

Published online on the journal's web page: http://jurnal.usahid.ac.id/index.php/jamr

eISSN: 2797-2917

Journal of Applied Management Research

Leadership in The Digital Era: A Systematic Literature Review and Bibliometric Analysis

Aldian Dewanda Azharie[1 *], Moh Rizky Abdillah[2], Arief Noviarakhman Zagladi[3], Elfia Nora[4]

[1,2,3,4] Department Master of Management, Faculty of Economics and Business, Universitas Negeri Malang, Indonesia

ARTICLE INFO

Received: 27 February 2026
Revised: 11 April 2026
Accepted: 24 May 2026

Keywords:

Leadership, Digital Era, Systematic Literature Review, Industry 4.0

** Corresponding author.*

Email addresses:
aldian.dewanda.2504138@students.um.ac.id
(A. D. Azharie).

ABSTRACT

The development of digital technology has transformed organizational leadership patterns and increased research interest in digital leadership. However, previous studies remain fragmented, and only a limited number of studies have systematically mapped publication trends in this field. This study aims to analyze research developments, conceptual frameworks, and major trends in leadership in the digital era. The study employs a Systematic Literature Review (SLR) approach and bibliometric analysis using the PRISMA framework. Data were obtained from the Scopus database using the keywords "leadership," "digital era," and "digital leadership" within the period of 2020–2026. The analysis was conducted using VOSviewer to map keyword relationships and research trends. Of the 1,060 articles identified, 25 met the inclusion criteria and were further analyzed. The findings indicate that publications on digital leadership have increased significantly in recent years. The dominant themes identified include digital transformation, digital leadership, innovation, Industry 4.0, and artificial intelligence. Network analysis reveals a strong relationship between digital leadership, organizational innovation, and company performance. This study highlights the importance of digital leadership in supporting organizational transformation and provides directions for future research related to digital competencies, virtual collaboration, and technological adaptation within organizations.

Published by LPPM Usahid
ISSN 2797-2917 – © 2026 The Authors. This is an open-access article under the CC BY NC SA license http://creativecommons.org/licenses/by/4.0

1. INTRODUCTION

In the context of modern organizational dynamics, leadership is a crucial factor in achieving organizational goals. Conceptually, leadership is an individual's ability to influence, direct, and coordinate organizational members to achieve common goals (Budiadi, 2026). From a theoretical perspective, transformational leadership emphasizes the crucial role of leaders in organizational success by inspiring and encouraging members to exceed expectations through articulating a clear vision and providing strong motivation (Musaigwa & Kalitanyi, 2023). The digital era not only brings advanced technology but also demands changes in the way organizations are led. Leadership in this era is not only technical or administrative; it must be able to build trust in technology, improve employees' digital competence, and create an environment that is adaptive to change. (Alzoubi et al., 2026) .

Over time, particularly in the era of Industrial Revolution 4.0, the concept of leadership has undergone a significant transformation. Advances in digital technology have reshaped organizational operations, from production processes and communication systems to increasingly data-driven decision-making (Suryadi et al., 2023). The adoption of digital technology has also changed the way organizations operate and compete in an increasingly dynamic environment. Digitalization has become a key driver of transformation across various sectors, including business and education, by increasing efficiency, accelerating processes, and expanding access to information. The adoption of technologies such as e-commerce, smartphones, and data-driven systems has brought fundamental changes to modern organizational operations (Senadjki et al., 2024).

DOI: http://dx.doi.org/10.36441/jamr

Previous studies have examined leadership in the digital era from various perspectives. Some studies focus on the role of leadership in improving organizational performance (Hu & Li, 2026). Others emphasize how leadership supports the digital transformation process and organizational outcomes. Furthermore, some studies highlight the importance of digital competencies, such as digital literacy and adaptability, in supporting organizational change (Rustina et al., 2024). Leadership is also considered crucial in managing complexity and fostering innovation in dynamic environments (Coleman, 2025a). However, despite the growing number of studies, the existing literature remains fragmented. Most studies tend to focus on specific aspects, such as performance, innovation, or technology adoption, without providing a comprehensive and integrative understanding of leadership implementation in the digital era (Ding, 2026). This suggests that current research has not fully captured the complexity of digital leadership across multiple contexts and dimensions.

