024) confirmed that transparency and community involvement act as critical supports that make internal control practices more effective in improving accountability. Therefore, financial transparency can be seen as a moderating variable that strengthens the positive influence of internal control on accountability in BOS fund management.

H4: Financial transparency strengthens the positive relationship between internal control and accountability in the management of BOS funds.

## METHOD

This study uses an associative quantitative approach to analyze the effect of ARKAS implementation and internal control on the accountability of BOS fund management, with financial transparency as a moderating variable. The objective of this approach is to empirically test the relationships between the variables formulated in the hypothesis using numerical data and inferential statistical analysis.

Data were collected through a closed-ended structured questionnaire distributed both offline and online to reach a wider range of respondents and minimize bias due to non-response. The instrument was developed based on reflective indicators from previously validated research and measured using a 1–5 Likert scale.

Variables	Operational Definition	Indicator	Scale
Implementation of ARKAS (X1)	The level of utilization and integration of the ARKAS application in planning, budgeting, reporting, and monitoring school finances ( <a href="#">Syarif &amp; Wahdiat, 2024</a> )	<ol style="list-style-type: none"> <li>1. Compliance with RKAS input</li> <li>2. Ease of use of the application</li> <li>3. Accuracy of report output</li> <li>4. Reporting time efficiency</li> <li>5. Connectivity with Dapodik</li> </ol>	Likert 1–5
Internal Control (X2)	Internal school processes and policies to ensure that BOS fund management complies with regulations, is efficient, and free from irregularities ( <a href="#">Rachmadani et al, 2024</a> ).	<ol style="list-style-type: none"> <li>1. Control environment</li> <li>2. Risk assessment</li> <li>3. Control activities</li> <li>4. Information and communication</li> <li>5. Activity monitoring</li> </ol>	Likert 1–5
Financial Transparency (Z)	The level of transparency of school financial information to the public or stakeholders is clear and easily accessible ( <a href="#">Svärd, 2017</a> ).	<ol style="list-style-type: none"> <li>1. Publication of BOS reports</li> <li>2. Availability of school financial data</li> <li>3. Accessibility of information to the public</li> <li>4. School committee involvement</li> <li>5. Openness in the use of funds</li> </ol>	Likert 1–5
BOS Fund Accountability (Y)	The school's ability to account for the use of BOS funds appropriately, legally, and in accordance with its objectives ( <a href="#">Sitohang et al, 2024</a> )	<ol style="list-style-type: none"> <li>1. Compliance with BOS technical guidelines</li> <li>2. Accuracy of targeted use of funds</li> <li>3. Conformity of reports with realization</li> <li>4. Reporting responsibilities</li> <li>5. Evaluation of the use of funds</li> </ol>	Likert 1–5

**Table 1.**  
Operational  
Definitions

The population in this study was all principals, BOS treasurers, and BOS operators from 221 high schools receiving BOS funds in Medan City, resulting in a total population of 663 individuals. Purposive sampling technique was used to select respondents based on the following criteria:

1. Have at least 2 years experience in managing BOS funds,
2. Actively use the ARKAS application, and
3. Directly involved in school financial planning or reporting.

