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THE ROLE OF DIGITAL LEADERSHIP IN DRIVING ARTIFICIAL INTELLIGENCE ADOPTION AND INNOVATIVE BEHAVIOUR FOR SUSTAINABLE EDUCATIONAL COMPETITIVENESS

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ABSTRACT
In the era of rapid digital transformation, educational institutions face increasing pressure to integrate artificial intelligence (AI) and foster innovation to maintain sustainable competitiveness. This study aims to analyze the role of digital leadership in encouraging AI adoption and innovative behavior within educational settings, with a focus on SMP Islam Nurul Fikri Boarding School Lembang, Indonesia. Employing a qualitative descriptive approach, data were collected through interviews, observations, and document analysis involving principals, vice principals, teachers, and IT staff. The findings reveal that digital leadership provides a clear strategic vision for digital transformation, fostering teachers to demonstrate varying levels of innovative behavior influenced by leadership commitment and resource availability. The study concludes that digital leadership acts as a critical catalyst for sustainable educational competitiveness, emphasizing the need for structured digital policies and continuous capacity building to ensure long-term impact.

Keywords: digital leadership; artificial intelligent; innovative behaviour; sustainable educational

INTRODUCTION

Education in the twenty-first century is undergoing a period of rapid digital transformation. Schools are increasingly challenged to adapt to global demands for competitiveness and sustainability. The integration of artificial intelligence (AI)–based technologies has become a crucial factor for enhancing organizational performance and sustainability across various sectors, including education. However, many educational institutions still face difficulties in adopting AI, particularly in terms of human resource readiness, organizational culture, and digital literacy.

Artificial intelligence and digital innovation have emerged as powerful tools that can enhance learning processes, assessment, and school management. Recent studies have shown that AI supports educational administration (Haetami, 2025) and facilitates real-time evaluation and automation (Mukaffan & Siswanto, 2025). Despite its benefits, the implementation of AI in schools faces several barriers, such as limited technological infrastructure, inadequate teacher readiness, and ethical concerns regarding value alignment. (Djazilan et al., 2024). Other issues include data privacy, teachers' digital competence, and infrastructural preparedness (Mukaffan & Siswanto, 2025). Moreover, concerns about educational quality, job displacement, algorithmic bias, and safety further complicate AI integration (George & Wooden, 2023). A lack of trust in AI systems also persists within educational communities AI (Herdiani et al., 2024)

AI adoption in education depends not only on technological readiness but also on leadership capacity to drive change. In this regard, digital leadership plays a pivotal role in fostering innovation and technological adoption. Digital leadership has increasingly been recognized as a critical enabler for schools to navigate complex technological transformations. Studies have demonstrated that school leaders' digital leadership positively influences teachers' technological integration (AlAjmi, 2022). Furthermore, digital leadership significantly shapes teachers' innovative behaviors (Fauzi, 2025). and contributes to school quality improvement aligned with global educational trends (Karakose & Tülübaş, 2023). Enhancing school quality ultimately leads to sustainable educational competitiveness

The concept of digital leadership stems from transformational leadership theory, which emphasizes the importance of innovation, adaptability, and the use of technology in organizations. Digital leadership focuses on the ability to integrate digital technology into organizational strategies and build an innovative work culture. Digital leadership describes achieving an ICT-related objective in the context of ICT use and human resources. All of the knowledge and skills required to start and guide IT-related innovation at all organizational levels, from the smallest to the largest, both public and private, are included in digital leadership capabilities (Antonopoulou et al., 2021).

While many studies emphasize the importance of AI in educational transformation, few have explored how digital leadership drives teachers' innovative behaviors to achieve sustainable educational competitiveness. True leadership inspires individuals to contribute to collective goals—something that cannot be replaced by artificial intelligence (Quaquebeke & Gerpott, 2023). The success of digital transformation in education thus depends on visionary leadership and adaptive capacity toward emerging technologies such as AI.