Implementing leadership in the digital era goes beyond simply adopting technology and encompasses leaders' capacity to strategically align and integrate digital technologies within the broader organizational framework. Leaders are expected to guide the digital transformation process, foster an adaptive organizational culture, and ensure the readiness of all members to face dynamic changes (Coleman, 2025). However, such implementation often faces several challenges, including resistance to change, limited resources, and low levels of digital competency within the organization (Gaile et al., 2026). On the other hand, academic interest in digital leadership has increased significantly in recent years. Many studies have examined the role of leadership in digital transformation; however, most focus on specific aspects in a fragmented manner, such as organizational performance, innovation, or technology adoption (Ding, 2026). This indicates that research on leadership implementation in the digital era has not been comprehensively integrated. Furthermore, there is a lack of studies that systematically map the development of digital leadership research, including identifying research trends and potential gaps for future investigation (Suryadi et al., 2023). Furthermore, previous research has been largely descriptive and context-specific, with limited efforts to systematically map research trends, identify dominant themes, and analyze relationships between key variables. While some studies acknowledge the importance of digital leadership, there is a lack of research integrating findings using structured approaches such as Systematic Literature Reviews (SLRs) combined with bibliometric analysis (Suryadi et al., 2023). Consequently, the current state of the art in this field remains unclear, particularly in identifying research patterns and future directions.

Based on these limitations, this study aims to provide a more comprehensive and systematic understanding of leadership in the digital age. Specifically, this study seeks to map research trends, identify dominant topics, analyze methodological patterns, and explore research gaps for future studies. By applying a Systematic Literature Review (SLR) approach complemented by bibliometric analysis, this study is expected to contribute to the development of a more integrated and data-driven perspective on digital leadership. This study aims to systematically map and analyze the development of research on leadership in the digital age. Specifically, this study seeks to identify the evolution of research trends, examine structural relationships among key themes, analyze methodological patterns, and synthesize existing findings to propose future research directions. By integrating a Systematic Literature Review (SLR) and bibliometric analysis, this study provides a more comprehensive and data-driven understanding of digital leadership and its development. Research questions (RQs) are designed to guide the study and deepen understanding of the phenomenon. The research questions of this study are as follows:
RQ1: How has research on leadership in the digital era evolved over time?
RQ2: What leadership styles are relevant in today’s digital era?
RQ3: How does leadership in the digital era influence company performance?

2. RESEARCH METHOD

This study aims to identify, critically review, and synthesize scientific literature on leadership implementation in the digital era through a Systematic Literature Review (SLR). This method was chosen for its ability to produce a structured, comprehensive, transparent, and replicable synthesis of prior research. To maintain methodological rigor, this study adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, which ensures the literature selection process is carried out systematically,

transparently, and consistently. The SLR procedure in this study includes four main stages, namely: (1) identification, (2) screening, (3) eligibility, and (4) inclusion. In the identification stage, a literature search was conducted in Scopus using the keywords "leadership" AND ("digital era" OR "digital leadership"). The search was limited to publications from 2020 to 2026 in the fields of Business, Management, and Accounting, and English-language journal articles. The initial search results yielded 1,060 articles.

In the screening stage, inclusion and exclusion criteria were systematically applied. Inclusion criteria included: (1) articles published between 2020 and 2026, (2) using empirical research methods (quantitative, qualitative, or mixed-method), and (3) explicitly discussing leadership in a digital context. Exclusion criteria included: (1) articles that had not undergone a peer-reviewed process, (2) not focused on the context of digitalization, (3) in the form of proceedings, books, or editorials, and (4) lack of full-text availability. Furthermore, in the eligibility stage, a full-text review was conducted to ensure the content was appropriate to the research topic. Articles that did not specifically discuss leadership implementation in the digital era were excluded. After all selection stages were completed in accordance with the PRISMA process, 25 articles met the inclusion criteria and were further analyzed. To increase the validity of the findings, this study also conducted a study quality assessment. Article quality was evaluated based on several indicators, namely: (1) journal ranking using Scimago Journal Rank (SJR) (Q1–Q4), (2) clarity of research methodology, and (3) relevance of findings to the topic. Only articles of adequate quality (at least indexed by Scopus and having methodological clarity) were retained in the final analysis.