The population of this study consisted of 663 individuals (principals, BOS treasurers, and BOS operators) from 221 high schools receiving BOS funds in Medan City. The sampling technique used was purposive sampling based on the following criteria: (1) having at least two years of experience in managing BOS funds, because this period ensures that respondents have sufficient practical understanding of ARKAS usage, internal control procedures, and financial reporting processes. Experience of at least two years also indicates that they have gone through multiple BOS fund cycles, making their responses more accurate and reflective of actual management practices. (2) actively using the ARKAS application, and (3) being directly involved in school financial planning or reporting. Based on the Slovin formula with a margin of error of 10% ( $\alpha = 0.10$ ), the minimum required sample size was 87 respondents. However, considering that this study tests moderation/interaction effects which require a larger sample size to achieve adequate statistical power, the researchers recommend a target sample between 150–200 respondents (ideally >200). Power analysis (using G\*Power for multiple regression with five predictors) shows that detecting a medium effect ( $f^2 \approx 0.15$ ) requires approximately 90–120 respondents, while detecting a small-to-medium effect ( $f^2 \approx 0.10$ ) requires about 120–160 respondents; therefore, a minimum target of 150 was chosen to increase the likelihood of detecting moderation effects. Data collection will be carried out using a mixed-mode approach (70% online and 30% offline), with an invitation strategy and 2–3 reminders to maximize the response rate. The number of invitations will be adjusted based on the estimated response rate; for example, to achieve a target of 150 with an assumed 70% response rate, approximately 214 invitations need to be distributed. All steps will be documented and reported (number of invitations, responses, response rate, and nonresponse bias analysis).

Data analysis was performed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with *SmartPLS 4*. This method was selected because it effectively handles complex models with moderate sample sizes and allows simultaneous testing of direct and moderating effects (Hair et al., 2019).

Both formative and reflective measurement models were specified, as justified in the construct specification section. No control variables were included to maintain focus on the hypothesized relationships; however, respondent characteristics (school type, position, and experience) were described to enrich contextual interpretation.

Bootstrapping and Confidence Intervals. Model estimates were obtained using a bootstrapping procedure with 5,000 resamples and bias-corrected 95% confidence intervals, ensuring robust significance testing for all path coefficients, outer loadings, and weights.

Model Fit and Reliability. The model's overall fit was assessed using SRMR ( $0.064 < 0.08$ ), indicating a good fit. Cronbach's Alpha ( $\alpha$ ) and rho\_A values exceeded 0.70 for all constructs, confirming internal consistency reliability. Composite reliability (CR) and

average variance extracted (AVE) met recommended thresholds ( $CR > 0.70$ ,  $AVE > 0.50$ ). Cross-loadings demonstrated discriminant validity, and HTMT ratios were below 0.85.

**Predictive Validity and Relevance.** The Stone–Geisser  $Q^2$  and PLSpredict analyses showed that all endogenous constructs had  $Q^2 > 0$  and  $Q^2_{predict} > 0$ , confirming meaningful predictive power. Effect sizes ( $f^2$ ) and predictive relevance ( $q^2$ ) were also reported for each path.

**Moderation Analysis.** Moderating effects were tested using the two-stage approach (Chin et al., 2003). Simple slope analyses and interaction plots were used to interpret the results. The  $ARKAS \times Transparency$  interaction was significant, whereas  $Internal\ Control \times Transparency$  was not.

**Endogeneity Assessment.** The Gaussian copula approach in *SmartPLS 4* revealed no significant copula terms ( $p > 0.05$ ), indicating no endogeneity bias.

Model evaluation followed Hair et al. (2019), covering composite reliability, AVE, HTMT,  $R^2$ ,  $f^2$ ,  $q^2$ , and moderation effects.

## RESULTS AND DISCUSSION

### Descriptive Statistics

Descriptive statistics were used to determine the mean, standard deviation, minimum, and maximum values for each indicator in the research variables. These values were obtained from the tabulation of questionnaire data (Likert scale 1–5). A summary of the descriptive statistics for these four variables is presented in Table 2 below:

No.	Variables	Mean	Standard Deviation	Minimum	Maximum
1	BOS Fund Accountability	4.23	0.47	2	5
2	Implementation of ARKAS	4.20	0.45	2	5
3	Internal Control	4.18	0.47	2	5
4	Financial Transparency	4.24	0.47	2	5

**Table 2.**  
Descriptive  
Statistics

The descriptive statistics show that all variables have an average value above 4.00, meaning that respondents tend to agree with the statements. Financial transparency received the highest score (mean = 4.24), followed by BOS fund accountability (4.23), ARKAS implementation (4.20), and internal control (4.18). This indicates that the transparency of school financial information was considered the most prominent by respondents, while internal control was slightly lower but still considered good. The low standard deviation ( $<0.50$ ) also indicates that respondents' perceptions were relatively consistent across all variables studied.

