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ORIGINAL RESEARCH ARTICLE

Implementing Data-Driven Decision Making in Madrasah Management

Ari Pramono^{1*}, Feri Riski Dinata¹, Muslih Qomarudin¹, Ali Kuswadi¹, Dwi Sugianik¹

¹*Sekolah Tinggi Ilmu Tarbiyah Pringsewu-Lampung, Indonesia*

Correspondence: *aripramono913@gmail.com

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) has accelerated digital transformation in education, requiring madrasah principals to move beyond technology adoption toward leading innovative, adaptive, and value-based organizational changes. Within Islamic educational institutions, digital leadership must not only improve organizational effectiveness but also preserve Islamic educational values. This study aimed to analyze the digital leadership practices of madrasah principals in the era of Artificial Intelligence and to develop a digital leadership model that reflects the characteristics of Islamic education. A qualitative multi-site case study design was employed in four State Islamic Senior High Schools (Madrasah Aliyah Negeri) in Lampung Province, Indonesia, namely MAN 1 Bandar Lampung, MAN 1 Metro, MAN 1 Lampung Selatan, and MAN 1 Pringsewu. Data were collected through in-depth interviews, observations, and document analysis involving madrasah principals, vice principals, teachers, administrative staff, and information technology personnel. Data were analyzed using the interactive model of Miles, Huberman, and Saldaña, consisting of data condensation, data display, and conclusion drawing and verification. The findings reveal that the digital leadership of madrasah principals plays a strategic role in facilitating digital transformation through the development of a digital vision, AI governance, teachers' digital capacity development, data-driven decision-making, collaborative digital organizational culture, and the integration of Islamic values into technology implementation. Based on these findings, the study proposes a Digital Leadership Model for Madrasah Principals in the Era of Artificial Intelligence, consisting of six interconnected dimensions: Digital Vision, AI Governance, Teachers' Digital Capacity Development, Data-Driven Decision-Making, Collaborative Digital Organizational Culture, and Islamic Ethical Leadership.

Keywords: Digital Leadership; Madrasah Principal; Artificial Intelligence; Digital Transformation; Islamic Education.



ABSTRAK

Transformasi digital yang dipercepat oleh perkembangan Artificial Intelligence (AI) telah mengubah paradigma kepemimpinan pendidikan, termasuk di lingkungan madrasah. Kepala madrasah dituntut tidak hanya mampu mengadopsi teknologi digital, tetapi juga memimpin perubahan organisasi yang inovatif, adaptif, dan tetap berlandaskan nilai-nilai Islam. Penelitian ini bertujuan untuk menganalisis praktik kepemimpinan digital kepala madrasah pada era Artificial Intelligence serta mengembangkan model kepemimpinan digital yang relevan dengan konteks pendidikan Islam. Penelitian menggunakan pendekatan kualitatif dengan desain studi multisitus yang dilaksanakan pada empat Madrasah Aliyah Negeri di Provinsi Lampung, yaitu MAN 1 Bandar Lampung, MAN 1 Metro, MAN 1 Lampung Selatan, dan MAN 1 Pringsewu. Data dikumpulkan melalui wawancara mendalam, observasi, dan studi dokumentasi terhadap kepala madrasah, wakil kepala madrasah, guru, tenaga kependidikan, dan operator teknologi informasi. Analisis data dilakukan menggunakan model interaktif Miles, Huberman, dan Saldaña yang meliputi kondensasi data, penyajian data, serta penarikan dan verifikasi kesimpulan. Hasil penelitian menunjukkan bahwa kepemimpinan digital kepala madrasah berperan penting dalam mendorong transformasi digital melalui penyusunan visi digital, penguatan tata kelola Artificial Intelligence, pengembangan kompetensi digital guru, pengambilan keputusan berbasis data, pembentukan budaya organisasi digital yang kolaboratif, serta integrasi nilai-nilai Islam dalam implementasi teknologi. Berdasarkan temuan tersebut, penelitian ini mengembangkan Model Kepemimpinan Digital Kepala Madrasah pada Era Artificial Intelligence yang terdiri atas enam dimensi utama, yaitu visi digital, tata kelola AI, pengembangan kompetensi digital guru, pengambilan keputusan berbasis data, budaya organisasi digital yang kolaboratif, dan kepemimpinan berbasis nilai-nilai Islam. Model ini memberikan kontribusi teoretis terhadap pengembangan kajian kepemimpinan digital serta menjadi kerangka praktis bagi kepala madrasah dan pembuat kebijakan dalam mewujudkan transformasi digital yang berkelanjutan, bertanggung jawab, dan sesuai dengan nilai-nilai pendidikan Islam.

