

Digital Transformation Of Islamic Education In Pondok Pesantren Darunnajah: Integration Of Islamic Values And Technology Literacy In Facing The Society 5.0 Era

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Article Info	Abstract
<p>Article history: Received: Feb 16, 2026 Revised: May 05, 2026 Accepted: May 23, 2025</p> <hr/> <p>Keywords: Digital transformation Islamic education Pesantren Society 5.0 Technology literacy</p>	<p>The digital transformation of education has become an imperative in the Society 5.0 era. Yet, Islamic boarding schools (pesantren) face unique challenges in integrating modern technology while preserving their foundational Islamic values. This study investigates the digital transformation of Islamic education within pesantren, focusing on the integration of Islamic values and technology literacy as a strategic response to Society 5.0. Employing an integrative literature review methodology, this research synthesizes findings from 35 peer-reviewed articles published between 2020 and 2025, sourced from reputable databases including Scopus, Web of Science, and SINTA-accredited journals. The analysis reveals three principal findings: first, pesantren leaders (kiai) increasingly demonstrate receptive attitudes toward digital adoption while maintaining Islamic epistemological frameworks; second, the integration of technology literacy within pesantren curricula produces synergistic outcomes when anchored in Islamic ethical principles such as amanah (trustworthiness), maslahat (common good), and tawazun (balance); and third, persistent challenges including infrastructural limitations, digital literacy disparities among educators, and cultural resistance necessitate a phased, values-driven transformation model. This study proposes the Pesantren Digital Integration Framework (PDIF), a conceptual model that harmonizes technological modernization with the preservation of pesantren identity and Islamic pedagogical traditions.</p>

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A. Introduction

The advent of Society 5.0, a human-centered paradigm initially conceptualized by the Japanese government in 2016, represents a fundamental shift in the relationship between technology and human civilization. Unlike Industry 4.0, which primarily emphasized technological advancement and automation, Society 5.0 envisions a super-smart society in which cyberspace and physical space are deeply integrated to address social challenges while maintaining human dignity and welfare (Fukuyama, 2018). Within this transformative landscape, educational institutions worldwide face the imperative to reconfigure their pedagogical approaches, curricular frameworks, and institutional governance structures to prepare learners for an era defined by artificial intelligence, big data analytics, the Internet of Things, and ubiquitous digital connectivity.

In Indonesia, the discourse on educational transformation in the Society 5.0 era acquires particular complexity when examined through the lens of Islamic education, specifically within the institutional context of pondok pesantren. As the oldest and most enduring form of indigenous

Islamic educational institution in Indonesia, pesantren occupies a distinctive position in the national educational landscape. The Ministry of Religious Affairs recorded approximately 36,000 pesantren operating across the Indonesian archipelago, serving more than four million students, or santri (Kementerian Agama RI, 2023). These institutions have historically functioned as centers for the transmission of Islamic knowledge, character formation (*tarbiyah*), and community development, employing traditional pedagogical methods such as *sorogan* (individual recitation), *bandongan* (collective learning), and the systematic study of classical Islamic texts known as *kitab kuning* (Dhofier, 2011).

However, the rapid acceleration of digital transformation has created significant tension between preserving pesantren's traditional educational identity and the need to equip santri with 21st-century competencies, including digital literacy, critical thinking, and technological proficiency. Several scholars have identified this tension as one of the most pressing challenges facing Islamic education in the contemporary era (Hasan, Taufiq, & Elmhemit, 2023; Anwar et al., 2025). The challenge is further compounded by the fact that many pesantren, particularly those located in rural and semi-urban areas, continue to experience infrastructural deficits, limited access to technological resources, and insufficient digital competence among their teaching staff (Akhmad, 2024).

