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ISLAMIC EDUCATION MANAGEMENT FACING INDUSTRY 4.0 AND SOCIETY 5.0: INNOVATIVE LEADERSHIP TRANSFORMATION STRATEGIES BASED ON ARTIFICIAL INTELLIGENCE (AI) TECHNOLOGY, WEB PLATFORMS, AND VIRTUAL REALITY TO OPTIMISE INSTITUTIONAL PERFORMANCE BASED ON A REVIEW OF THE LATEST LITERATURE

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Abstract

This study examines the transformation of Islamic education management in facing the challenges of Industry 4.0 and Society 5.0 through innovative leadership strategies based on artificial intelligence (AI) technology, web platforms, and virtual reality (VR). Using a literature review approach, the results show that the synergy of these technologies optimises the performance of Islamic educational institutions, despite the challenges of infrastructure and digital ethics. This study concludes that transformational leadership based on maqasid sharia is the key to creating a holistic educational ecosystem that is efficient, inclusive, and relevant to the digital era. Recommendations include digital literacy training for leaders, productive waqf funding for infrastructure, and further empirical research to validate the model. This study contributes to the development of contemporary Islamic education management theory that combines spirituality with technological innovation for the benefit of the community.

Keywords: Islamic Education Management, Industry 4.0, Society 5.0, Innovative Leadership, Artificial Intelligence (AI), Web Platform, Virtual Reality, Digital Transformation, Literature Review.

Introduction

Industry 4.0 has revolutionised almost all aspects of human life by introducing automation, digital connectivity, and cyber-physical system integration. This revolution has brought about a paradigm shift in the world of education, requiring educational institutions to adapt to advances in information and communication technology (Escueta et al., 2025) . On the other hand, the emergence of the concept of Society 5.0, which centres on the balance between technology and humanity, expands the challenges and opportunities for transformation in Islamic education in creating a humanistic, inclusive, and spiritually-based education system.

Islamic education, as an institution that plays a role in shaping the character and morality of society, cannot be separated from these technological dynamics. Islamic

educational institutions such as Islamic boarding schools, madrasas, and Islamic universities face pressure to transform not only in terms of curriculum but also in governance, human resources, and leadership strategies (Trinova et al., 2025) . This transformation is crucial so that Islamic educational institutions do not fall behind in the increasingly technology-based global competition (Dalton, 2017) .

Changes in digital technology architecture demand a more adaptive model of Islamic education management. Connectivity, big *data*, artificial intelligence (AI), and virtual reality (VR) have become integral parts of the modern learning process . Effective Islamic education management must be able to utilise this technology to improve organisational efficiency, teaching and learning effectiveness, and strengthen the relevance of education to the needs of Society 5.0 (. The context of Society 5.0, particularly as it has developed in Japan and is now being adopted globally, emphasises a human-centred society approach by utilising advanced technology to improve the quality of human life. Within the framework of Islamic education, this concept is similar to the principle *of rahmatan lil 'alamin*, which is to bring technological advances that are oriented towards the benefit of the people. Therefore, Islamic education needs to develop a model that harmoniously integrates spiritual ethics and technological intelligence (Sari et al., 2025) .

One important aspect in facing this era is the transformation of leadership in Islamic educational institutions. Innovative, visionary, and technology-based leadership is the key to creating resilient and competitive institutions. Islamic education leaders are required to not only have a strong religious understanding, but also digital literacy and strategic innovation in order to be able to guide their institutions in facing technological disruption (Aslan & Azizan, 2025) .

Artificial intelligence (AI) now plays a dominant role in the global education world. The use of *learning analytics* systems, academic chatbots, and AI-based assessments can provide a more personalised and adaptive learning experience. In the context of Islamic education, the potential of AI can be directed to support more effective learning, such as analysing the achievement of memorising the Qur'an, spiritual competency assessment systems, and more accurate and efficient management of Islamic data (Islim, 2022) . In addition, web platforms are an important means of strengthening the Islamic education management system. The presence of web-based academic systems can accelerate communication, expand the reach of online learning, and increase the transparency of institutional management. Web-based platform management also enables the implementation of *evidence-based management*, which provides a stronger basis for strategic decision-making in Islamic education environments (Hidayat, 2022) .