Kata Kunci: Kepemimpinan Digital; Kepala Madrasah; Artificial Intelligence; Transformasi Digital; Pendidikan Islam.

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1. INTRODUCTION

The rapid advancement of digital technology has fundamentally transformed educational governance worldwide, including in Indonesia. The emergence of big data, educational information systems, artificial intelligence (AI), and digital management platforms has encouraged educational institutions to shift from intuition-based decision-making toward data-driven decision making (DDDM). In contemporary educational management, data are no longer viewed merely as administrative records but as strategic assets that support evidence-based planning, policy formulation, resource allocation, performance evaluation, and continuous quality improvement. Consequently, the ability of educational institutions to collect, analyze, interpret, and utilize data has become an essential indicator of effective and accountable educational governance (Vasyliuk & Zakharova, 2024).

Within the context of Indonesian madrasahs, the implementation of data-driven decision making has become increasingly important in response to educational reforms and digital transformation initiatives introduced by the Ministry of Religious Affairs (Diah Khoirohnissah, 2023). The implementation of digital platforms such as the Education Management Information System

(EMIS), the National Assessment, Education Report Cards (*Rapor Pendidikan*), e-Performance systems, and internal quality assurance mechanisms has generated extensive educational data that can potentially support strategic decision-making. These data provide valuable information regarding student achievement, teacher performance, institutional quality, financial management, and stakeholder satisfaction. However, despite the increasing availability of educational data, many madrasahs continue to utilize data primarily for administrative reporting and regulatory compliance rather than as evidence for strategic planning and organizational improvement (Perdana & Ritonga, 2026). As a result, many managerial decisions remain heavily dependent on personal experience, intuition, or traditional practices rather than empirical evidence, limiting the effectiveness and responsiveness of madrasah governance.

From a theoretical perspective, Data-Driven Decision Making is closely aligned with the principles of Evidence-Based Management (EBMgt), which argues that organizational decisions should be grounded in the best available evidence rather than intuition or personal assumptions (Criado-Perez et al., 2024). Likewise, Learning Organization Theory emphasizes that organizations capable of systematically collecting, interpreting, and applying information are more adaptive, innovative, and capable of sustaining continuous improvement (Mohammad et al., 2024). Furthermore, the concept of Data-Driven Decision Making highlights that data become valuable only when transformed into actionable knowledge that guides organizational decisions and enhances institutional performance. Therefore, implementing DDDM within madrasahs involves more than adopting digital technologies; it requires developing an organizational culture in which data serve as the primary basis for strategic decision-making.

Although research on data-driven decision making has expanded considerably in educational management, several important gaps remain. Existing studies have predominantly examined the relationship between data use and student achievement, instructional improvement, school leadership, or the adoption of educational information systems (Miller & Paul, n.d.). Other studies have focused on teachers' data literacy, principals' digital leadership, or the technical implementation of educational databases. However, relatively few studies have investigated how data-driven decision making is systematically implemented as an integrated governance process within madrasahs, particularly considering their unique organizational characteristics and Islamic educational values. Moreover, previous research has generally conceptualized DDDM as a technical or technological practice, providing limited explanation of the organizational mechanisms through which data are transformed into strategic decisions that influence institutional governance, policy implementation, organizational learning, and continuous quality improvement. Consequently, there remains a significant research gap concerning the implementation process of DDDM within Islamic educational institutions.

Based on these gaps, this study aims to analyze the implementation of data-driven decision making in madrasah governance and to develop a conceptual implementation model explaining how educational data are systematically transformed into strategic decisions that improve institutional effectiveness, accountability, and educational quality. Rather than merely describing the use of educational data, this study seeks to explain the organizational process through which data support planning, policy formulation, implementation, monitoring, and evaluation within madrasahs.