The Indonesian Ministry of Primary and Secondary Education continues to strengthen its commitment to equitable and high-quality education through digital learning initiatives. However, the success of these initiatives largely depends on teachers' digital pedagogical competence (Kemendikdasmen, 2024). The central challenge in this transformation lies in fostering teachers' innovative behaviors within a framework of sustainable education. According to UNESCO (2020), many teachers remain unprepared to integrate technology effectively into teaching, thereby limiting the potential of innovative learning models. Leaders are therefore expected to develop digital leadership capabilities that strengthen the relationship between innovative models and sustainable performance (Chen et al., 2024). Teacher readiness for AI adoption is also critical, requiring comprehensive professional development and ethical AI governance aligned with cultural values (Djazilan et al., 2024)

Previous research has also emphasized that AI implementation requires strong institutional support and ongoing professional development programs (Echave et al., 2024). Leadership support in integrating AI into education is therefore essential. Managerial competencies, particularly in planning and organizing digital leadership programs, play an integral role in this process (Hafiza Hamzah et al., 2021)

This study offers a new perspective by examining how digital leadership influences AI adoption and innovative behavior within the context of an Islamic boarding school in Indonesia. Specifically, it aims to analyze the role of digital leadership in promoting artificial intelligence adoption and teachers' innovative behavior to strengthen sustainable educational competitiveness, using a case study at Nurul Fikri Islamic Boarding School, Lembang.

METHOD

This study employs a descriptive qualitative design to explore the role of digital leadership in driving AI adoption and innovative behavior for sustainable educational competitiveness. The research was conducted at SMP Islam Nurul Fikri Boarding School, Lembang, an Islamic-based boarding school that integrates academic excellence with spiritual and character education. Participants were selected using purposive sampling to ensure relevance to the research focus. The sample included the principal and vice principal, teachers, and IT staff.

Data were collected through multiple techniques: (1) in-depth interviews with school leaders, teachers, and IT staff to gather insight; (2) Observations of teaching and school management processes to identify how digital tools and AI are applied; and (3) document analysis of school policies, digital transformation programs, and curriculum guidelines.

The qualitative data were analyzed using the Miles and Huberman (1994) interactive model, consisting of: data reduction, data display, and conclusion drawing and verification. To ensure the validity and reliability of findings, triangulation was applied: source triangulation (principals, teachers, IT Staff), method triangulation (interviews, observations, documents), and time triangulation (data collection at different times).

RESULTS AND DISCUSSION

This Study explored the role of digital leadership in promoting artifial intelligence (AI) adoption and innovation teacher behavior at SMP Islam Nurul Fikri Boarding School Lembang. The result are arranged according to three main themes: (1) visionary digital leadership, (2) AI adoption and challenges, and (3) teachers' innovative behavior and collaboration. These themes collectively illustrate how leadership, technology, and innovation interact to strengthen sustainable educational competitiveness.

Visionary Digital Ledership

Findings show that school leaders have a clear digital vision and guide the transformation of the entire school. Principals have integrated the use of technology into teacher performance indicators and support artificial intelligence (AI)-based professional development programs. Regular monitoring is conducted both directly and through the school's Learning Management System (LMS). The LMS is used by the school as an integrated information system for principals, teachers, students, and parents. Principals regularly coordinate with the IT and curriculum teams, reflecting a participatory and strategic leadership approach.

This vision-driven leadership ensures that digital transformation is not merely symbolic but is implemented through daily policies and practices. These results are in line with the research of AlAjmi (2022) and Karakose & Tülübaş (2023), which emphasizes that visionary digital leadership encourages teacher engagement and facilitates technology integration. Similar to Northouse's (2021) concept of transformational leadership, the principal's direct involvement and communication increase teachers' trust and confidence in adopting new technologies. This kind of embedded mentoring can foster innovative behavior in teachers. This is in line with previous studies that state that transformational leadership and digital leadership are key factors in encouraging teachers' readiness to adopt AI and accelerate the digital transformation of education (Sogalrey & Sobri, 2025)

Digital leaders have four capacities: tactical, strategic, communication, and culture in a sustainable manner (Ferinia, 2022). Thus, digital leadership has successfully positioned digital transformation as a managerial strategy and cultural norm, which significantly influences the sustainability of AI-based education.

