

Systematic Literature Review: Information Technology Transformation within the Muhammadiyah Organization

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ABSTRACT

The development of Information Technology (IT) has brought significant impacts on *da'wah* patterns, organizational governance, and the management of Muhammadiyah's charitable enterprises (*amal usaha*). This study aims to conduct a Systematic Literature Review (SLR) of scientific publications on the use of technology within the context of the Muhammadiyah organization, specifically in e-learning, management information systems, digital *da'wah*, and information governance. The article search was conducted via Google Scholar, Garuda, the Muhammadiyah Aisyiyah Higher Education (PTMA) journal portal, and SINTA-indexed journal databases using the keywords: Muhammadiyah, information technology, e-learning, information systems, and digital *da'wah*. The inclusion criteria were: (1) scientific journal articles, and (2) a focus on the use of technology within Muhammadiyah's charitable enterprises or organizational structure. From the screening process meeting these criteria, the review results indicate four main themes: (1) the utilization of e-learning in Muhammadiyah schools and higher education institutions, (2) the development of academic and management information systems, (3) the transformation of Muhammadiyah's digital *da'wah* and communication, and (4) challenges regarding information governance and security. Overall, technology adoption has enhanced the effectiveness of education and *da'wah* services; however, key weaknesses remain in system integration, data security policies, and IT human resource capacity. Further research is vital regarding data security, centralized information governance, and measuring the impact of digitalization on the development of the Muhammadiyah organization.

INTRODUCTION

Muhammadiyah is known as a modernist Islamic movement with the slogan "Progressive Islam" (Islam Berkemajuan), which encourages the utilization of science and technology for the benefit of the ummah. In the era of digital disruption, information technology has become a key factor in strengthening *da'wah*, education, and the governance of charitable enterprises (*amal usaha*). Several studies indicate that Muhammadiyah is actively adopting digital media in *da'wah* and organizational communication, and is developing academic information systems and e-learning across various educational charitable enterprises (Rendi Marta Agung et al., 2025a).

However, these technological developments also bring new challenges, including infrastructure readiness, human resource (HR) competence, data governance, and information security issues. On the other hand, studies that systematically map how technology is adopted within the Muhammadiyah organization, particularly from the perspectives of information systems, data management, and security, remain limited.

Therefore, this study conducts a Systematic Literature Review (SLR) to:

1. Identify research trends in information technology within the Muhammadiyah organization and its charitable enterprises, as reported in published journals.
2. Categorize major themes of technology utilization: e-learning, academic management information systems, digital *da'wah*, and information governance.
3. Identify research gaps, particularly regarding data security and IT governance within Muhammadiyah.

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METHODS

This article employs a Systematic Literature Review (SLR) approach. The methodology follows a series of general steps comprising Identification, selection, and inclusion, as detailed below:

Identification

The initial article search was carried out using a structured set of keyword combinations in both Indonesian and English to capture a comprehensive range of relevant publications. These keywords were designed to specifically reflect the intersection between Muhammadiyah and technological development, and included terms such as “Muhammadiyah” AND “e-learning”, “Muhammadiyah” AND “sistem informasi” (information systems), “Muhammadiyah” AND “teknologi informasi” (information technology), “Muhammadiyah” AND “dakwah digital / digital da’wah”, and “Muhammadiyah” AND “management information system / MIS”. By employing these targeted search phrases, the review aimed to collect studies that directly address the role of technology in Muhammadiyah’s educational, managerial, and da’wah activities, ensuring that the final dataset accurately represents current scholarly discourse in this domain.

Databases

The initial search process was conducted through widely recognized indexing services such as Google Scholar, Garuda, and SINTA, which provide access to peer-reviewed national and international publications. Furthermore, the search was extended to journal portals of Muhammadiyah’s Aisyiyah Higher Education Institutions (PTMA) including universities such as Universitas Muhammadiyah Yogyakarta (UMY), Universitas Muhammadiyah Surakarta (UMS), Universitas Muhammadiyah Malang (UMM), and Universitas Muhammadiyah Surabaya which serve as primary sources for scholarly works specifically focusing on technological development within Muhammadiyah’s organizational context. In addition, relevant publications were also retrieved from journal portals of State Islamic Universities (UIN) and other Islamic higher education institutions that conduct studies related to Muhammadiyah, ensuring that the collected literature reflects diverse perspectives and provides a comprehensive foundation for analysis.

