

Transforming Madrasah Education: Integrating Technology, Governance, and Commitment within Management Information Systems

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ABSTRACT

In the digital age, madrasah education transformation is often impeded by inadequate management information systems (MIS), resulting from disjointed technology integration, ineffective governance, and insufficient organizational commitment. This study analyzes how technology integration, governance, and organizational commitment drive madrasah education transformation to strengthen MIS effectiveness. Using a quantitative approach and Structural Equation Modeling–Partial Least Squares (SEM-PLS) on a sample of teachers in Makassar City, the study identifies education transformation as a central mediator. The findings reveal that technology integration (0.452) and governance (0.351) are the most dominant direct determinants of MIS effectiveness. Organizational commitment does not have a significant direct effect on MIS ($p = 0.381$). Still, it does have a significant indirect effect through a full mediation mechanism via education transformation, which is shown by changes in digital culture and new curriculum ideas. The structural model demonstrates excellent predictive power, explaining 76.3% of the variation in education transformation and 63.8% of the variation in MIS effectiveness. This research underscores that successful digitalization depends not only on technical readiness but also on the institution's ability to internalize technology through a comprehensive work culture transformation.

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INTRODUCTION

Digital transformation in education has become a strategic agenda for improving the quality of educational institution management in the modern era (Alwi & Mumtahana, 2023; Chabibi et al., 2025; Fathir, 2026; A. Fauzi et al., 2025; Haqqi et al., 2025; Harini et al., 2024; Mohamed Hashim et al., 2022). The massive development of information technology has encouraged educational institutions to integrate digital systems into various aspects of administration, learning, and organizational decision-making (Izzah & Magfiroh, 2025; Suhardi & Fahmi, 2025; Sunarjo et al., 2024). The use of information technology today is no longer merely an optional administrative tool but has evolved into an integral part of an effective, transparent, and data-driven education management system (Amalia, 2026; Aryasutha et al., 2025; Azizah et al., 2026; Choy & Onuma, 2025; Elihami et al., 2025; Sarifudin & Damanik, 2024). This phenomenon has created a new paradigm in which the success of an educational institution is largely determined by the extent to which it can align its digital infrastructure with the organization's strategic goals (Gkrimpizi et al., 2023; Øvrelid, 2022).

In the context of Islamic education, Madrasah, as an institution with unique characteristics, is also required to adapt to technological developments to improve the quality of institutional governance and educational services to the community (Badrun, 2024; Faizin, 2024; Hariadi et al., 2024; Madkan et al., 2025). The challenges faced by Madrasahs are often more complex than those faced by public schools, given the dual curriculum and the need to maintain traditional values while embracing modernity, which can hinder their ability to effectively integrate new technologies and adapt to changing educational demands. The use of a Management Information System (MIS) in schools has been shown to make managing academic data more efficient, speed up the flow of organizational information, and help people make better decisions (Adhikari et al., 2024; Iwogbe et al., 2025; Shah, 2014). Therefore, Madrasah should view MIS not as a cost burden, but as a strategic investment for future competitiveness.

An educational management information system is a system designed to manage, integrate, and present information needed for planning, organizing, implementing, and evaluating educational activities (Sunarjo et al., 2024). The educational institution's technological readiness greatly influences the success of this system's implementation (Sudrajat et al., 2024; Veseli et al., 2025). Adequate technological infrastructure, such as hardware, internet networks, and relevant software, will facilitate the rapid and accurate processing and distribution of information within an educational organization (Harahap & Mahardhani, 2025; Liu et al., 2025; Mhlanga, 2024). Without strong technological support, an MIS remains merely a concept on paper that adds no added value to organizational efficiency.

However, technology is not the only factor to consider. Good organizational governance is another crucial pillar in ensuring the sustainability of information system implementation (Humaidi, 2026; Nursodiq et al., 2026). Transparent and accountable governance can foster a more systematic and integrated information management system within the educational management process (Bravo et al., 2021; Sofyani et al., 2020). Within the madrasah ecosystem, strong governance ensures that data flows from the elementary madrasah (MI) to the senior high madrasah (MA) levels and adheres to uniform standards, thus optimally achieving vertical and horizontal integration (Hidayat, 2025; Silviya & Tanzeh, 2026).