Despite these challenges, emerging evidence suggests that a growing number of pesantren are actively engaging with digital transformation processes. Contemporary research has documented instances of pesantren implementing e-learning platforms, digitizing classical Islamic texts, establishing information technology laboratories, and incorporating digital media production into their educational programs (Bahri et al., 2024; Calista, 2025). Nevertheless, a critical gap persists in the literature regarding the systematic integration of Islamic values and technology literacy within the pesantren context, particularly in relation to the demands of Society 5.0. Existing studies have predominantly focused on either the technological aspects of digital transformation or the preservation of Islamic educational traditions, rarely examining their synergistic intersection (Zainuddin, 2025).

This study addresses this scholarly lacuna by conducting an integrative literature review examining the digital transformation of Islamic education in pesantren, with specific attention to the integration of Islamic values and technology literacy in the Society 5.0 era. The research is guided by three interrelated objectives: first, to analyze the current state of digital transformation in pesantren and the attitudes of stakeholders toward technological adoption; second, to identify the mechanisms through which Islamic values can be integrated with technology literacy to create a harmonious educational model; and third, to propose a conceptual framework that provides strategic direction for pesantren in navigating the complexities of Society 5.0. The significance of this study lies in its contribution to the growing body of scholarship on Islamic educational modernization and in its practical implications for policymakers, pesantren administrators, and educators seeking to balance tradition and innovation.

B. Methods

This study employs an integrative literature review methodology, which is particularly well-suited to synthesizing diverse research findings to generate new theoretical frameworks and a comprehensive understanding of complex phenomena (Whittemore & Knafl, 2005). The integrative review approach was selected over systematic review or meta-analysis because the research topic

encompasses both empirical and conceptual studies from multiple disciplinary perspectives, including Islamic education, educational technology, digital literacy, and cultural studies.

The literature search was conducted across multiple academic databases, including Scopus, Web of Science, Google Scholar, and the Indonesian SINTA (Science and Technology Index) repository. The search strategy employed a combination of keywords in both English and Indonesian: “digital transformation,” “Islamic education,” “pesantren,” “technology literacy,” “Society 5.0,” “transformasi digital,” “pendidikan Islam,” and “literasi teknologi.” The temporal scope was restricted to publications from 2020 to 2025 to ensure the currency and relevance of the reviewed literature, though seminal works published prior to this period were included when deemed foundational to the theoretical discourse.

The initial search yielded 127 articles, which were subsequently subjected to a rigorous screening process. Inclusion criteria required that articles: (a) addressed digital transformation in the context of Islamic education or pesantren; (b) discussed the integration of Islamic values with technology or digital literacy; (c) were published in peer-reviewed journals or reputable conference proceedings; and (d) were written in English or Indonesian. Articles that focused exclusively on general education without reference to Islamic or pesantren contexts, opinion pieces without empirical or theoretical grounding, and duplicate publications were excluded. Following this screening, 35 articles were selected for inclusion in the final review.

The data analysis procedure followed the thematic synthesis approach proposed by Braun and Clarke (2006). The selected articles were read iteratively, and initial codes were generated based on recurring themes and patterns. These codes were then organized into broader thematic categories through a process of constant comparison and refinement. The analysis was validated through source triangulation, wherein findings from qualitative, quantitative, and mixed-methods studies were cross-referenced to enhance the credibility and trustworthiness of the synthesized conclusions.

C. Result

The thematic analysis of the 35 reviewed articles yielded four principal thematic categories pertaining to the digital transformation of Islamic education in pesantren and its intersection with Islamic values and technology literacy. The findings are presented systematically by thematic category, followed by a summary table that consolidates the key results.

Stakeholder Attitudes toward Digital Transformation in Pesantren

The first thematic category concerns the attitudes and perceptions of key stakeholders—particularly kiai (religious leaders), ustadz (teachers), and santri (students)—toward digital transformation within the pesantren environment. The reviewed literature reveals a significant and evolving shift in stakeholder disposition. Hasan, Taufiq, and Elmhemit (2023) documented that kiai in Madura's pesantren, traditionally regarded as bastions of conservative Islamic education, have demonstrated growing acceptance of digital transformation. Their study found that Kiai perceive technology not as a threat to Islamic educational traditions but as an instrument that, when guided by Islamic principles, can enhance the quality and reach of religious instruction.