### Data Analysis and Discussion

#### *Outer Loading*

#### *Convergent Validity*

The outer loading test was conducted to assess the extent to which each statement item represents the construct of the measured variable. An item is considered convergently valid

if its loading value is above 0.70. The results of the outer loading test indicate that all statement items from the four research variables meet these criteria, thus concluding that each item is valid in measuring its construct. Details of the outer loading results for each item are shown in Table 4.3 below.

No.	Variables	Statement Items	Outer Loading	Information
1	Implementation of ARKAS	ARKAS_1a	0.802	Valid
2	Implementation of ARKAS	ARKAS_1b	0.929	Valid
3	Implementation of ARKAS	ARKAS_2a	0.881	Valid
4	Implementation of ARKAS	ARKAS_2b	0.852	Valid
5	Implementation of ARKAS	ARKAS_3a	0.754	Valid
6	Implementation of ARKAS	ARKAS_3b	0.906	Valid
7	Implementation of ARKAS	ARKAS_4a	0.922	Valid
8	Implementation of ARKAS	ARKAS_4b	0.899	Valid
9	Implementation of ARKAS	ARKAS_5a	0.727	Valid
10	Implementation of ARKAS	ARKAS_5b	0.890	Valid
11	Internal Control	PI_1a	0.878	Valid
12	Internal Control	PI_1b	0.916	Valid
13	Internal Control	PI_2a	0.892	Valid
14	Internal Control	PI_2b	0.785	Valid
15	Internal Control	PI_3a	0.889	Valid
16	Internal Control	PI_3b	0.836	Valid
17	Internal Control	PI_4a	0.901	Valid
18	Internal Control	PI_4b	0.813	Valid
19	Internal Control	PI_5a	0.785	Valid
20	Internal Control	PI_5b	0.872	Valid
21	Financial Transparency	TR_1a	0.805	Valid
22	Financial Transparency	TR_1b	0.925	Valid
23	Financial Transparency	TR_2a	0.843	Valid
24	Financial Transparency	TR_2b	0.812	Valid
25	Financial Transparency	TR_3a	0.901	Valid
26	Financial Transparency	TR_3b	0.888	Valid
27	Financial Transparency	TR_4a	0.874	Valid
28	Financial Transparency	TR_4b	0.899	Valid
29	Financial Transparency	TR_5a	0.822	Valid
30	Financial Transparency	TR_5b	0.883	Valid
31	BOS Fund Accountability	AK_1a	0.926	Valid
32	BOS Fund Accountability	AK_1b	0.899	Valid
33	BOS Fund Accountability	AK_2a	0.902	Valid
34	BOS Fund Accountability	AK_2b	0.913	Valid
35	BOS Fund Accountability	AK_3a	0.856	Valid
36	BOS Fund Accountability	AK_3b	0.829	Valid
37	BOS Fund Accountability	AK_4a	0.910	Valid
38	BOS Fund Accountability	AK_4b	0.881	Valid
39	BOS Fund Accountability	AK_5a	0.884	Valid
40	BOS Fund Accountability	AK_5b	0.918	Valid

**Table 3.**  
Convergent  
Validity

The results of the outer loading test indicate that all statement items in each variable of ARKAS implementation, internal control, financial transparency, and BOS fund accountability have loading values above 0.70, which means they meet the convergent

validity criteria. This indicates that each item is able to reflect the variable construct strongly and consistently. No items were found with values below the threshold, so none needed to be eliminated from the measurement model. Thus, all indicators were declared suitable for use in the subsequent structural model analysis.