On the other hand, human resources (HR) play a crucial role. The level of acceptance and long-term use of technology in daily work by teachers and other education staff will depend on how committed they are to their jobs (Imaniyati et al., 2025; Sukawati et al., 2020). Individuals with a high level of organizational commitment tend to be more adaptive to changes in technology-based work systems and view digitalization as an opportunity for growth, not a threat (Akbar et al., 2025; Aydın & Baykal, 2023). Numerous studies have demonstrated a significant correlation between organizational

commitment and the effectiveness of implementing information systems in educational organizations (Alzoraiki et al., 2023; Atika et al., 2022; Faizin, 2024; Ibrada et al., 2022). Without commitment, even the most sophisticated technology integration will encounter resistance during implementation.

While the urgency of MIS is clear, previous studies have shown that implementation in the field still faces significant challenges, particularly related to limited technological infrastructure and human resource readiness (Dilu et al., 2017; Ibrahim et al., 2020). Low digital literacy among educators is a major obstacle to optimizing the use of information systems (Fernández-Otoya et al., 2024; Temirkhanova et al., 2024). Furthermore, the lack of strong organizational governance support often results in suboptimal integration of information technology utilization, resulting in data overlaps, which hinders effective decision-making and resource allocation within educational institutions (Ramayah, 2024; Wahyu Widodo et al., 2021). Building upon preliminary observations conducted by researchers in October 2025 at several Madrasah (MI, MTs, and MA) in Makassar City, it was found that technology utilization by educators tends to be limited to personal administrative purposes. Field observation data indicate that the use of digital devices has not been integrated into an organized and sustainable management information system (MIS). This is evident in the continued use of separate manual data storage patterns, thus preventing the formation of an information ecosystem that supports systematic school managerial decision-making.

This gap calls for deeper digital system integration. Technology integration refers to the level of integration of information technology utilization to systematically support various management functions (Amar & Hlupic, 2016; Apologia et al., 2024; Ariona et al., 2023; Bond et al., 2020; Madaki et al., 2024). In the madrasah context, this integration includes data synchronization between units and the use of digital applications that can be quickly accessed by stakeholders (Ali et al., 2024; Ikhwan et al., 2023). The use of technology to support managerial decision-making is a key indicator of the success of this integration (Maskin et al., 2025; Rafique et al., 2024). Additionally, the quality of governance must also align with international standards of transparency and accountability. Administrative and reporting accountability guarantees responsible management of educational resources (H. A. H. Fauzi et al., 2025). This process is supported by a strong organizational commitment, where members feel a sense of belonging to the madrasah's vision (Darmawan, 2019). This commitment is reflected in active involvement in organizational change toward digitalization.

This is where educational transformation emerges as a vital element. This transformation is not simply a change of tools but rather a systematic change encompassing learning innovation, curriculum adaptation, and enhancing educators' digital competencies (Palacios-Rodríguez et al., 2023; Rasskazova et al., 2020). Shifting work culture toward digitalization creates an adaptive environment (Tondeur et al., 2019). An effective MIS, characterized by data accuracy, speed of access, and reliability, will only be created if this transformation process is well-executed. However, a significant research gap remains in existing literature. While previous studies have extensively explored digital competence in general urban school settings (Palacios-Rodríguez et al., 2023) or the technical infrastructure of MIS (Tondeur et al., 2019), there is a lack of empirical evidence specifically addressing the integration of MIS within the unique socio-religious administrative framework of Islamic Schools. Specifically, previous research has not yet measured how the transition from individual administrative digitalization to a centralized, system-wide MIS impacts managerial efficiency in Islamic multi-level educational institutions (MI, MTs, and MA). This study addresses this gap by analyzing the synchronized implementation of MIS across these levels, a dimension that has been largely overlooked in broader educational transformation studies.

This research is new because it looks at "educational transformation" as a key link between technology (technology integration), management (governance), and people (organizational commitment) to improve management information systems. Unlike previous research that tends to examine these factors in isolation, this study examines them integratively in the context of Madrasah in Makassar City. Focusing on the mediating role of educational transformation offers a new perspective: technology and governance will not automatically improve the quality of MIS without a profound transformation of educational culture and competencies.