Inclusion Criteria

The inclusion criteria for this review were determined to ensure that the selected studies were both relevant and academically reliable. Only scientific journal articles were considered, excluding books, theses, and non-peer-reviewed reports to maintain the scholarly integrity of the dataset. The publications were required to be issued between 2020 and 2025, reflecting the most recent developments in digital transformation within the Muhammadiyah context. Moreover, the studies had to focus explicitly on the utilization or analysis of technology either within Muhammadiyah’s charitable enterprises including schools, universities, hospitals, and other organizational service units or within its organizational structures and activities, such as leadership levels, autonomous bodies (ortom), and da’wah practices. Finally, to facilitate verification and deeper examination, only articles with full-text accessibility in PDF or HTML format were included in the review.

Exclusion Criteria

The exclusion criteria were established to avoid the inclusion of studies that did not align with the scope and objectives of this review. Articles that discussed Muhammadiyah only in a general sense without any connection to technology were excluded, as they did not contribute to the examination of digital transformation within the organization. Likewise, publications focusing on technological topics unrelated to Muhammadiyah were omitted to ensure that all selected studies directly addressed the intersection between technology and Muhammadiyah’s organizational or institutional contexts. In addition, duplicate entries identified across different databases or journal portals were removed in order to maintain the uniqueness and accuracy of the final dataset.

Selection and Synthesis

The selection and synthesis process followed a structured approach to ensure the relevance and rigor of the reviewed studies. Initially, a screening procedure was conducted by examining the titles and abstracts of all retrieved publications, which was then followed by a thorough full-text assessment to confirm their eligibility. After the qualified studies were identified, the findings were systematically analyzed using a thematic analysis approach. This method allowed the literature to be categorized into four core thematic areas: Theme A, focusing on e-learning and digital learning practices; Theme B, highlighting academic and management information systems implemented within Muhammadiyah institutions; Theme C, addressing the development of digital da’wah and communication strategies; and Theme D, examining issues related to information governance and digital security. This thematic classification enabled a clearer understanding of technological trends and challenges within Muhammadiyah’s organizational context.

From approximately 80 initial findings, after eliminating duplicates and irrelevant articles, 35 articles were selected for analysis in this SLR.

RESULTS AND DISCUSSION

The results of the review for each theme are as follows:

Theme A – E-learning and Digital Learning in Muhammadiyah Charitable Enterprises (Amal Usaha)

Many studies focus on the implementation of e-learning in Muhammadiyah higher education institutions and schools:

1. An evaluation of e-learning at UMY (Arabic Language Education Study Program) using the CIPP model indicates that e-learning implementation is rated good across the context, input, process, and output aspects (Fitriani, 2021).
2. Universitas Muhammadiyah Sumatera Utara (UMSU) examined the impact of e-learning on student learning outcomes during the COVID-19 pandemic and found a positive effect on learning independence and academic achievement (Husna, 2022).
3. (Sutama & Fajriani, 2022) developed web-based e-learning media for the vocational high school (SMK) level affiliated with UMS; Moodle-based e-learning was found to increase student participation and learning independence.
4. Research at Universitas Muhammadiyah Purwokerto analyzed the success of an e-learning website using the DeLone & McLean model, finding that system and information quality significantly influence user satisfaction and intention to use (Pambudi et al., 2024).
5. A study at Universitas Muhammadiyah Kupang examined students' mathematics anxiety in the context of statistics e-learning, finding that e-learning utilization affects anxiety levels and student learning strategies (Listyotami & Wahyuningsih, 2025).

Overall findings under Theme A indicate that the adoption of e-learning has increasingly become a standard instructional practice across various Muhammadiyah Higher Education Institutions (PTMA), particularly since the acceleration of digital learning during and after the COVID-19 pandemic period. This shift demonstrates a strong institutional commitment to utilizing technology to enhance teaching and learning processes. However, several key challenges persist, including disparities in infrastructure readiness, limitations in instructional design, and varying levels of digital literacy among both lecturers and students. Additionally, the functionality and interactivity provided by existing e-learning platforms still require improvement to fully support meaningful learning engagement. Despite these progressive developments, research addressing data security and privacy issues within Muhammadiyah's e-learning systems remains scarce. Discussions related to cybersecurity, protection of personal information, and digital ethics tend to appear only as minor observations rather than a central focus, highlighting an important gap for future scholarly inquiry.

Theme B – Academic and Management Information Systems

The second group highlights the development of Management Information Systems (MIS) and Academic Information Systems (AIS):

1. (Wahyu Triono et al., 2023) studied the optimization and challenges of implementing Academic Service Management Information Systems in several Muhammadiyah Universities. The results show that systems have aided service efficiency but remain weak in planning, data integration, and information distribution.
2. (Tarmidzi & Hidayati, 2023) examined the role of management information systems at SMP Muhammadiyah Bandung and concluded that school MIS supports planning, organizing, and monitoring processes but requires improvements in operator competence and network infrastructure.
3. (Patappari et al., 2025) designed a web-based Academic Information System for SMP Muhammadiyah Leworeng using prototype methods and web framework technology (CodeIgniter and MySQL). This system replaces the manual processing of teacher, student, subject, and grade data.
4. In other Muhammadiyah vocational schools, systems have been developed for computer laboratory inventory, measuring student satisfaction with campus services at Muhammadiyah Jambi, and other internal academic systems (Nugraha et al., 2022).