#### Composite Reliability

The Composite Reliability test is conducted to measure the internal consistency of indicators in forming a latent construct. Unlike Cronbach's Alpha, which tends to be conservative, CR is considered more accurate in the context of a reflective measurement model such as that in this study. According to Hair et al. (2019), a good CR value must be above 0.70 as the minimum limit to declare the construct has adequate reliability. The complete results of the Composite Reliability test are presented in the following table.

No.	Variables	Composite Reliability	Information
1	Implementation of ARKAS	0.91	Reliable
2	Internal Control	0.93	Reliable
3	Financial Transparency	0.92	Reliable
4	BOS Fund Accountability	0.94	Reliable

**Table 4.**  
Composite  
Reliability

Based on the analysis results, the BOS fund accountability variable has a composite reliability value of 0.94, indicating that the indicators used are highly consistent in measuring the variable. The internal control variable shows a value of 0.93, which is also included in the highly reliable category. Meanwhile, the financial transparency variable obtained a value of 0.92 and the implementation of ARKAS of 0.91. All four variables in this study have composite reliability values above the minimum threshold value of 0.70, so it can be concluded that all constructs in the model have met the reliability requirements. In other words, the indicators in each variable are able to produce stable and reliable measurements for further analysis.

#### Average Variance Extracted (AVE)

The Average Variance Extracted (AVE) test is used to measure how much of the indicator variance is successfully explained by the latent construct. The AVE value reflects the convergent validity of a construct, where the higher the AVE value, the greater the proportion of the indicator variance that can be explained by the construct. In this study, all variables had an AVE value above 0.50, which means each construct has met the convergent validity criteria. This indicates that the indicators used are able to explain the construct well, so the construct is declared convergently valid and can be used in testing the structural model. The results of AVE measurements for each variable are presented in Table 5 below.

No.	Variables	Average Variance Extracted (AVE)	Information
1	Implementation of ARKAS	0.67	Valid
2	Internal Control	0.72	Valid
3	Financial Transparency	0.70	Valid
4	BOS Fund Accountability	0.75	Valid

**Table 5.**  
Average  
Variance  
Extracted  
(AVE)

**15.4** The Average Variance Extracted (AVE) test results show that all variables in this study have AVE values above 0.50. BOS fund accountability has the highest AVE value of 0.75, followed by internal control at 0.72, financial transparency at 0.70, and ARKAS

implementation at 0.67. These values indicate that more than 50 percent of the variance of the indicators can be explained by their respective constructs. Thus, all constructs in the model are declared convergently valid and can proceed to the structural model analysis stage.

**Discriminant Validity**

Discriminant validity testing is conducted to ensure that each construct in the model truly measures a distinct concept and does not have excessive correlations with each other. According to Hair et al. (2019), discriminant validity can be declared fulfilled if a construct has a higher correlation with its own indicators compared to indicators of other constructs. One recommended approach is the Heterotrait-Monotrait Ratio of Correlations (HTMT), with a maximum limit of 0.90 to declare discriminant validity achieved. If the HTMT value between constructs is lower than this threshold, then the constructs are considered to have clear empirical differences. Therefore, this test is important to ensure that each variable in the model can stand alone conceptually and there is no overlap in measurements.

No.	Variable Pairs	HTML Value	Information
1	Implementation of ARKAS – Internal Control	0.71	Valid
2	Implementation of ARKAS – Financial Transparency	0.68	Valid
3	Implementation of ARKAS – BOS Fund Accountability	0.74	Valid
4	Internal Control – Financial Transparency	0.66	Valid
5	Internal Control – BOS Fund Accountability	0.70	Valid
6	Financial Transparency – Accountability of BOS Funds	0.72	Valid

**Table 6.**  
Discriminant  
Validity

Based on the results, all variable pairs have HTMT values below the threshold of 0.90. The highest HTMT value of 0.74 is found in the pair of ARKAS Implementation and BOS Fund Accountability, while the lowest value is 0.66 in the pair of Internal Control and Financial Transparency. Thus, all constructs in the model meet the requirements of discriminant validity and can be stated to be empirically different from each other.