Building upon these issues, this study aims to analyze the integration of technology, organizational governance, and commitment to management information systems through the transformation of madrasah education in Makassar City. This research is expected to contribute academically to the development of Islamic education management studies (Anwar, 2021) and provide practical guidance for policymakers in optimizing the digital ecosystem in Madrasah. The proposed hypothesis is that the integration of technology, governance, and organizational commitment positively influences management information systems by strengthening educational transformation.

METHODS

This study uses a quantitative approach with an explanatory research design to test hypotheses regarding causal relationships between the variables studied. This design was chosen to explain the influence of information technology integration, governance, and organizational commitment on the effectiveness of Management Information Systems (MIS) in Madrasah. The primary focus of this study is to analyze the role of educational transformation as a mediating variable linking organizational input factors with the resulting information system output.

Data analysis was conducted using the Structural Equation Modeling (SEM) method with a Partial Least Squares (PLS) approach, assisted by SmartPLS software. SEM-PLS was chosen based on its ability to handle complex research models with latent variables containing many indicators. Furthermore, this method is highly effective for testing predictive relationships and developing theory in relatively limited sample sizes, while still providing accurate and reliable estimates of the relationships between variables in the structural model.

The research was conducted over a period of four months, from November 2025 to February 2026. The population in this study included all educators or madrasah teachers in Makassar City, across the Madrasah Ibtidaiyah (MI), Madrasah Tsanawiyah (MTs), and Madrasah Aliyah (MA) levels, across both public and private institutions. Data collection through the distribution of instruments and field observations was specifically carried out between November 2025 and February 2026. Teachers were selected as primary research subjects because they are the central actors who interact directly with information systems and are the primary drivers of the educational transformation process in Madrasah. This heterogeneity across educational levels was utilized to provide a comprehensive picture of digital readiness at various levels of Islamic educational institutions.

The sample size was determined using the Slovin formula with a precision level or margin of error of 10%. The respondent criteria were specifically set (purposive sampling): active madrasah teachers with at least one year of service and directly involved in administrative activities and digital-based learning. Based on these calculations, a sample size of 88 respondents was obtained, deemed representative of the dynamics of technology use and governance in Madrasah in Makassar City.

Data was collected through a survey method using a structured questionnaire as the primary instrument, compiled based on indicators for each variable: technology integration, governance, organizational commitment, educational transformation, and madrasah MIS. The questionnaire was distributed using a hybrid approach to ensure a high response rate and data representativeness. Online

distribution was conducted via Google Forms, shared through official educator communication networks and professional social media groups (WhatsApp and Telegram) across MI, MTs, and MA levels in Makassar City. Additionally, physical copies of the questionnaire were distributed directly during coordination meetings and academic workshops at selected Madrasahs to reach respondents with limited digital access.

Prior to final data analysis, the research instrument underwent a series of data quality tests, including validity tests (convergent and discriminant) and reliability tests (composite reliability and Cronbach's alpha). This process was done to ensure that each item in the questionnaire was able to measure the research constructs consistently, accurately, and scientifically.

FINDINGS AND DISCUSSION

Evaluation of Measurement Model (Outer Model)

In Partial Least Squares (PLS)-based Structural Equation Modeling (SEM) analysis, the crucial first step is to ensure that the measurement instrument has a level of validity and reliability that meets academic standards. Testing is conducted through Outer Loadings evaluation to gauge the extent to which individual indicators reflect their latent constructions: Technology Integration, Governance, Organizational Commitment, Educational Transformation, and Management Information Systems. According to statistical principles, an individual's reflection is considered high and ideal if it has a correlation value or loading factor > 0.70 with the construct being measured. However, in the context of initial research or the development of a measurement scale in an educational organization, a loading value between 0.50 and 0.60 is considered sufficient and acceptable for further analysis. Based on the results of data processing using SmartPLS, all indicators in this study met this minimum threshold.

Table 1 (Outer Loading Results) shows that the correlation value of each indicator with its parent variable is much higher than its relationship with other variable constructs (cross-loading). This phenomenon confirms that each variable, from technical elements such as technology integration to humanistic elements such as teacher commitment, has been measured specifically and does not overlap with other variables. The high loading factor value, which is above the threshold of 0.50, reflects a strong level of convergent validity. This proves that the questionnaire instrument distributed to teachers in Madrasah Teachers in Makassar can accurately represent key dimensions of educational transformation and the effectiveness of the management information system. Meeting these validity criteria allows us to declare the structural model suitable for proceeding to the hypothesis testing stage (Inner Model).