The review also reveals several notable patterns concerning the development of information systems within Muhammadiyah institutions. First, many Muhammadiyah organizations, including schools and campuses, have increasingly adopted locally developed information systems, designed and implemented at the institutional level to support administrative and academic processes. While this represents meaningful progress toward digital transformation, integration between branches and regional levels of the organization remains largely unexplored, resulting in fragmented data management and limited interoperability across the broader Muhammadiyah network. Furthermore, existing studies demonstrate a predominant emphasis on functional aspects of system development, such as usability and operational effectiveness, whereas crucial components of information security including encryption mechanisms, access control policies, data backup procedures, and audit logging are rarely addressed in depth. This imbalance highlights a pressing need for research that not only advances system functionality but also prioritizes secure and standardized data governance within Muhammadiyah's digital ecosystem.

Theme C – Muhammadiyah Digital Da'wah and Communication

Another strong theme is the transformation of Muhammadiyah's *da'wah* in the digital realm:

1. (Rendi Marta Agung et al., 2025) examined the *Transformation of Muhammadiyah's Da'wah in the Digital Era*, introducing the "Progressive-Digital Da'wah" model, in which digitalization is not merely a change in media but part of Muhammadiyah's ideological strategy for responding to global dynamics.

2. (Riyan Muhammad & Milana Abdillah Subarkah, 2024) discussed Muhammadiyah's *da'wah* strategy in the digital era, highlighting content innovation, social media use, and challenges posed by hoaxes and polarization in the digital space.
3. (Agustyawati, 2022) outlined Muhammadiyah's cultural *da'wah* strategy in the digital era, combining local cultural approaches with digital media to reach diverse communities.
4. (Rajuddin, 2022) conducted a study of the Muhammadiyah Digital *Da'wah* Communication Movement among millennial youth, showing how the younger generation uses social media to create more communicative and interactive *da'wah* content.
5. (Jamil et al., 2025) in "From Mosque to Media," described the digital *da'wah* strategy of East Java Muhammadiyah Youth (Pemuda Muhammadiyah), based on data and creative content to reach a broad audience.

The synthesis of studies under Theme C demonstrates a significant shift in Muhammadiyah's *da'wah* practices toward the utilization of contemporary digital platforms. Social media channels, institutional websites, YouTube, and various online media have emerged as primary instruments of *da'wah*, particularly among the younger generation of Muhammadiyah activists who actively engage with digital audiences. In response to this transformation, several organizational structures at different levels such as PWM, PDM, and autonomous bodies (*ortom*) have begun to establish dedicated media or digital units to support communication and content dissemination, although these units are not always formally institutionalized as information technology councils. Alongside this progress, scholarly discussions have increasingly emphasized the importance of digital literacy, ethical conduct in online environments, and strategic organizational branding to strengthen Muhammadiyah's presence in the digital public sphere. Nevertheless, critical aspects of digital safety, including the security of official accounts, protection of follower data, and systematic cyber risk management, remain largely underexplored within the existing literature. This indicates a need for more focused research addressing cybersecurity issues in order to safeguard Muhammadiyah's digital *da'wah* infrastructure and maintain public trust in its online identity.

Theme D – Governance, Challenges, and Information Security

A number of studies also explore more conceptual dimensions of Muhammadiyah's digital transformation. These include discussions on the challenges faced by Muhammadiyah in innovating Islamic education in the digital era, particularly emphasizing the necessity of utilizing technology and social media to ensure that *da'wah* activities remain responsive to rapidly evolving societal dynamics (Tiana Dwi Marisa et al., 2024). In addition, the revitalization of Al-Islam and Kemuhammadiyah (AIK) learning policies through blended or fully digital approaches in Muhammadiyah universities is highlighted as an effort to better align instructional practices with the learning characteristics and technological orientation of Generation Z students. Furthermore, analyses of organizational readiness for information system adoption within Muhammadiyah's charitable enterprises reveal a persistent gap between institutional digitalization policies and the actual capabilities of human resources, as well as infrastructure preparedness (Aditianto et al., 2024). Collectively, these conceptual studies underscore the importance of coherent digital strategies that integrate technological advancement, pedagogical reform, and organizational capacity building across Muhammadiyah institutions. Key Findings from this SLR:

1. Absence of Security Focus: Almost no articles explicitly make data security or cybersecurity within the Muhammadiyah environment the primary focus of research (e.g., AIS security audits, member data leakage risk analysis, online *da'wah* system security, etc.).
2. Superficial Security Mention: Security usually appears only briefly, for example, mention of login use, admin access rights, or general mentions of "data security" without clear models or measurements.