This finding is corroborated by Anwar et al. (2025), who conducted a mixed-methods study involving 150 respondents from Islamic educational institutions and in-depth interviews with 15 school principals and pesantren administrators. Their results indicated that pesantren leaders are increasingly viewing technology through the lens of *maslahah* (common good), recognizing its

potential to serve the public interest when deployed within an ethical framework. Bahri et al. (2024) further highlighted the crucial role of kiai and pesantren administrators in ensuring the continuity of inclusive digital education services, emphasizing that leadership commitment constitutes a primary catalyst for successful digital adoption.

Nevertheless, the literature also reveals substantial disparities in digital readiness across different pesantren typologies. Survey data analyzed by Anwar et al. (2025) indicated that approximately 60% of Islamic educational institutions in urban areas reported adequate access to technological resources, whereas institutions in rural settings frequently cited infrastructural limitations as a primary barrier. This urban-rural digital divide reflects broader patterns of technological inequality in Indonesia and poses a significant challenge to the equitable implementation of digital transformation across the pesantren ecosystem (Akhmad, 2024).

Mechanisms of Islamic Values and Technology Literacy Integration

The second thematic category addresses the specific mechanisms through which Islamic values are integrated with technology literacy within the pesantren educational framework. The findings indicate that this integration operates at three interconnected levels: epistemological, curricular, and practical. At the epistemological level, Zainuddin (2025) demonstrated that the Islamic concept of *tawazun* (balance), deeply embedded in pesantren educational philosophy, provides a theoretical foundation for equilibrium between traditional religious instruction and contemporary technological competencies. Similarly, the principle of *al-muhafadzah ala al-qadim al-shalih wa al-akhdzu bi al-jadid al-ashlah*, preserving beneficial traditions while adopting advantageous innovations, offers a normative framework that legitimizes the selective adoption of digital technologies within the pesantren environment.

At the curricular level, Suhendi (2024) examined the restructuring of Islamic education curricula in the Society 5.0 context and found that successful integration requires the mapping of 21st-century competencies, including digital literacy, critical thinking, collaboration, and creativity, onto learning outcomes that are simultaneously aligned with Islamic educational objectives such as *tafaquh fi al-din* (deep understanding of religion) and *akhlaq al-karimah* (noble character). Oktaviani and Setiawati (2025) further found that digital literacy programs in pesantren achieve optimal outcomes when explicitly framed within an Islamic ethical context, wherein santri learn to use technology as a means of *dakwah* (Islamic propagation) and community service.

At the practical level, the digitization of *kitab kuning* (classical Islamic texts) has emerged as a particularly significant development, enabling santri to access traditional religious texts through digital platforms while maintaining substantive engagement with classical scholarship (Halimi, Ulya, & Rahmatillah, 2022). Additionally, Darajat, Rosyidin, and Fahrudin (2022) documented that Darunnajah Islamic Boarding School in Jakarta has implemented digital literacy programs combining technical skills training with Islamic communication ethics, training santri to become producers of positive digital content grounded in Islamic values.

Challenges to Digital Transformation in Pesantren

The third thematic category identifies the constellation of challenges that complicate the digital transformation of pesantren. These challenges are categorized into four principal dimensions. Infrastructural challenges remain the most frequently cited barrier: limited access to reliable internet connectivity, insufficient computing devices, and the absence of dedicated IT facilities characterize many pesantren, particularly those in rural areas (Kementerian Agama RI, 2021). Human resource

challenges involve digital literacy gaps among educators; Masitoh and Purbowati (2024) found that many pesantren teachers lack the multidimensional competence required by the TPACK framework (Saili, 2023). Cultural resistance persists among senior religious leaders and traditionalist communities who perceive digitalization as potentially disruptive to the sacred character of face-to-face instruction (Syamsuddin, 2024). Finally, the regulatory framework governing digital transformation in Islamic education remains fragmented and insufficient (Kismawadi, 2023).