Table 1. Outer Loading

	INT (X1)	TKL (X2)	KMT (X3)	TPN (Z)	SIM (Y)
X1.1	0.834				
X1.2	0.892				
X1.3	0.833				
X1.4	0.854				
X1.5	0.829				
X2.1		0.924			
X2.2		0.898			
X2.3		0.765			
X2.4		0.688			
X3.1			0.875		
X3.2			0.859		
X3.3			0.734		

	INT (X1)	TKL (X2)	KMT (X3)	TPN (Z)	SIM (Y)
X3.4			0.695		
X3.5			0.758		
Y.1					0.798
Y.2					0.752
Y.3					0.855
Y.4					0.819
Y.5					0.763
Z.1				0.691	
Z.2				0.793	
Z.3				0.846	
Z.4				0.835	

The initial stage in evaluating the measurement model is to test the level of convergent validity to ensure that each indicator in the research instrument accurately reflects its latent construct. The outer loading analysis using SmartPLS-based Structural Equation Modeling (SEM) showed that all of the indicators in Technology Integration (X1), Governance (X2), Commitment (X3), Educational Transformation (Z), and Management Information Systems (Y) generally had values that met the recommended empirical threshold.

For the technology integration construct, all indicators demonstrated very impressive performance, with values above 0.80. This indicates that each item in the questionnaire strongly and consistently reflects the technology variables, emphasizing that digital infrastructure readiness is a key foundation in the madrasah ecosystem. Meanwhile, the Management Information Systems (Y) construct demonstrated a stable outer loading value above 0.75, confirming that these indicators represent the effectiveness of information management very well.

The governance construct also exhibited high loading values, although one indicator had a value of 0.688. While this value is slightly below the ideal threshold of 0.70, it is still within acceptable tolerance limits (>0.50) for social research and model development. A similar pattern was found for the educational commitment and transformation constructs, where one indicator for each variable had a value slightly below 0.70. However, cumulatively, these indicators still demonstrate adequate relationship strength in explaining their respective constructs.

Overall, the results of this evaluation confirm that the measurement model in this study meets the criteria for convergent validity. The consistency of loading values for the mediating variable (Educational Transformation) and the endogenous variable (SIM) demonstrates the instrument's reliability in capturing the dynamics of digital change in Madrasah in Makassar City. Therefore, each construction is deemed suitable for use in further analysis in the structural model (inner model) to test the hypothesized causal relationships and mediation effects.

Table 2. Composite Reliability

Variables and Indicators	Composite Reliability (Alpha)	(AVE)
Technology Integration (X1)	0.872	0.781
Governance (X2)	0.849	0.722
Commitment (X3)	0.867	0.716
Educational Transformation (Z)	0.872	0.692
Management Information Systems (Y)	0.764	0.633

Internal consistency evaluation in the SEM-PLS model was conducted through a composite reliability test to ensure that the indicators consistently measure their latent constructs. Building upon

the analysis results in Table 2, the composite reliability values for all variables were all above the 0.70 threshold: technology integration (0.872), governance (0.849), commitment (0.867), educational transformation (0.872), and management information systems (0.764). Achieving these values confirms the research instrument's very high reliability, with each statement providing consistent results in capturing the dynamics of governance and organizational commitment in the Makassar City madrasah environment.

In addition to reliability, convergent validity is strengthened by the Average Variance Extracted (AVE) value, which represents the extent of indicator variance explained by its latent construct. All variables in this study had AVE values above 0.50, with details: Technology Integration (0.781), Governance (0.722), Commitment (0.716), Educational Transformation (0.692), and Management Information Systems (0.633). With AVE values exceeding 0.50, each construct was proven to be able to explain more than 50% of the variance of its indicators, thus meeting strict convergent validity criteria. These findings provide a strong empirical basis that all research instruments are valid and reliable for use in the structural model analysis stage (inner model) to test the mediating effect of educational transformation.