This indicates a significant research gap for future studies in the field of information data security and the development of the Muhammadiyah organization.

Muhammadiyah's Position in Digital Transformation

This SLR demonstrates that Muhammadiyah is not merely a passive adopter of technology, but rather an active agent of digital transformation within Islamic civil society. The organization has undertaken various strategic initiatives, such as developing e-learning platforms and internal information systems to support administrative and academic processes in schools and universities. Additionally, Muhammadiyah has increasingly optimized social media and other digital communication channels as instruments of *da'wah*, enabling broader outreach and more dynamic interaction with diverse audiences. These efforts are complemented by emerging institutional discussions on information governance and educational innovation, reflecting a growing awareness of the organizational shifts required in the digital era. Collectively, these developments align closely with the vision of Islam Berkemajuan (Progressive Islam), which emphasizes the integration of science, technology, and modern knowledge systems into religious propagation and charitable services as a means to advance societal well-being.

Dominance of Pedagogical & Functional Issues vs. Lack of IT Governance Studies

Despite these advancements, the dominant focus of national journal publications between 2020 and 2025 remains largely centered on practical and pedagogical aspects of digital implementation. Most studies examine the impact of e-learning on learning outcomes, student motivation, and learning anxiety, particularly in the context of pandemic-driven shifts toward online education. Others primarily evaluate the effectiveness of information systems in improving academic and administrative services, highlighting gains in efficiency and accessibility rather than system-wide integration or governance. Moreover, a significant portion of the literature explores strategies and communication patterns of digital *da'wah* aimed at effectively engaging Millennial and Generation Z audiences. While these research directions contribute

valuable insights into the immediate benefits of technology adoption, they also indicate that deeper structural issues related to digital governance and security have not yet been given sufficient scholarly attention.

Meanwhile, aspects of information security such as the protection of student/patient/congregant data, the security of official Muhammadiyah social media accounts, the safety of IT infrastructure in charitable enterprises, and compliance with data protection regulations are rarely addressed in depth. This opens a vast space for new research.

Implications for Research on Data Security and Muhammadiyah Organizational Development

Based on this literature map, several strong research entry points include:

1. Security Audit of Muhammadiyah Academic/Membership Information Systems
 - a. Using ISO/IEC 27001 standards or the NIST framework.
 - b. Case studies: PTMA, SMP/SMK Muhammadiyah, or LAZIS/Muhammadiyah Hospitals.
2. Cyber Risk Analysis on Muhammadiyah Digital *Da'wah* Channels
 - a. Threats: Phishing, social media account hacking, logo/brand misuse, and the spread of hoaxes in the name of Muhammadiyah.
 - b. Focus on protection mechanisms and administrator education.
3. Centralized Data Governance Model for the Muhammadiyah Organization
 - a. Integration of member data at various levels (PR, PCM, PDM, PWM, PP).
 - b. Data governance issues: Data quality, access rights, backup, and disaster recovery.
4. Security Awareness and Information Security Literacy of Muhammadiyah Cadres/HR
 - a. Surveys on knowledge and attitudes toward password security, phishing, and privacy.
 - b. E-learning-based training interventions, measured pre- and post.

All these topics relate to the digitalization trends observed in the SLR for Muhammadiyah but remain largely untouched in the literature.

CONCLUSION

Based on the results of the Systematic Literature Review (SLR) conducted on 35 journal articles, it can be concluded that the utilization of information technology within the Muhammadiyah organization and its charitable enterprises (*amal usaha*) has evolved significantly, encompassing at least four main areas: (1) e-learning and digital learning, (2) academic and management information systems, (3) digital *da'wah* and communication, and (4) governance along with the accompanying digital challenges. These four themes demonstrate that information technology is no longer merely a supplementary tool but has become a crucial pillar in strengthening educational services, enhancing the quality of *da'wah*, and improving the effectiveness of management in Muhammadiyah's charitable enterprises.

However, amidst these advancements, studies specifically highlighting aspects of data security and information governance within the Muhammadiyah context remain very limited and tend to appear only implicitly across various research. This condition implies a vast scope for future research, particularly studies that prioritize information security and correlate it with organizational development, governance quality, and public trust in Muhammadiyah.

This study itself has several limitations: it relied solely on open-access sources and publicly accessible portals, potentially excluding subscription-based articles or internal repositories; not all 35 articles could be reviewed individually due to space constraints; and the analysis was qualitative, without a quantitative meta-analysis. Nevertheless, the findings of this SLR are expected to serve as a solid foundation for future researchers to develop more in-depth studies, particularly in the fields of data security and information technology governance within the Muhammadiyah organization.

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