Other technologies such as virtual reality (VR) and augmented reality (AR) provide new opportunities to create immersive and contextual learning experiences. In Islamic education, VR can be used for simulations of Islamic civilisation history, virtual

learning about the hajj and umrah, and interactive laboratories for understanding scientific concepts in the Qur'an. This innovation aligns with the principle *of experiential learning*, which fosters emotional and spiritual engagement among learners (Legris, 2003) .

Nevertheless, significant challenges remain. The digitisation of education often faces obstacles in terms of human resource readiness, infrastructure limitations, and a lack of digital literacy among teachers and leaders of Islamic institutions. Without innovative leadership strategies, technology can become a new administrative burden rather than a catalyst for productivity . Therefore, digital transformation needs to be accompanied by a change in mindset and organisational culture in Islamic educational institutions.

In recent years, various literature has highlighted the importance of adaptive strategies based on Islamic values in responding to the digital revolution. The concept *of integrated Islamic leadership* emphasises harmony between spirituality, professionalism, and innovation. This model offers an ethical foundation to ensure that the application of technology remains aligned with the values of humanity and social justice as idealised by the vision of Society 5.0.

Based on this reality, this study aims to conduct a review of the latest literature to analyse Islamic education management and leadership strategies in facing the challenges of Industry 4.0 and Society 5.0.

Research Method

This study uses a qualitative approach based on library research with a systematic literature review method. Research data was obtained from secondary sources such as national and international scientific journals, academic books, conference proceedings, and the latest research reports. The data collection procedure was carried out through targeted searches in databases such as Scopus, Google Scholar, and ScienceDirect using keywords such as *Islamic education management*, *innovative leadership*, *Artificial Intelligence in education*, *web-based platform*, and *virtual reality learning* (Eliyah & Aslan, 2025) . The stages of literature analysis included the selection of relevant articles, theme categorisation, and interpretation of results using thematic synthesis and comparative analysis techniques between findings. The literature review serves not only to map the results of previous studies related to Islamic education management in the digital era, but also to identify research gaps so as to obtain a theoretical understanding and conceptual model of innovative technology-based leadership transformation strategies in the context of current and future Islamic education (Gough et al., 2020) .

Results and Discussion

Transformation of Islamic Education Management and Leadership in the Era of Industry 4.0 and Society 5.0

The Industry 4.0 era is characterised by the integration of digital technology, artificial intelligence, and cyber-physical systems that fundamentally change the economic, social, and educational order. In this context, Islamic education faces an urgent need to adapt its management system to be relevant to the demands of rapid change. Meanwhile, Society 5.0, which is oriented towards humanity, requires every educational institution to not only master technology but also uphold spiritual and ethical values as the foundation for human progress (Tondeur, 2024) .

These changes in the global education ecosystem directly influence the paradigm of Islamic education management. While the old paradigm was more oriented towards administrative routines and conventional learning, Islamic educational institutions are now required to have agile, collaborative, and digital data-based management systems. Digitalisation is not only carried out in the learning system, but also in human resource management, performance evaluation, and strategic decision-making based on *data-driven management* (Mudzakir & Aslan, 2025) .

Leadership in the world of Islamic education is also being redefined. Leaders are no longer merely scholars, clerics, or academics with moral authority, but must be innovative transformational leaders who are able to inspire change, understand technology, and navigate global complexities. This type of leadership is based on collaboration, creativity, and empathy—characteristics that are in line with the Islamic principle of *rahmatan lil 'alamin* (Rahman et al., 2025) .

The transformation of Islamic education management in this era includes a shift in leadership functions from authoritarian to participatory. Participatory leadership patterns enable the use of technology to build collaborative networks between teachers, students, parents, and the community. Through this approach, Islamic educational institutions can form *a digital ecosystem* that is not only efficient but also supports the formation of Islamic character relevant to the needs of the times (Sampe & Aslan, 2025) . In addition to leadership, changes in the educational management paradigm must also touch on organisational structure. Islamic educational institutions need to move from a hierarchical model to a more flexible network model. For example, the use of web-based digital platforms can accelerate cross-unit coordination, strengthen financial transparency, and facilitate public accountability as part of the principle *of trust* in Islamic management (Romadhon & Aslan, 2025) .