Table 3. Determination Test

	R-Square
Educational Transformation (Z)	0.763
Management Information Systems (Y)	0.638

The evaluation of the structural model (inner model) in this study commenced with an analysis of the coefficient of determination (R^2) to assess the predictive capacity of exogenous variables on endogenous variables. The R^2 value represents the proportion of variability in the dependent variable that can be simultaneously explained by the influencing independent variables within the SEM-PLS framework. Referring to the criteria of the structural analysis literature, an R^2 value of 0.75 is categorized as a strong (substantial) model, 0.50 as a moderate model, and 0.25 as a weak model. This measurement is crucial for validating the extent to which technology integration, governance, and organizational commitment can be the main drivers for creating an effective management information system in the madrasah environment.

The data processing results in Table 3 show that the Educational Transformation (Z) variable has an R^2 value of 0.763, placing it in the strong (substantial) category. These findings show that 76.3% of the changes in the educational transformation process in Madrasahs in Makassar City can be fully explained by the combined effects of technological integration, governance, and organizational commitment, while the other 23.7% is affected by outside factors not included in the model. Meanwhile, the Management Information System (Y) variable shows an R^2 value of 0.638, which falls into the moderate to strong category. This proves that 63.8% of the effectiveness of the madrasah management information system is successfully explained by the variables in the research model, which confirms that this structural model has excellent relevance and explanatory power in supporting the digitalization of Islamic education.

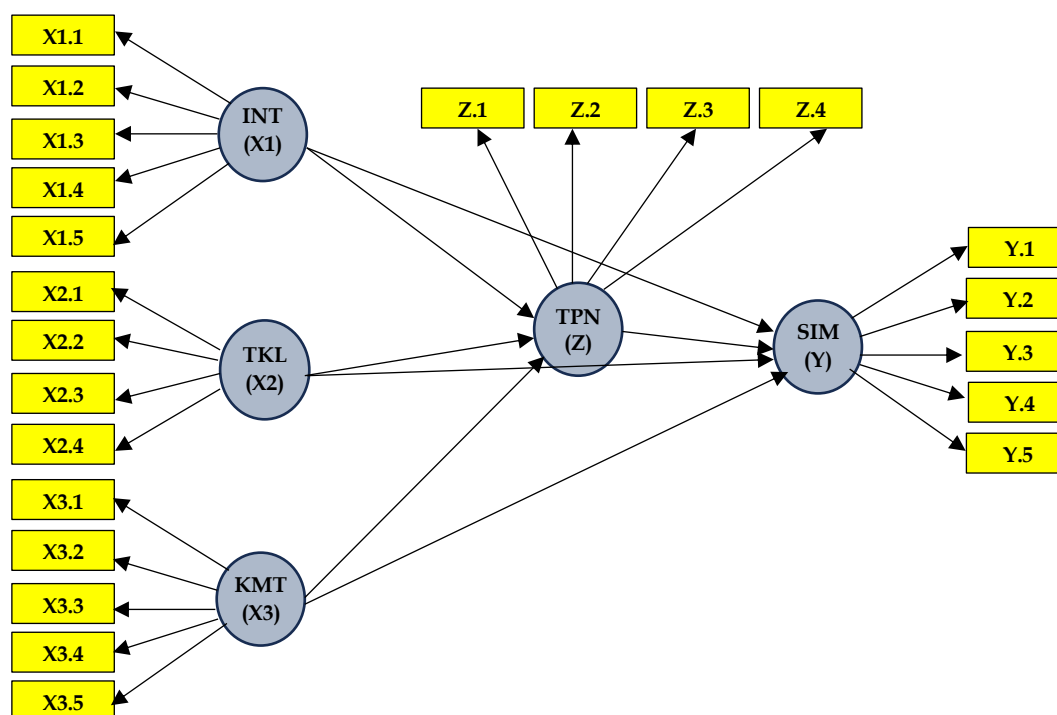


Figure 1. Bootstrapping Output

This diagram depicts a conceptual model that examines how three key organizational pillars—Technology Integration (TI), Governance (TKL), and Commitment (KMT)—interact in driving Educational Transformation (TPN) to optimize Management Information Systems (MIS) in Madrasah.

Direct Effects Path

This model indicated how well Management Information Systems (MIS) work and how quickly Educational Transformation (TPN) happens in Madrasah, depending mainly on the combined effect of Technology Integration (X1) as the main digital force, Governance (X2) as the policy framework, and Human Resource Commitment (X3) as an important human element. Using technology effectively and having clear rules helps make sure that the information system works well. At the same time, the dedication of teachers and staff is crucial for changing the culture, as it creates a positive atmosphere for using new technologies and methods. Together, these three key areas create a strong base that makes sure any updates to the information system are backed by ready infrastructure, solid rules, and the active participation of everyone in the organization.