The novelty of this study lies in two major contributions. First, it reconceptualizes data-driven decision making from being merely an administrative or technological tool into a strategic governance capability that enhances organizational effectiveness and sustainable educational quality. Second, this study proposes a Madrasah Data-Driven Decision Making Implementation Model, which explains the dynamic implementation process through five interconnected stages: data collection, data analysis, decision making, policy implementation, and monitoring and evaluation. Unlike previous studies that primarily emphasize the outcomes of data utilization, this model explains how educational data are systematically transformed into strategic organizational actions that support evidence-based governance, continuous organizational learning, and sustainable improvement within madrasahs. Accordingly, this research contributes to the advancement of evidence-based educational management by integrating digital governance, organizational decision-making, and Islamic educational management into a comprehensive conceptual framework.

2. RESEARCH METHODS

This study employed a qualitative research approach using a multiple-case study design to explore the implementation of Data-Driven Decision Making (DDDM) in madrasah management. A qualitative approach was selected because the study aimed to understand the processes, practices, and organizational mechanisms through which educational data are transformed into strategic decisions rather than to examine causal relationships among variables. The multiple-case study design enabled the researcher to compare implementation practices across different madrasahs and identify common patterns as well as context-specific characteristics that contribute to effective data-driven governance (Mantula et al., 2024).

This study was conducted in three public Islamic senior high schools (Madrasah Aliyah Negeri) in Lampung Province, Indonesia, namely MAN 1 Bandar Lampung, MAN 1 Metro, and MAN 1 Lampung Timur. These madrasahs were purposively selected because they have demonstrated continuous improvement in academic and institutional performance while actively implementing digital-based educational management. They have adopted various educational information systems, including the Education Management Information System (EMIS), Rapor Pendidikan, National Assessment reports, e-performance systems, and Internal Quality Assurance Systems (SPMI) to support planning, monitoring, evaluation, and institutional decision-making.

The three madrasahs represent different educational contexts within Lampung Province, allowing the study to capture variations in the implementation of Data-Driven Decision Making (DDDM) across diverse organizational environments. As leading public madrasahs, these institutions have integrated educational data into strategic planning, curriculum management, teacher performance evaluation, student achievement monitoring, and resource allocation. Such characteristics make them appropriate research sites for examining how educational data are transformed into evidence-based managerial decisions. A multiple-case study design was employed to gain an in-depth understanding of the implementation process of DDDM within madrasah management (Aprilianty et al., 2026). The research sites were selected using purposive criterion sampling based on four criteria: (1) implementation of digital-based educational management systems; (2) systematic

utilization of educational data in planning and decision-making; (3) consistent institutional achievements and quality improvement; and (4) commitment to evidence-based governance. Investigating multiple cases enabled cross-case analysis to identify common implementation patterns and contextual differences, thereby providing a comprehensive understanding of data-driven decision making in the governance of Indonesian madrasahs (Jurnal et al., 2026).

The participants in this study were selected using purposive sampling, focusing on individuals who were directly involved in planning, managing, analyzing, and utilizing educational data in madrasah governance. The participants consisted of three madrasah principals, three vice principals for curriculum, three vice principals for student affairs, three heads of administration, three quality assurance coordinators, three EMIS operators, twelve teachers, three madrasah committee representatives, and three supervisors from the Ministry of Religious Affairs, resulting in a total of 36 participants.

These participants were selected because they possessed substantial experience and responsibilities in implementing Data-Driven Decision Making (DDDM), including educational planning, policy formulation, quality assurance, academic supervision, and institutional evaluation. Their diverse roles enabled the researcher to obtain comprehensive perspectives regarding the implementation process of data-driven decision making within madrasah management. Participant recruitment continued until data saturation was achieved, indicating that no new themes or significant information emerged from additional interviews. Data were collected using three complementary techniques: semi-structured interviews, participant observation, and document analysis (Mihr, 2018). Semi-structured interviews were conducted with all participants to explore their experiences in collecting, managing, interpreting, and utilizing educational data for planning, decision-making, policy implementation, monitoring, and institutional evaluation (Mashuri et al., 2022). The interviews also investigated leadership practices, organizational collaboration, challenges encountered during DDDM implementation, and strategies adopted to improve evidence-based governance.

Participant observation was undertaken during strategic planning meetings, curriculum development discussions, quality assurance activities, academic supervision sessions, teacher coordination meetings, and other managerial activities. These observations enabled the researcher to examine directly how educational data were discussed, interpreted, and transformed into institutional decisions.