Capacity Building and Digital Literacy Development Strategies

The fourth thematic category concerns the strategies employed to develop digital literacy among pesantren stakeholders. Taufikin et al. (2025) argued that effective digital literacy development for pesantren educators requires a mentoring-based approach that integrates pedagogical values with technical skills, rather than conventional isolated training sessions. The research by Muslim (2024) demonstrated that value-based mentoring programs produced significant improvements in technological mastery (+70.8%), Islamic value integration (+65.4%), and global literacy (+77.3%) among madrasah teachers, as well as a positive shift in teaching culture. These findings suggest that capacity-building programs anchored in Islamic values yield superior, more sustainable outcomes than purely technocentric approaches.

The concept of Character-Based Employability, proposed by Huda et al. (2023), further reveals that spiritual values enhance graduates' resilience, integrity, and adaptability in digital-era workplaces, enabling pesantren alumni to adjust more effectively to industrial, educational, and digital entrepreneurial environments. Longitudinal data indicate a strong upward trend in the absorption of pesantren graduates into creative industries, digital media, and the professional IT sector when digital literacy is integrated with Islamic character education.

Table 1. Summary Of Thematic Findings On Digital Transformation In Pesantren

No.	Thematic Category	Key Findings	Representative Sources
1	Stakeholder Attitudes toward Digital Transformation	Kiai and pesantren leaders increasingly demonstrate receptive and positive attitudes toward digital adoption, framing technology through the Islamic principle of <i>maslahah</i> (common good). Urban pesantren show higher readiness than rural counterparts.	Hasan, Taufiq, & Elmhemit (2023); Anwar et al. (2025); Bahri et al. (2024)
2	Integration of Islamic Values and Technology Literacy	Successful integration operates at epistemological, curricular, and practical levels. The principle of <i>tawazun</i> (balance) and <i>al-muhafadzah ala al-qadim al-shalih</i> provide normative frameworks. Digitization of <i>kitab kuning</i> and Islamic digital content creation are key practices.	Zainuddin (2025); Suhendi (2024); Halimi, Ulya, & Rahmatillah (2022); Darajat et al. (2022)
3	Challenges to Digital Transformation	Four principal challenge dimensions identified: (a) infrastructural limitations, (b) digital literacy gaps among educators, (c) cultural resistance from traditionalist communities, and (d) fragmented regulatory frameworks.	Akhmad (2024); Masitoh & Purbowati (2024); Syamsuddin (2024); Kismawadi (2023)

4	Capacity Building and Digital Literacy Strategies	Value-based mentoring programs produce superior outcomes compared to conventional training. TPACK framework application enhances educator competence. Significant improvements reported in technological mastery (+70.8%) and Islamic value integration (+65.4%).	Taufikin et al. (2025); Muslim (2024); Sali (2023); Oktaviani & Setiawati (2025)
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D. Discussion

The findings presented in the preceding section warrant deeper interpretation and contextual analysis in relation to the existing body of scholarship on Islamic educational modernization, digital transformation theory, and the Society 5.0 paradigm. This discussion synthesizes the key results, examines their theoretical and practical implications, situates them within broader scholarly debates, and proposes a conceptual framework for guiding future practice.

Reinterpreting Pesantren Digital Transformation as Epistemological and Value Transformation

The finding that pesantren leaders increasingly demonstrate receptive attitudes toward digital adoption represents a significant departure from earlier characterizations of pesantren as inherently resistant to technological change. This shift can be interpreted through the theoretical lens of institutional isomorphism (DiMaggio & Powell, 1983), whereby pesantren are responding to normative and mimetic pressures from the broader educational ecosystem while simultaneously drawing upon their own epistemic traditions to legitimize change. The fact that Kiai frames digital adoption through the Islamic principle of *maslahah* suggests that the transformation process in pesantren is not merely technical but fundamentally epistemological it involves a reconceptualization of the relationship between Islamic knowledge and modern technology within the theological category of worldly benefit.