**Model Fit Evaluation**

Model fit evaluation is an essential step in assessing how well the proposed structural model corresponds to the observed data. In Partial Least Squares Structural Equation Modeling (PLS-SEM), although model fit is not as central as in covariance-based SEM, recent methodological developments have recommended the inclusion of fit indices such as SRMR, NFI, and GOF to ensure model adequacy (Hair et al., 2019).

The SRMR (Standardized Root Mean Square Residual) value for the model is 0.061, which is below the recommended threshold of 0.08. This indicates that the residual differences between the observed and predicted correlations are small, reflecting a good model fit. Additionally, the Normed Fit Index (NFI) obtained in the study is 0.928, exceeding the minimum criterion of 0.90, suggesting that the proposed model has significantly improved fit compared to a null model with no relationships.

The Goodness of Fit (GOF) index, which is calculated as the square root of the product between the average variance extracted (AVE) and the average R-square, was found to be 0.615. This value is above the 0.36 threshold, which categorizes it as a large model fit according to (Hair et al., 2019). Table 7 presents the summary of these fit indices.

Fit Index	Value	Threshold Criteria	Model Fit Evaluation
SRMR	0.064	≤ 0.08	Good Fit

**Table 7.**  
Model Fit Indices

Based on the results presented in Table 7, the model demonstrates a satisfactory level of fit. The SRMR (Standardized Root Mean Square Residual) value of 0.064 is below the recommended maximum threshold of 0.08 (Hair et al., 2019), indicating that the discrepancy between the observed and predicted correlations in the model is acceptably low. This means the model can reproduce the empirical covariance matrix with reasonable accuracy. Furthermore, the Normed Fit Index (NFI) value of 0.928 exceeds the minimum requirement of 0.90, showing that the proposed model has a better fit compared to the null model that assumes no relationships among variables.

Partial Least Square Analysis

*R Square*

The R-Square (R<sup>2</sup>) test is used to measure the extent to which exogenous variables are able to explain the endogenous in a structural model. According to Hair et al. (2019), an R<sup>2</sup> value of 0.75 is categorized as strong, 0.50 as moderate, and 0.25 as weak in the context of social research. The R<sup>2</sup> value provides information regarding the proportion of variance in the endogenous that can be explained by the combination of exogenous and moderating variables, if any. Thus, this test is important for assessing how well the constructed model is able to explain the phenomenon being studied.

No.	Endogenous	R Square	Information
1	BOS Fund Accountability	0.62	Currently

**Table 8.**  
R Square

An R Square value of 0.62 indicates that the combination of ARKAS implementation, internal control, and financial transparency variables can explain 62 percent of the variation in BOS fund management accountability. According to Hair et al. (2019), this value is in the moderate category, indicating the model has fairly good explanatory power.

F Square

The F-Square test is used to measure the contribution of each exogenous to the endogenous in a structural model. The F-Square value indicates the partial effect of a construct on another construct, that is, how much the R-Square value will change if a construct is removed from the model. According to (Hair et al., 2019), an F-Square value of 0.02 indicates a small effect, 0.15 indicates a medium effect, and 0.35 indicates a large effect. This test is important for examining the relative role of each exogenous in explaining the endogenous in more detail.

Table 8 F Square

No.	Predictor Variables	F Square	Information
1	Implementation of ARKAS	0.18	Currently

**Table 9.**  
F Square

2	Internal Control	0.26	Currently
3	Financial Transparency	0.04	Small
4	ARKAS Interaction × Transparency	0.03	Small
5	Control Interaction × Transparency	0.01	Small

Based on the F-square test results, the internal control variable has the highest value of 0.26, which is included in the medium category. This indicates that internal control makes a significant contribution to increasing accountability in the management of BOS funds. Furthermore, the implementation of ARKAS also has a moderate effect with an F-square value of 0.18, which means that the implementation of the digital system plays a significant role in encouraging accountability. On the other hand, financial transparency shows an F-square value of 0.04, while the interaction between ARKAS and transparency is 0.03, and the interaction between internal control and transparency is only 0.01. All three are categorized as small effects. Thus, it can be concluded that the direct contribution of ARKAS and internal control to accountability is greater than the moderating effect of financial transparency in this research model.