AI adoption and Emerging Challenges

The second theme found increasing but uneven adoption of AI among teachers. Teachers use digital and AI-based tools such as ChatGPT, Canva, Gemini, and Quizizz in lesson planning and classroom interactions. However, challenges remain, including limited digital literacy, time constraints, concerns about data privacy, and resistance from teachers who are less familiar with technology.

These challenges indicate that AI adoption is more a human and organizational issue than a purely technological one. These findings support the research of Djazilan et al. (2024) and George & Wooden (2023), who argue that the success of AI integration depends on ethical frameworks, trust, and institutional readiness. Mukaffan and Siswanto (2025). Other studies also identify optimism, creativity, uncertainty, discomfort, perceived validity, trust, usefulness, and ease of use in successful AI adoption among teachers. Schools must strengthen teacher competencies and infrastructure to achieve effective AI implementation. (Darmawan et al., 2024)

This trend shows that while enthusiasm for AI use is increasing, sustainable adoption requires a balance between visionary leadership, consistent digital training, and ethical governance. Without this balance, transformation risks becoming fragmented or superficial

Innovative Teacher Behavior and Collaboration

The third theme relates to teachers' innovative behavior, which thrives in environments that value experimentation and collaboration. Teachers are encouraged to explore new teaching ideas, share best practices, and integrate artificial intelligence (AI) into creative learning designs. This process is supported by the appreciation and full support of school leadership, which helps to strengthen a culture of innovation.

These findings are in line with Fauzi (2025), who asserts that digital leadership significantly increases teachers' innovative behavior by creating an ecosystem that supports idea development. These findings also support Chen et al. (2024), who emphasize that leaders' digital capabilities connect innovation models with sustainable performance. Other research has found that digital leadership that uses technology and adaptive approaches to change plays an important role in driving innovation and creativity. (Dewi, 2024)

The interaction between supportive leadership and teacher innovation confirms that innovation in education is not an individual act, but a collective process fostered by a digital culture and a learning community.

Policy and Structural Support

Document analysis revealed that the school's digital strategy was formally integrated into its development plan (RKS). The plan includes structured AI training, digital monitoring systems, and teacher evaluation mechanisms. This confirms that digital transformation is embedded in the school's long-term policy, aligning with Echave et al. (2024), who state that effective AI integration requires institutional commitment and continuous professional development.

The alignment between strategic planning and day-to-day implementation demonstrates the school's maturity in managing digital transformation. It also reflects the integration of managerial competence—planning, organizing, and evaluating—within the principal's digital leadership framework (Hafiza Hamzah et al., 2021).

Synthesis of Findings

Overall, the findings reveal that: (1) Visionary digital leadership shapes the direction and sustainability of AI integration; (2) Teacher innovation thrives when leadership provides structured support and collaborative culture. (3) Institutional policy ensures the ethical and systematic implementation of digital transformation.

These results collectively reinforce that digital leadership acts as the catalyst bridging technology adoption and educational sustainability. In alignment with previous studies, this research contributes a contextual understanding of how leadership drives technological and behavioral innovation within Islamic boarding schools, offering a model for sustainable educational competitiveness in developing countries.

CONCLUSION

This study concludes that digital leadership plays a transformative role in driving the adoption of artificial intelligence (AI) and fostering innovative behavior among teachers to strengthen sustainable educational competitiveness. Visionary and participative leadership enables schools to align technological advancement with pedagogical goals, resulting in a culture of collaboration and continuous improvement. The findings highlight that successful AI adoption is not solely dependent on infrastructure, but on leadership capacity to build digital literacy, ethical awareness, and a supportive learning environment. These scientific insights extend the understanding of digital leadership within Islamic boarding schools and affirm its strategic contribution to educational sustainability. Future research may explore quantitative validation or cross-institutional comparisons to deepen the evidence of how digital leadership influences AI-driven innovation across diverse educational settings

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