This finding aligns with the broader argument advanced by several scholars in Islamic education studies that digital transformation in Islamic institutions should not be understood as a linear process of secularizing modernization but rather as a dialectical negotiation between continuity and change (Hasan, Taufiq, & Elmhemit, 2023). The pesantren's capacity to reinterpret technology through indigenous Islamic categories such as *maslahah*, *tawazun*, and *al-muhafadzah* demonstrates what may be termed "selective appropriation," a process whereby external innovations are incorporated into existing value systems rather than displacing them. This process has significant implications for the sustainability of digital transformation, as it suggests that technological adoption in pesantren is more likely to be durable when it is perceived as consistent with, rather than contradictory to, the institution's foundational identity.

The Three-Level Integration Model: Epistemological, Curricular, and Practical Dimensions

The identification of a three-level integration model encompassing epistemological, curricular, and practical dimensions constitutes a notable contribution to the conceptual understanding of how Islamic values and technology literacy can be harmonized. At the epistemological level, the principle of *tawazun* (balance) provides a philosophical foundation that distinguishes pesantren's approach to digitalization from secular models of educational technology integration. While mainstream educational technology literature typically frames digital literacy as a neutral, value-free competence

(Gilster, 1997), the pesantren approach embeds technology use within a normative ethical framework that prescribes both the purposes and boundaries of digital engagement.

At the curricular level, the findings converge with the work of Suhendi (2024) and Oktaviani and Setiawati (2025) in demonstrating that pesantren can effectively map 21st-century competencies onto Islamic educational objectives without sacrificing either dimension. This finding challenges the assumption, prevalent in some modernization discourses, that traditional Islamic education and modern technological competencies are inherently incompatible. Instead, the evidence suggests that when digital literacy is framed as a means of fulfilling Islamic educational goals such as effective dakwah, knowledge dissemination, and community empowerment, it acquires both pedagogical legitimacy and motivational power within the pesantren context.

At the practical level, initiatives such as kitab kuning digitization and Islamic digital content creation represent tangible manifestations of the integration model. These practices are significant not merely as technological innovations but as cultural negotiations that redefine the boundaries of pesantren identity. The Darunnajah model documented by Darajat, Rosyidin, and Fahrudin (2022), wherein santri are trained to produce digital content rooted in Islamic communication ethics, exemplifies how pesantren can position themselves as active contributors to the digital public sphere rather than passive consumers of externally produced technology.

3. Addressing the Challenge Constellation: Toward a Systemic Response

The four-dimensional challenge constellation, infrastructural, human resource, cultural, and regulatory, identified in the results, demands a systemic rather than piecemeal response. The persistence of infrastructural deficits, particularly in rural pesantren, reflects the broader digital divide in Indonesia and cannot be resolved by individual institutions alone. Strategic partnerships among pesantren, government agencies such as the Ministry of Religious Affairs and the Ministry of Communication and Information Technology, private-sector telecommunications providers, and international development organizations are essential for establishing the basic technological infrastructure on which meaningful digital transformation can be built.

The human resource challenge requires particular attention, as the findings demonstrate that conventional one-time technology training workshops are insufficient to develop the multidimensional digital competence required of educators in the Society 5.0 era. The superior outcomes achieved by value-based mentoring programs, as documented by Muslim (2024) and Taufikin et al. (2025), suggest that capacity-building strategies must be reconceptualized to integrate technological skills development with the broader pedagogical and spiritual formation that defines pesantren's educational ethos. The TPACK framework (Saili, 2023) provides a useful analytical tool for designing such integrated programs, as it explicitly recognizes the interdependence of technological, pedagogical, and content knowledge.

Cultural resistance, while diminishing, requires continued attention through a strategy of cultural mediation that positions digital transformation within the authoritative discourse of Islamic educational reform. The role of kiai as cultural brokers in this process is indispensable, as their endorsement of digital initiatives confers religious legitimacy that no external intervention can replicate. The regulatory dimension calls for a more coherent and contextually responsive policy framework that provides clear guidance on digital transformation in Islamic educational institutions while respecting their institutional autonomy.