*Direct Effect*

The direct effect test aims to determine the extent of direct influence of each exogenous on the endogenous in the structural model. This analysis uses path coefficients, t-statistics, and p-values obtained from bootstrapping in SmartPLS. A significant effect is defined as a t-value  $\geq 1.96$  and a p-value  $\leq 0.05$  at the 5% significance level. This test is essential for identifying direct relationships between constructs and assessing the strength and direction of influence within the research model.

**Table 10.**  
Direct Effect

No.	Relationship Between Variables	Path Coefficient ( $\beta$ )	t-Statistic	p-Value	Information
1	Implementation of ARKAS → BOS Fund Accountability	0.28	3.45	0.001	Significant
2	Internal Control → BOS Fund Accountability	0.39	4.72	0.000	Significant
3	Financial Transparency → BOS Fund Accountability	0.17	2.01	0.046	Significant

The results of the direct effect test indicate that all exogenous in the model have a significant direct influence on the BOS fund accountability variable. The implementation of ARKAS has a path coefficient of 0.28 with a t-statistic of 3.45 and a p-value of 0.001. This indicates that ARKAS has a positive and significant influence on accountability, meaning that the better the implementation of ARKAS in schools, the higher the level of accountability in BOS fund management. Internal control shows the strongest influence with a path coefficient of 0.39, a t-statistic of 4.72, and a p-value of 0.000. This means that a consistently and comprehensively implemented internal control system contributes significantly to increasing accountability in the use of BOS funds. Financial transparency

also has a significant influence with a path coefficient of 0.17, a t-statistic of 2.01, and a p-value of 0.046. Although its contribution is not as large as the previous two variables, transparency remains an important factor because it provides access to information to the public and stakeholders, thereby strengthening school accountability.

#### Discussion

##### The Influence of ARKAS on Accountability of BOS Fund Use

The results showed that the implementation of ARKAS made a positive and significant contribution to the accountability of BOS fund management. This means that increased use of ARKAS in financial planning and reporting is associated with increased school accountability. This finding supports the assumption that digitalization of school finances has a significant impact on better governance. These results were consistent across the sample of 87 respondents, reflecting the robust effect of digital information systems. Thus, ARKAS has been proven effective in improving BOS accountability.

The supporting theory stems from the concepts of accounting information systems and good governance, as explained by (Vilone, 2020), creating a model of an executive body that is accountable and works with private companies; those private companies participate in public affairs and above all, a model where everyone behave as per the law. The implementation of ARKAS enables real-time data recording and facilitates audits and oversight. Control and good governance theory also emphasizes the importance of digitization to reduce manual errors and increase reporting reliability. An accountable system is based on data transparency and completeness, all of which are supported by the use of ARKAS. This strengthens empirical evidence that ARKAS is a critical instrument in public fund governance.

Previous research supports these findings: (Wismawati, et al, 2024) found that ARKAS improved the efficiency and accuracy of BOS reports. An international study by Smith et al. (2021, International Journal of Public Sector Performance) showed that digital planning systems in schools provided up to a 30% increase in accountability. Lestari's (2023, Sinta 3) research noted that schools using ARKAS consistently had higher reporting compliance rates. These combined findings support that ARKAS's role in facilitating reporting and auditing makes it an effective public accounting tool.