Document analysis was conducted to validate and complement the interview and observational data (Gross, 2020). The analyzed documents included the Madrasah Strategic Plan (*Rencana Strategis*), Annual Work Plan and Budget (*RKAM*), EMIS reports, *Rapor Pendidikan*, National Assessment reports, Internal Quality Assurance documents (*SPMI*), School Self-Evaluation reports (*EDM*), academic supervision reports, meeting minutes, teacher performance evaluations, student achievement reports, and other institutional documents related to educational management. The integration of interviews, observations, and document analysis enabled methodological triangulation, thereby enhancing the credibility and richness of the research findings.

The data were analyzed using the Interactive Model of Miles, Huberman, and Saldaña (2014), which consists of four iterative stages: data collection, data condensation, data display, and conclusion drawing and verification (Mizwar et al., 2026). The analysis began with organizing interview transcripts, observation field notes, and institutional documents. During the data condensation stage, the researcher employed open coding to identify concepts related to educational data utilization (Ahmad, 2025). Similar codes were subsequently grouped through axial coding into broader analytical categories, including data collection, data analysis, decision-making, policy implementation, and monitoring and evaluation (Kriukow, 2018). Finally, selective coding was performed to integrate these categories into a comprehensive explanation of the implementation process of Data-Driven Decision Making in madrasah management. As this research employed a multiple-case study design, cross-case analysis was conducted to compare findings across MAN 1 Bandar Lampung, MAN 1 Metro, and MAN 1 Lampung Timur.

This analytical process enabled the identification of recurring implementation patterns, contextual differences, enabling factors, and implementation challenges across the three research sites (Kim et al., 2020). The synthesis of these findings led to the development of the Madrasah Data-Driven Decision Making Implementation Model, which explains how educational data are systematically transformed into strategic decisions that improve governance effectiveness, accountability, and educational quality. To ensure the trustworthiness of the findings, the study employed source triangulation, methodological triangulation, member checking, peer debriefing, and an audit trail. These procedures strengthened the credibility, dependability, confirmability, and transferability of the research, ensuring that the findings accurately represented the implementation of data-driven decision making within the participating madrasahs.

3. RESULTS AND DISCUSSION

The findings indicate that the implementation of Data-Driven Decision Making (DDDM) in madrasah management has shifted the decision-making paradigm from experience-based and intuition-driven practices toward evidence-based management. Across the three participating madrasahs, educational data are no longer treated solely as administrative reports submitted to the Ministry of Religious Affairs but have become strategic resources that support planning, policy formulation, implementation, monitoring, and evaluation. The study found that DDDM is implemented through five interconnected stages: data collection, data analysis, decision making, policy implementation, and monitoring and evaluation. These stages constitute a continuous management cycle that enables madrasahs to improve institutional effectiveness, accountability, and educational quality.

Implementation of Data-Driven Decision Making in Madrasah Management

Using data systematically to improve the quality of madrasah governance and education

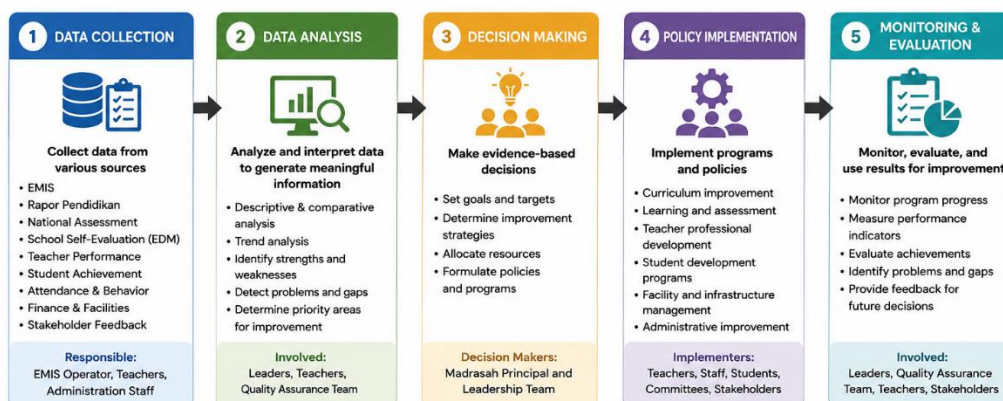


Figure 1: Implementation of Data-Driven Decision Making in Madrasah Management

Data Collection: Establishing Reliable Educational Information

The first stage of Data-Driven Decision Making is the systematic collection of educational data from multiple internal and external sources. The findings show that the participating madrasahs utilize various digital information systems, including the Education Management Information System (EMIS), Rapor Pendidikan, National Assessment reports, School Self-Evaluation (EDM), Internal Quality Assurance System (SPMI), teacher performance assessments, student achievement reports, attendance records, financial reports, and stakeholder satisfaction surveys.