The Mediating Role of Educational Transformation (Z)

The Educational Transformation (TPN) variable in this model is very important because it connects organizational inputs—like technology use, governance, and commitment from staff—with the effectiveness of Management Information Systems (MIS). The presence of this mediating mechanism shows that improving digital tools and management policies won't be fully effective in the management system unless there is also a change in work culture and significant teaching improvements within the madrasah environment. Thus, educational transformation serves as a key catalyst that ensures all organizational resources are comprehensively internalized to produce an accurate, adaptive, and highly effective information system.

Construct Indicator Analysis (Outer Model)

The constructing indicator analysis (outer model) in this study encompasses comprehensive dimensions that reflect each primary variable. Technology Integration (X1) is measured through infrastructure reliability and connectivity, while Governance (X2) is represented by the principles of transparency, accountability, and regulatory compliance. In terms of human resources, the Commitment variable (X3) shows how loyal and actively involved educators are, which works together with the Education Transformation indicator (Z) that includes updating the curriculum, improving digital skills, and changing the organizational culture. All these factors together help improve the quality of the Management Information System (Y), which is measured by how accurate the data is, how quickly information can be accessed, and how well it supports decision-making in Madrasah. This model demonstrates that Education Transformation (Z) is a key variable. To improve the quality of the Management Information System (Y) in Madrasah, policymakers cannot simply focus on procuring tools (X1) or regulations (X2) but must ensure a comprehensive transformation process. This transformation ensures that technology and human resource commitment are truly internalized into the institution's management information system, which is essential for enhancing data accuracy, improving decision-making processes, and ultimately supporting the educational goals of the Madrasah.

Path analysis in this study includes testing the direct effect and indirect effect to validate the relationship between variables in the structural model. Direct effect analysis tests the importance of the relationship between independent and dependent variables by excluding other variables. Indirect effect analysis, on the other hand, looks at the role of intervening or mediator variables in connecting the two variables. Building upon the results of the data processing presented in Table 4, all hypotheses proposed in this study are declared accepted, indicating that both the direct influence path and the hypothesized mediation mechanism have strong statistical significance in explaining the phenomena studied.

Table 4. Hypothesis Testing

Relationship Between Variables	Path Coefficient	t-Statistic	p-Value	Information
Direct Influence				
Technology Integration → Educational Transformation	0.494	4.387	0.000	Accepted
Governance → Educational Transformation	0.336	3.375	0.023	Accepted
Commitment → Educational Transformation	0.441	4.279	0.000	Accepted
Technology Integration → Management Information Systems	0.452	4.395	0.000	Accepted
Governance → Management Information Systems	0.351	3.678	0.001	Accepted
Commitment → Management Information Systems	0.039	0.671	0.381	Rejected
Educational Transformation → Management Information Systems	0.368	4.102	0.000	Accepted
Indirect Influence				
Technology Integration → Educational Transformation → Management Information Systems	0.088	4.351	0.000	Accepted
Governance → Educational Transformation → Management Information Systems	0.072	3.488	0.012	Accepted

Relationship Between Variables	Path Coefficient	t-Statistic	P-Value	Information
Commitment → Educational Transformation @ Management Information Systems	0.059	2.786	0.033	Accepted

Building upon the results of the bootstrapping analysis on the SEM-PLS model presented in Table 4, hypothesis testing was conducted by examining the Path Coefficient, t-statistics, and p-value. The results of this study provide a comprehensive overview of the dynamics of the relationships between the variables, as follows:

Direct Effects Analysis

The test results indicate that almost all exogenous variables have a positive and significant influence on the endogenous variables, except for one specific path. Technology Integration (0.452), Governance (0.351), and Educational Transformation (0.368) were shown to have a significant direct influence on the effectiveness of the Management Information System (MIS) with a p-value < 0.05. This confirms that digital infrastructure and technically transparent governance can improve the quality of information systems in Madrasah.

However, a unique finding emerged for the Commitment variable, where its direct effect on MIS had a very small coefficient value (0.039) with a p-value of 0.381 (above 0.05). Thus, the hypothesis of a direct effect of commitment on MIS was rejected. This indicates that intentions of loyalty or verbal promises from human resources do not necessarily improve the quality of the management system if they are not translated into concrete actions.