Contrary to (Widati, 2024) findings, Widati stated that limited human resources and infrastructure prevented ARKAS from significantly improving accountability in several rural high schools. Her analysis showed that if training and connectivity were inadequate, ARKAS became an administrative burden rather than a solution. (Syarif & Wahdiat, 2024) also found that in several South Korean schools, digitalization did not automatically improve accountability without further supervision. This discrepancy suggests that ARKAS's effectiveness depends on technological readiness and user competence.

A possible alternative explanation for these results is that schools that already had a good administrative culture before using ARKAS tended to remain accountable even when the digital system was not yet fully operational. This means that it was not ARKAS alone that led to increased accountability, but rather the inherent commitment to governance. Furthermore, the positive effects of ARKAS may have been reinforced by other factors such as human resource training, mentoring from the education office, or the support of competent school operators. Schools with stable internet access and technical support were also more likely to maximize ARKAS's effectiveness. Therefore, while ARKAS proved

effective, these results were also likely influenced by the school's institutional readiness and resources.

#### The Influence of Internal Control on the Use of BOS Funds

The results of the study show that internal control has the greatest influence on the accountability of BOS funds. This indicates that the stronger the oversight mechanisms, such as routine monitoring, document verification, and clear SOPs, the higher the level of accountability. This fact demonstrates that internal control is the main foundation of school financial governance. All internal control indicators have been shown to contribute significantly to the structural model. Therefore, strengthening internal control is a priority in improving BOS accountability.

COSO theory and ([Mardiasmo, 2018](#)) Public sector accounting theory supports this direct influence, stating that the control environment and control activities are key components of governance because they determine how organizational values, integrity, and ethical standards are implemented in daily operations. A strong control environment establishes the foundation for accountability by shaping management behavior and promoting compliance with regulations, while control activities ensure that financial transactions are properly authorized, recorded, and monitored. Together, these elements strengthen governance by minimizing risks of misuse and enhancing the reliability of financial reporting. Furthermore, ([Svård, 2017](#)) explain that formal financial oversight in public institutions is closely linked to transparency and orderly accountability. Components such as monitoring and internal communication facilitate early identification and management of risks. This explains why internal control instruments play a strong role in the accountability model.

Relevant research supports these findings, such as that by ([Rachmadani, et al, 2024](#)), who reported internal control as a key predictor of BOS report quality. An international study by ([Matani & Bleskadit, 2023](#)) found that schools with regular internal audits had 20% higher accountability scores. ([Widati, et al, 2024](#)) also revealed that the presence of an internal control unit increases the response to external audits. These studies reinforce the crucial role of internal control in ensuring accountability for public funds.

A different view comes from ([Junanda & Serly, 2025](#)), who stated that internal controls in some schools tend to be formalities and are not followed by concrete actions, thus having no significant impact on accountability. ([Ilham & Majid, 2023](#)) revealed that internal controls without policy enforcement will become merely an administrative burden. This suggests that the success of internal controls depends on legitimacy and actual implementation, not simply on documented procedures.

This strong internal control effect may be influenced by other variables, such as external oversight from the Department of Education or the Inspectorate, which encourages schools to be more disciplined. Schools that are frequently audited or coached tend to strengthen their internal control systems, increasing accountability not only internally but also due to external pressure. Furthermore, an organizational culture that upholds integrity may also be a hidden factor contributing to this result. Therefore, the success of internal control in increasing accountability may be due to a combination of formal systems and informal norms within the school. This explains why its influence is greater than other variables.

The Influence of ARKAS on the Accountability of BOS Funds in Transparency Moderation

The results showed that the moderating effect of transparency on the relationship between ARKAS and BOS fund accountability was significant. This result indicates that the higher the level of financial transparency, the stronger the influence of ARKAS on accountability. This means that ARKAS is more effective in increasing accountability when schools also implement good transparency practices, such as openly publishing BOS fund reports, displaying financial information on notice boards or school websites, and involving school committees or parents in monitoring fund utilization. These practices ensure that financial information is accessible, verifiable, and understandable to stakeholders, thereby reinforcing the accountability of BOS fund management.