Data collection is coordinated by the principal through collaboration among vice principals, EMIS operators, quality assurance teams, teachers, and administrative staff. Each unit is responsible for collecting data related to its respective functions, ensuring that institutional information is comprehensive, accurate, and regularly updated. This integrated approach allows the madrasahs to establish a reliable educational database that reflects institutional performance across academic, managerial, financial, and student development dimensions. The findings also reveal that digital technology has significantly improved data accessibility and reduced duplication in reporting. Consequently, educational data become more readily available for managerial analysis and strategic planning.

Following data collection, the second stage involves systematic analysis of educational information. Rather than relying solely on descriptive statistics, the madrasahs compare data across semesters, identify performance trends, examine achievement gaps, and determine priority areas for improvement. For example, National Assessment results and Rapor Pendidikan indicators are analyzed together with classroom assessment data to identify weaknesses in literacy, numeracy, and learning quality. Teacher performance data are integrated with academic supervision reports to determine professional development needs, while attendance records and disciplinary reports are analyzed to identify patterns affecting student engagement.

The findings indicate that collaborative data analysis meetings involving school leaders, teachers, and quality assurance teams enable the interpretation of educational data from multiple perspectives. As a result, raw data are transformed into organizational knowledge that supports strategic decision-making rather than remaining administrative information.

The third stage demonstrates how analyzed data are translated into organizational decisions. The findings show that annual work plans, school development programs, curriculum improvement initiatives, teacher training priorities, budgeting decisions, and student development programs are formulated based on empirical evidence generated during the data analysis process. For instance, when learning outcome data indicate weaknesses in science achievement, the madrasah allocates additional instructional support, teacher training, laboratory development, and learning resources. Similarly, low stakeholder satisfaction data encourage leadership to improve communication systems and administrative services.

The findings further indicate that evidence-based decision-making enhances transparency and accountability because policy priorities are justified through measurable institutional evidence rather than personal assumptions. Teachers and staff also demonstrate greater commitment to policy implementation because they understand the empirical rationale behind organizational decisions.

The findings reveal that strategic decisions are systematically translated into organizational programs through coordinated implementation involving all institutional stakeholders. Each policy is accompanied by implementation plans, performance indicators, responsible personnel, timelines, and monitoring mechanisms. Academic improvement programs include curriculum refinement, differentiated instruction, teacher professional development, academic supervision, and digital learning innovation. Student development initiatives include character education, extracurricular activities, counseling services, literacy programs, and religious enrichment activities. Administrative improvements involve digitalization of services, financial transparency, and strengthening internal quality assurance procedures. The implementation process is characterized by collaborative leadership, where principals delegate responsibilities to vice principals, department heads, and teachers while maintaining regular coordination meetings to ensure program consistency. This collaborative implementation strengthens organizational commitment and facilitates effective execution of institutional policies.

The final stage of DDDM focuses on monitoring and evaluation. The findings indicate that program implementation is continuously monitored using predefined performance indicators derived from institutional planning documents. Monitoring activities include academic supervision, classroom observations, quality assurance reviews, budget realization analysis, teacher performance evaluations, and periodic progress reports. Evaluation results are discussed during leadership meetings and quality assurance forums to determine whether institutional targets have been achieved. When performance indicators are not met, corrective actions are immediately formulated based on updated educational data. Consequently, evaluation functions not merely as an accountability mechanism but also as a process of organizational learning that continuously improves institutional performance. The findings further reveal that the monitoring and evaluation process generates new institutional data, which subsequently become the starting point for the next

planning cycle. This demonstrates that Data-Driven Decision Making operates as a continuous improvement system rather than a linear administrative procedure.

Discussion

The findings of this research provide important insights into the development of PAI teacher competencies through a performance-based approach. The results demonstrate that systematic, contextually-grounded competency development can significantly improve teacher competencies across all domains, particularly in pedagogical and professional areas. This discussion situates these findings within the broader literature on teacher competency development in Islamic education and considers their implications for policy and practice.