Meanwhile, in the context of Society 5.0, humans are at the centre of technological development. This principle is highly relevant to the philosophy of Islamic education, which places humans as caliphs on earth. Islamic education must ensure that the development of digital technology benefits humanity, not merely system efficiency.

Therefore, Islamic educational leadership must be able to balance the use of artificial intelligence and moral values in the decision-making process (Hilton, 2018) .

A number of studies conducted by (Hifza et al., 2020) show that the quality of innovative leadership is directly correlated with the level of success of digital transformation in educational institutions. Visionary and future-oriented leaders tend to encourage the strategic use of technology to improve the quality of education. In the context of Islam, this type of leadership reflects the character of *ijtihad*—that is, creative and rational efforts to develop new solutions that remain based on sharia values.

Transformation in the Industry 4.0 era also creates opportunities to strengthen the integration of science and technology with Islamic values. Islamic education curricula need to adopt an interdisciplinary approach that combines digital technology with Islamic studies. This will produce graduates who not only have technological literacy but also spiritual and moral sensitivity in managing knowledge for the benefit of the ummah (Pratiwi et al., 2024) .

However, this transformation is not without structural and cultural challenges. There is still a digital gap among educators and leaders of Islamic institutions, especially in the use of AI-based technology and online platforms. Resistance to change sometimes arises from the perception that technology can displace traditional values. This is where innovative leadership is crucial to foster an inclusive culture of change based on Islamic values (Al-Emran, 2025) . To address these challenges, Islamic educational institutions need to develop value-based leadership and technological knowledge strategies. This approach includes digital literacy training for teachers and leaders, the provision of AI-based management information systems, and the formation of online learning communities that connect Islamic madrasas or universities. This strategy not only strengthens technological capacity but also fosters cross-institutional collaboration (Crompton, 2025) .

Furthermore, the success of Islamic education management transformation in the digital era requires institutional policy support and long-term commitment. The government and related institutions need to strengthen regulations and incentives for technology-based learning innovations that are in line with the principles *of maqāṣid al-syarī'ah*—the main objectives of Islamic law in the form of benefit and balance. Thus, technological innovation becomes a means, not an end, of the educational process that humanises humans (Chatterjee, 2024) .

Finally, the transformation of Islamic education management and leadership in the era of Industry 4.0 and Society 5.0 must be seen as *an intellectual jihad* that reaffirms the role of Islam in shaping future civilisations. Islamic education leaders are required to balance intellectuality, spirituality, and technological proficiency so that they can produce a generation ready to become architects of a new world—a world that is digital, yet moral, inclusive, and civilised.

Implementation of AI Technology, Web Platforms, and Virtual Reality in Optimising Islamic Education Performance

Artificial Intelligence (AI) has become a major pillar of global education transformation with its predictive analysis and personalised learning capabilities. In Islamic education, AI can be integrated to analyse patterns of Al-Qur'an memorisation, assess understanding of tafsir, and predict the risk of madrasah students dropping out. AI-based *learning analytics* systems enable institutional leaders to make accurate data-driven decisions in managing educational resources (Granić, 2022) .

Practical applications of AI in the Islamic context include the development of a Sharia chatbot that answers basic fiqh questions 24/7, as well as a content recommendation system based on students' Islamic competencies. This technology not only improves the accessibility of Islamic education for rural communities, but also frees teachers from routine administrative tasks so they can focus on more in-depth spiritual guidance. The integration of AI with Islamic values creates an adaptive learning ecosystem that is oriented towards individual needs (Oyelere et al., 2018) .

The web platform serves as the backbone of digital management for Islamic educational institutions by providing an integrated academic information system (SIAK). This platform facilitates online registration, real-time financial reporting, and *an Islamic KPI-based* performance dashboard that measures the achievement of tahfidz targets, academic performance, and stakeholder satisfaction. The resulting transparency reinforces the principle *of muhasabah* in the governance of Islamic institutions (Rogers, 2003) .

Furthermore, the web platform enables cross-institutional collaboration through *a learning management system* (LMS) that connects madrasahs, Islamic boarding schools, and Islamic universities in a single national digital ecosystem. Webinar features, discussion forums, and cloud-based teaching material repositories increase the efficiency of knowledge sharing and accelerate the dissemination of best practices in Islamic education management. This approach is in line with the concept *of a digital community* that strengthens solidarity among the people through technology (Aslan & Hajiri, 2025) .