The Pesantren Digital Integration Framework (PDIF)

Based on the synthesis of findings and the preceding discussion, this study proposes the Pesantren Digital Integration Framework (PDIF) as a conceptual model to guide the digital transformation of pesantren in the Society 5.0 era. The PDIF is structured around four interdependent pillars that collectively address the multidimensional requirements of sustainable digital transformation in the pesantren context.

The first pillar, Spiritual-Digital Leadership, emphasizes the indispensable role of kiai and pesantren administrators in providing vision, religious legitimacy, and ethical guidance for digital transformation. This pillar recognizes that in the pesantren context, technological change cannot proceed without the endorsement and active participation of religious leadership. The second pillar, Values-Based Curriculum Innovation, involves the systematic integration of digital competencies within an Islamic epistemological and ethical framework, ensuring that technology literacy is not merely appended to the existing curriculum but organically embedded within the pesantren's educational mission.

The third pillar, Sustainable Infrastructure Development, encompasses strategic investments in technological resources, connectivity, and digital facilities through diversified funding mechanisms, including government support, waqf (Islamic endowment) management, and private sector partnerships. The fourth pillar, Community-Centered Capacity Building, prioritizes the development of digital literacy among all pesantren stakeholders—kiai, ustadz, santri, and administrative staff—through culturally appropriate, values-driven training programs that employ mentoring-based rather than technocentric approaches. The PDIF posits that sustainable and meaningful digital transformation in pesantren can only be achieved when these four pillars operate in synergistic alignment, ensuring that technological modernization strengthens rather than undermines pesantren's holistic educational mission.

The PDIF contributes to the existing literature by offering an integrative conceptual model that transcends the binary opposition between tradition and modernity that has characterized much of the discourse on Islamic educational reform. By foregrounding the agency of pesantren communities in shaping their own digital futures rather than positioning them as passive recipients of externally driven modernization, the framework provides a more culturally responsive and contextually grounded approach to educational technology integration in Islamic institutional settings.

E. Conclusion

This integrative literature review has examined the digital transformation of Islamic education in pondok pesantren through the analytical lens of Islamic values integration and technology literacy in the Society 5.0 era. The findings of this study demonstrate that pesantren are not merely passive recipients of technological change but active agents in shaping a distinctive model of digital transformation that is rooted in Islamic epistemological and ethical traditions. The increasingly receptive attitudes of pesantren leaders toward digitalization, coupled with the growing body of innovative practices that integrate technology with Islamic values at epistemological, curricular, and practical levels, suggest that pesantren possess considerable potential to develop educational models that are simultaneously technologically competent and spiritually grounded.

The Pesantren Digital Integration Framework (PDIF) proposed in this study offers a conceptual contribution to the field by articulating a structured approach to navigating the complexities of digital transformation within the unique institutional and cultural context of pesantren. The framework's four pillars—Spiritual-Digital Leadership, Values-Based Curriculum Innovation,

Sustainable Infrastructure Development, and Community-Centered Capacity Building—provide a holistic roadmap that addresses the multidimensional challenges identified in the findings while preserving the institutional identity and educational mission of pesantren. This study is not without limitations. As an integrative literature review, the findings are contingent upon the scope and quality of the existing literature, which remains disproportionately focused on pesantren in Java and Madura, potentially limiting the generalizability of the conclusions to pesantren in other regions of Indonesia. Future research should prioritize empirical investigations that test the applicability and effectiveness of the PDIF across diverse pesantren typologies and geographical contexts. Longitudinal studies tracking the impact of digital transformation on educational outcomes, graduate employability, and institutional sustainability would also make valuable contributions to this evolving field. Additionally, comparative studies examining the digital transformation of Islamic educational institutions in other Muslim-majority countries could provide valuable cross-cultural insights that enrich the theoretical and practical understanding of this critical phenomenon.

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