The findings of this study indicate that the digital leadership of madrasah principals in the era of Artificial Intelligence (AI) extends beyond the adoption of digital technologies. Instead, it represents a comprehensive leadership model that integrates digital vision, AI governance, teachers' digital capacity development, data-driven decision-making, collaborative digital organizational culture, and Islamic ethical leadership. This finding suggests that digital transformation in Islamic educational institutions is a multidimensional process requiring leaders who are capable of managing technological innovation, organizational change, and ethical responsibility simultaneously.

The proposed model confirms the Digital Leadership Theory introduced by Sheninger (2019), which emphasizes that effective educational leaders should establish a clear digital vision, foster innovation, empower stakeholders, and utilize technology to improve educational quality (Hamzah et al., 2025). Similar to Sheninger's framework, the madrasah principals in this study demonstrated their ability to formulate strategic digital policies, strengthen technological infrastructure, and promote innovation within their institutions. However, this study extends Sheninger's theory by demonstrating that digital leadership in the AI era requires not only technology integration but also systematic AI governance and ethical leadership. Therefore, digital leadership should be viewed as a strategic capability that combines technological innovation with responsible institutional management.

The findings also support the Transformational Leadership Theory proposed by Bass and Avolio (1994). According to this theory, transformational leaders inspire organizational members through a shared vision, intellectual stimulation, individualized consideration, and continuous motivation. The principals participating in this study exhibited these characteristics by encouraging teachers to adopt digital innovation, providing professional development opportunities, facilitating mentoring programs, and creating collaborative learning environments. These leadership practices enabled teachers and staff to adapt to technological changes while maintaining organizational commitment. Consequently, digital leadership in the era of Artificial Intelligence can be interpreted as a contemporary form of transformational leadership that emphasizes digital innovation and organizational adaptability.

The dimension of teachers' digital capacity development further reinforces the ISTE Standards for Education Leaders (2018), which highlight the responsibility of school leaders to empower educators through continuous professional learning and digital competency development (Mushadi

et al., 2025). The present findings are also consistent with Dexter, who argued that technology integration is largely determined by leadership practices that support teachers' professional growth rather than by technological infrastructure alone (AlDhaheri et al., 2026). Nevertheless, this study provides a broader perspective by demonstrating that teachers' competencies in the AI era should include not only digital literacy but also AI literacy, critical evaluation of AI-generated content, ethical awareness, and responsible technology utilization. This finding reflects the evolving nature of teachers' professional competencies in response to emerging Artificial Intelligence technologies.

The findings concerning Data-Driven Decision Making are consistent with recent studies emphasizing the strategic value of educational data in school leadership. According to OECD (2024), the integration of educational data analytics and Artificial Intelligence enables school leaders to improve organizational effectiveness, strategic planning, and institutional performance through evidence-based decision-making (Chigbu & Makapela, 2025). Similarly, the principals in this study increasingly utilized student achievement data, teacher performance indicators, institutional evaluations, and AI-assisted analytics to formulate school policies and improvement strategies. These findings demonstrate that AI has evolved beyond instructional support and has become an essential component of strategic educational leadership.

Another important finding concerns the emergence of AI Governance as a central dimension of digital leadership. Existing Digital Leadership frameworks generally emphasize technology integration and innovation but pay relatively limited attention to governance mechanisms for Artificial Intelligence. The present findings support UNESCO's Guidance for Generative AI in Education and Research, which recommends that AI implementation should be governed by principles of transparency, accountability, privacy protection, fairness, and responsible use ("Guid. Gener. AI Educ. Res.," 2023). The participating madrasah principals developed institutional policies regulating AI utilization, academic integrity, data security, and ethical technology practices. Therefore, this study extends previous Digital Leadership models by positioning AI Governance as a core leadership competency rather than merely a technological management issue.

The findings also demonstrate the importance of developing a collaborative digital organizational culture. Madrasah principals encouraged teamwork, knowledge sharing, digital communication, and collaborative professional learning through various digital platforms. These findings are consistent with the Professional Learning Community (PLC) Theory proposed by DuFour and Eaker (1998), which emphasizes that sustainable school improvement depends on collaboration, collective learning, and shared responsibility (Jones et al., 2013). Likewise, Antonopoulou et al. (2021) found that collaborative organizational culture significantly influences the success of digital transformation in educational institutions. The present study confirms these findings within the context of Islamic schools, where collaboration is strengthened not only through digital technologies but also through collective responsibility and shared educational values.