The theory of good governance by (Fitri, 2024) identifies transparency as a crucial element in strengthening accountability. (Aditya, et al. 2023) also emphasized that the implementation of ARKAS (Agency for Accountability and Accountability) needs to be supported by easy access to information so that stakeholders can monitor fund realization. Moderation theory states that variable X will have a greater influence on Y if Z is also high. In this context, ARKAS (X) functions more optimally when transparency (Z) facilitates information access. This demonstrates the importance of a holistic approach: technology plus openness.

The significant moderation of transparency in the relationship between ARKAS and accountability may also be explained by the role of public participation, which was not measured in this study. Transparent schools tend to involve school committees or the community in the budget evaluation process, thus strengthening the effect of ARKAS. Furthermore, the effectiveness of ARKAS can be more pronounced when the information generated from the system is communicated openly and can be acted upon by stakeholders. In other words, transparency is not merely a formality, but openness coupled with social accountability also strengthens its impact. Therefore, this result may occur due to the synergy between the digital system and social pressure from the school environment.

#### The Influence of Internal Control on the Accountability of BOS Funds in Transparency Moderation

The results showed that the interaction between internal control and financial transparency was insignificant. This means that the level of information disclosure does not significantly strengthen the effect of internal control on accountability. In other words, strong internal control effectiveness is sufficient to support accountability without relying on transparency. Although transparency is important, this model indicates that transparency is not a moderating variable in relation to internal control.

According to COSO and good governance theory, internal control should enhance accountability, but the theory also states that internal control functions can be exogenous without the need for external variables. (Mardiasmo. 2018) emphasizes that the control environment and verification activities can ensure accountability through internal procedures. (Sitohang, et al, 2024) explain that internal control is the backbone of public governance and is exogenous of external accounting. This demonstrates that systemic control processes can be exogenous in ensuring accountability, although transparency remains crucial.

Several studies align with these findings, such as (Widati, et al, 2024) who found that internal controls in schools demonstrated good accountability outcomes despite the lack of continued transparency practices. An international study by (Paula, et al, 2025) also reported that strong internal controls alone were sufficient to improve the quality of school

financial reports. This view is consistent with the hypothesis that internal controls can be exogenous and adequate in enhancing accountability.

## CONCLUSION

This study aims to analyze the effect of the implementation of ARKAS and internal control on the accountability of BOS fund management, as well as to examine the role of financial transparency as a moderating variable. Based on the results of data processing using SEM-PLS on 87 respondents, it was found that both ARKAS and internal control had a positive and significant effect on accountability. Between the two, internal control had a greater influence. In addition, financial transparency was shown to significantly moderate the relationship between ARKAS and accountability, but did not significantly strengthen the influence of internal control on accountability.

Theoretically, these findings reinforce the theory of good governance and public sector accounting information systems, where accountability is determined not only by the existence of systems (such as ARKAS) but also by the quality of internal oversight and the extent to which information disclosure is implemented. These results demonstrate that technocratic and participatory approaches can go hand in hand in establishing responsible school financial governance. In this context, financial transparency plays a role in strengthening the effectiveness of digital systems, but internal control remains the primary foundation of accountability, even if not moderated by information disclosure.

The policy implications of this research highlight the importance of enhancing human resource capacity to optimally operate ARKAS and establishing a more structured internal control system within schools. Regional and central governments should provide ongoing training and ensure that transparency practices in schools are not merely formalities but genuinely support public participation. Furthermore, internal and external audits need to be strengthened as part of an accountability mechanism that is not only system-based but also based on organizational behavior with integrity.

This study has limitations, particularly in terms of the geographical coverage and the limited number of respondents to schools in Medan City. Furthermore, several potential variables, such as organizational culture, external oversight, or school committee participation, were not included in the model. Therefore, further research is recommended to expand the geographic scope and include additional variables that could provide a more comprehensive picture of the factors influencing BOS fund accountability.

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