The Mediating Role of Educational Transformation (Indirect Effects)

The most significant finding in this study is the role of educational transformation as a strong mediating variable. Although commitment did not have a direct effect on MIS, the results of the indirect effect test showed a coefficient value of 0.059 with a p = 0.033 (significant). This indicates that organizational commitment will only impact MIS effectiveness if mediated by the educational transformation process. This phenomenon is known as full mediation. The term means that teacher and educational staff loyalty must first be converted into changes in work culture, digital literacy, and curriculum innovation (transformation) to produce tangible results in an integrated management information system. Similarly, Technhas Integration and Governance also have a significant indirect effect through the educational transformation pathway, which facilitates the alignment of technology with teaching practices and enhances overall educational outcomes.

Overall, the integration of technology and governance acts as a technical catalyst, while educational transformation serves as a strategic bridge connecting human resource potential (commitment) with end results (SIM). This demonstrates that to optimize information systems in Madrasah, institutions must not focus solely on procuring technical tools but rather prioritize a digital cultural transformation process that touches all aspects of education.

Discussion

The results of the hypothesis testing indicate that Technology Integration (INT), Governance (TKL), and Commitment (KMT) have a positive and significant influence on Educational Transformation (TPN), with a significant value ($p < 0.05$) confirming their role as primary determinants of organizational change. Technology integration, which recorded the highest path coefficient of 0.494 ($t = 4.387$), demonstrates that digital system synchronization and effortless data access are key drivers of instructional innovation and a digital work culture in Madrasah. This finding aligns with the Technology Acceptance Model (TAM) and previous studies, which state that the availability of adequate technological infrastructure is an absolute prerequisite for successful digital transformation in the education ecosystem (Aldosemani, 2023; Saif et al., 2024). Meanwhile, accountable governance and strong human resource commitment serve as managerial and emotional foundations that ensure the process of curriculum adaptation and digital literacy improvement is systematic and sustainable, ultimately leading to enhanced educational outcomes and better alignment with technological advancements (Waldan, 2025).

On the other hand, this study confirms the significant influence of technology integration on the quality of Management Information Systems (MIS) with a path coefficient of 0.452 ($t = 4.395$), indicating that technically integrated infrastructure has a direct impact on data accuracy and decision-making speed. Theoretically, these results support the Resource-Based View (RBV), which emphasizes that information technology capabilities are strategic assets capable of creating operational efficiency (da Silva et al., 2025; Dhrubo, 2025; Mehmood et al., 2023). The synergy between transparent governance and loyal staff commitment ensures that every digital policy does not stop at the procurement of equipment but is internalized into daily managerial practices. Thus, the effectiveness of MIS in Madrasah is not merely a technical phenomenon but rather the result of a complex interaction between technological readiness, supportive regulations, and the active involvement of all organizational elements in responding to the dynamics of the digital era.

Furthermore, the results of the hypothesis testing indicate that Governance (TKL) and Educational Transformation (TPN) have a positive and significant influence on the effectiveness of the Management Information System (MIS), with path coefficients of 0.351 ($t = 3.678$) and 0.368 ($t = 4.102$), respectively. This finding confirms the good governance theory, which states that transparency and accountability are the main foundations for creating a reliable and accountable information system (Khanna, 2017). Furthermore, the significance of the TPN variable as a mediator indicates that technology integration not only has a technical impact but also strengthens the quality of the MIS through changes in work culture and instructional innovation, ultimately leading to improved decision-making and operational efficiency within the organization. This aligns with previous studies that emphasize that the success of information systems in organizations is highly dependent on the extent to which the technology is internalized in the adaptive organizational transformation process (Malek & Almarri, 2023).

On the other hand, an intriguing finding emerged regarding the Commitment (KMT) variable, which was shown to have no significant direct effect on MIS ($p = 0.381$) but plays a crucial role through an indirect pathway. This insignificant direct effect suggests that staff loyalty and emotional engagement do not necessarily improve the technical quality of the system without adequate infrastructure and governance support. This finding theoretically corroborates the sociotechnical systems model, which posits that the human component (commitment) is more efficacious when it facilitates alterations in work processes and enhances digital competencies (educational transformation) rather than merely the direct utilisation of technological devices (Sony & Naik, 2020; Zhang & Dong, 2024). Therefore, in Madrasah, commitment serves as a catalyst, propelling educational transformation to achieve optimal managerial output.