The most significant contribution of this study lies in identifying Islamic Ethical Leadership as a distinctive dimension of digital leadership. Existing Digital Leadership models proposed by Sheninger (2019), Dexter (2018), and the ISTE Standards (2018) primarily focus on technological innovation, organizational improvement, and digital competence. In contrast, this study

demonstrates that digital leadership in madrasahs is inseparable from Islamic ethical principles. Artificial Intelligence is regarded as a supporting instrument rather than a replacement for teachers' professional judgment. Consequently, AI implementation is guided by the principles of amanah (trustworthiness), mas'uliyah (responsibility), 'adl (justice), academic integrity, and maslahah (public benefit). These findings suggest that technological innovation should always be accompanied by ethical responsibility and moral education. Therefore, the integration of Islamic values represents an important extension of Digital Leadership Theory within the context of Islamic educational institutions.

Overall, this study confirms the fundamental assumptions of Digital Leadership Theory, Transformational Leadership Theory, and the ISTE Standards, while simultaneously extending these frameworks through the incorporation of AI Governance and Islamic Ethical Leadership. Previous studies have primarily emphasized digital vision, innovation, technology integration, and professional development as the main components of digital leadership. However, the findings of this study demonstrate that leadership in the era of Artificial Intelligence requires additional competencies related to responsible AI governance, ethical decision-making, and the integration of religious values into digital transformation. Consequently, the proposed Digital Leadership Model for Madrasah Principals in the Era of Artificial Intelligence contributes to the advancement of educational leadership theory by providing a contextual framework specifically designed for Islamic educational institutions. The model also offers practical implications for policymakers, educational leaders, and the Ministry of Religious Affairs in designing sustainable, ethical, and value-based digital transformation strategies for madrasahs

4. CONCLUSION

leadership of madrasah principals plays a crucial role in facilitating educational transformation in the era of Artificial Intelligence (AI). The findings demonstrate that effective digital leadership extends beyond technology adoption and encompasses strategic, organizational, and ethical dimensions that support sustainable digital transformation in Islamic educational institutions.

The study proposes a Digital Leadership Model for Madrasah Principals in the Era of Artificial Intelligence, consisting of six interconnected dimensions: Digital Vision, AI Governance, Teachers' Digital Capacity Development, Data-Driven Decision-Making, Collaborative Digital Organizational Culture, and Islamic Ethical Leadership. These dimensions collectively provide a comprehensive leadership framework that enables madrasah principals to respond effectively to rapid technological changes while maintaining the core values of Islamic education.

Theoretically, this study contributes to the development of Digital Leadership Theory by extending existing frameworks proposed by Sheninger (2019), Dexter (2018), and the ISTE Standards (2018). While previous models primarily emphasize digital vision, technology integration, innovation, and professional development, the proposed model introduces two additional dimensions—AI Governance and Islamic Ethical Leadership—which address the emerging challenges of Artificial Intelligence and the unique characteristics of Islamic educational

institutions. Consequently, the model offers a contextual framework that integrates technological innovation, organizational transformation, ethical AI governance, and Islamic educational values.

Practically, the findings provide strategic guidance for madrasah principals, educational policymakers, and the Ministry of Religious Affairs in designing policies and programs that strengthen digital transformation. Priority should be given to developing digital leadership competencies, improving teachers' AI literacy, establishing institutional AI governance policies, promoting evidence-based decision-making, fostering collaborative digital cultures, and ensuring that AI implementation remains aligned with Islamic ethical principles.

Despite these contributions, this study has several limitations. The research was conducted in selected state madrasahs in Lampung Province using a qualitative approach, limiting the generalizability of the findings to other educational contexts. Future research is recommended to validate the proposed model using quantitative or mixed-method approaches involving a larger number of madrasahs across different regions of Indonesia. In addition, future studies may examine the relationships among the six dimensions and their influence on educational quality, organizational performance, teachers' innovation, and students' learning outcomes in the era of Artificial Intelligence. Overall, the proposed model provides a new perspective on digital leadership by integrating Artificial Intelligence governance with Islamic ethical leadership. It offers both a theoretical contribution to educational leadership literature and a practical framework for achieving sustainable, responsible, and value-based digital transformation in madrasahs.

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