Virtual Reality (VR) and Augmented Reality (AR) open new dimensions in Islamic education learning experiences through immersive simulations. Students can virtually "visit" the Masjid al-Haram, witness a 3D reconstruction of the Isra' Mi'raj event, or practise prayer movements with corrective AR guidance. This technology is highly effective for learning Islamic history and worship practices that require contextual visualisation (Jayadi et al., 2023) ; (Aslan, 2018) .

The application of VR in modern fiqh laboratories enables the simulation of contemporary legal cases such as sharia digital transactions or Islamic medical bioethics. This *experiential learning* approach increases knowledge retention by up to 75%

compared to conventional methods, while fostering empathy and a deep understanding of complex Islamic issues. VR bridges the gap between abstract theory and practical application in Islamic education (Nurfadilah et al., 2023) .

The synergistic integration of these three technologies (AI-web-VR) creates a holistic *smart Islamic education ecosystem*. AI analyses data from the web platform to provide personalised recommendations, while VR delivers the recommended learning experiences. This model results in a 40% improvement in institutional performance in terms of operational efficiency and learner satisfaction, based on global case studies (Khan, 2024) . However, ethical challenges in technology implementation cannot be ignored. The use of AI raises issues of student data privacy, algorithmic bias in Islamic assessment , and the potential replacement of teachers as *murabbi*. Islamic education needs to develop *an AI ethics framework* based on maqasid syariah to ensure that technology continues to serve the purpose of human creation as khalifah.

Infrastructure is a major obstacle in regional Islamic educational institutions. Limited access to stable internet, expensive VR hardware, and a lack of local IT experts hinder the scalability of innovation. Hybrid solutions based on *edge computing* and low-bandwidth platforms are needed to reach remote Islamic boarding schools without compromising the quality of digital learning (Nasution & Aslan, 2025) .

Human resource training is key to the success of technological transformation. *Digital pesantren leadership* programmes that combine AI literacy, Islamic VR content development, and web platform management must be a priority for innovative leadership. Teachers and clerics need to be trained not only as technology users, but also as *content creators* and *innovation leaders* in the digital Islamic education ecosystem. The financial sustainability of technological innovation requires creative funding models. Digital productive waqf, corporate zakat for AI infrastructure, and public-private partnerships with halal technology companies are sources of sustainable funding. This approach ensures technology accessibility for Islamic educational institutions of various economic capabilities (Aslan & Nur, 2025) .

Evaluating the effectiveness of technology requires Islamic performance indicators that measure not only operational efficiency but also spiritual achievements (memorisation progress), character development (digital ethics), and social contributions (community impact). An AI-based dashboard can visualise these *spiritual KPIs* in real-time for strategic decision-making by leaders (Bond et al., 2024) .

Ultimately, the implementation of AI technology, web platforms, and VR in Islamic education must be understood as *a civilisational mandate* to prepare a generation *of digital native Muslims* who are proficient in technology while remaining steadfast in their faith. This transformation is not merely modernisation, but *tajdid*—renewal—that reinforces Islam's mission as a blessing for the universe in facing the challenges of Industry 4.0 and Society 5.0.

Conclusion

Islamic education management in the face of Industry 4.0 and Society 5.0 requires innovative leadership transformation that integrates Islamic values with advanced technologies such as AI, web platforms, and virtual reality. This strategy not only improves institutional operational efficiency through predictive data analysis, integrated information systems, and immersive learning experiences, but also strengthens the relevance of Islamic education as rahmatan lil 'alamin in the digital age. Technology-based visionary leadership has proven to be a major catalyst for optimising institutional performance, from madrasahs to Islamic universities, by bridging the digital and ethical divide.

The synergy of AI for personalising Islamic learning, web platforms for management transparency, and VR for contextual simulations of Islamic worship and history has succeeded in creating a holistic educational ecosystem. Although challenges such as infrastructure and digital literacy remain, a transformational leadership model based on maqasid syariah is capable of turning the potential for disruption into opportunities for tajdid civilisation. The findings of this study enrich contemporary Islamic education management theory with an adaptive and sustainable practical framework.

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