Furthermore, the results of the hypothesis testing indicate that Governance (TKL) and Commitment (KMT) have a significant indirect effect on the Management Information System (MIS) through the mediation of Educational Transformation (TPN), with path coefficients of 0.072 ($p=0.012$) and 0.059 ($p=0.033$), respectively. These findings confirm that transparent and accountable governance and organizational member commitment—in the form of loyalty and a sense of belonging—are the primary drivers in designing changes to a more modern education system. This teamwork supports the ideas of (Mallillin, 2022; Munandar, 2025), who said that using appropriate governance principles in schools is essential for successfully applying technology and making adaptive management systems work well.

Comprehensively, Technology Integration (INT) has proven to be the strongest determinant in accelerating the digitalization of managerial processes and improving the quality of information in Madrasah. Having a connected system and easy access to data helps make better and faster decisions, which supports the research by (Abedi, 2024) about how important technology integration is for managing information effectively. Therefore, the success of MIS in Madrasah relies not just on technical factors but also on well-organized management practices and support from staff, which come from a thorough change in digital work culture that includes training, involvement of stakeholders, and ongoing assessment of digital activities.

Additionally, the test results indicate that Commitment (KMT) does not have a significant direct influence on the effectiveness of Management Information Systems (MIS) in Madrasah. This finding indicates that loyalty, sense of belonging, and involvement of organizational members in the institution's vision and mission are not yet the main determinants of the technical quality of information systems independently. This is because MIS implementation is predominantly influenced by technical factors such as technological infrastructure and organizational governance mechanisms, rather than by the commitment of organizational members alone. Even though commitment is an important asset for organizations, it doesn't automatically affect the technical aspects of the system without additional support, like training programs and effective communication strategies that connect employee goals with technology.

Nevertheless, commitment has been shown to play a crucial role as a driver of educational transformation (TPN), which ultimately has a significant impact on MIS optimization. In this context, the commitment of organizational members helps to prepare and support learning innovation and the improvement of digital skills. It also acts as a middleman between the effects of human resources on the use of information systems. This finding corroborates the studies conducted by (Chouaibi et al., 2022), which emphasize that for technology to be effectively implemented in educational institutions, it is essential for the organization to be prepared and for staff to provide active support as they transition to a more digital work environment.

This study adds essential knowledge to the field of educational digitalization by showing how crucial technology integration and governance are, while also providing a new way to understand how educational changes connect organizational commitment to the effectiveness of information systems. However, this study has limitations in the generalizability of the results due to its specific geographic scope and sample size, as well as the use of a purely quantitative approach that does not fully capture contextual dynamics. So, future research should include a larger and more diverse group of participants and use a mix of research methods to better understand how different factors work together to improve management information systems in schools.

CONCLUSION

This study indicated that improving Management Information Systems (MIS) in Madrasah comes from a smart combination of being ready with technology, strengthening management, and involving people, with Technology Integration (0.452) and Governance (0.351) being the most important direct factors. A crucial finding in this model positions educational transformation as a central mediator bridging all organizational inputs into functional outputs. The evidence shows that the commitment variable plays a key role in the process, even though it doesn't have a strong direct effect ($p = 0.381$); it positively influences changes in digital culture and curriculum innovation. This model shows that the success of digitalization in Madrasah depends on more than just technical factors. It also depends on how well the institution can change its work culture to accept technology. It explains 76.3% of the changes in educational transformation and 63.8% of how well the information system works.

As a suggestion, Madrasah managers should focus on programs that change the digital culture instead of just getting technical equipment. Such programs will help staff turn their emotional commitment into useful digital skills. The government, particularly the Ministry of Religious Affairs, needs to strengthen a transparent and accountable governance framework as an operational standard to ensure the sustainability of a credible management information system, which is critical to building trust and engagement among stakeholders in the digitalization process. Finally, future researchers should investigate other factors, like digital leadership or outside influences, to add more depth to the study of digitalization in Islamic education, since 36.2% of the differences in MIS effectiveness are not explained by this model, indicating that additional variables may significantly impact the outcomes of digitalization efforts.

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