In addition to thematic analysis, this study applies bibliometric analysis using VOSviewer to map research trends and relationships among concepts. In this process, the following settings are used: (1) the minimum number of occurrences is set at 5 to ensure that only significant keywords are analyzed, (2) the normalization method uses association strength, and (3) the type of analysis is co-occurrence based on keywords (author keywords). The visualization results are used to identify the main theme clusters in leadership research in the digital era. With this more systematic, transparent, and comprehensive methodological approach, the study is expected to provide a more accurate picture of the development and direction of research on leadership implementation in the digital era, particularly regarding employee performance.

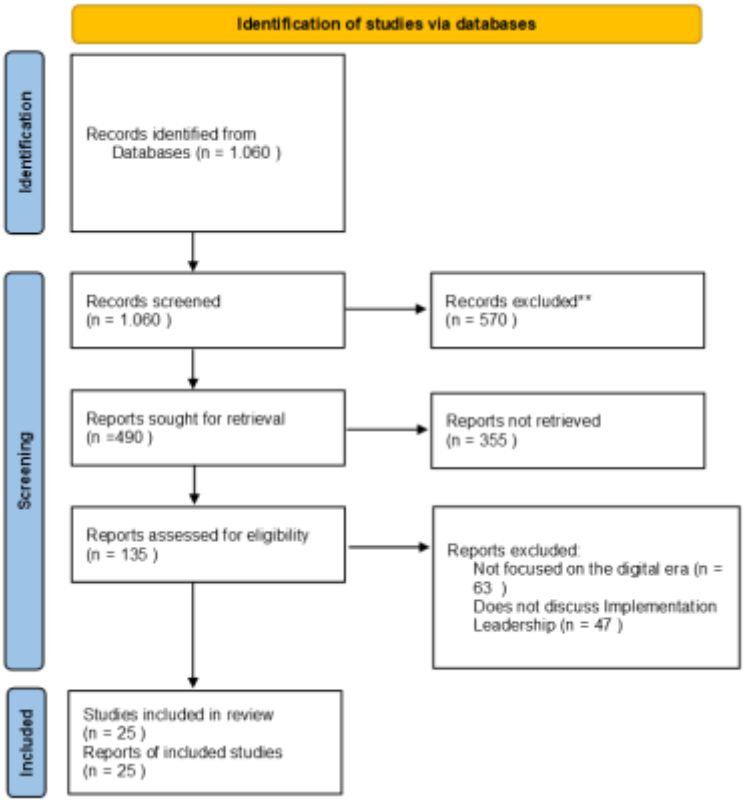


Fig 1. Prism Diagram

3. RESULTS AND DISCUSSIONS

3.1. Results

This section presents the results of the data analysis. Following the complete selection process, 25 articles were identified as meeting the inclusion criteria and were therefore retained for further examination. These studies formed the main basis for both the bibliometric analysis and the systematic synthesis in addressing the research questions.

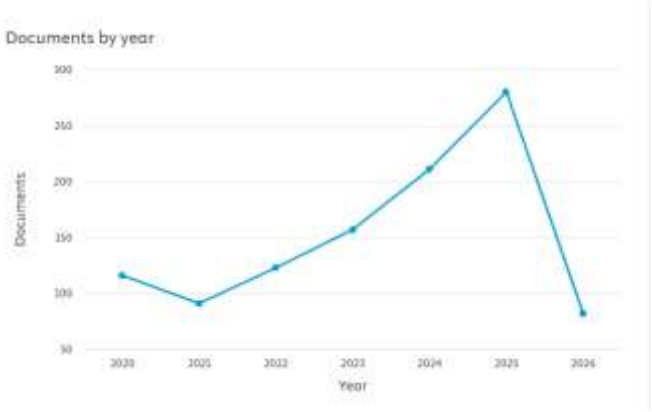


Fig.2 Fluctuations in the Number of Publications

The distribution of publications by year was used to examine the development of research related to employee performance in the era of digitalization. Based on Scopus data, the number of publications fluctuated, with 116 articles published in 2020, decreasing to 91 in 2021, then increasing to 123 in 2022, 157 in 2023, 211 in 2024, and reaching 280 in 2025, before declining again to 82 in 2026. Overall, the total number of publications during the 2020–2026 period was 1,060. Based on the figure, fluctuations in the number of publications from 2020 to 2025 indicate that research on Implementation Leadership in the Digital Era continues to grow and receive increasing scholarly attention. The decline in publications in 2026 is likely due to the indexing process not yet being completed, as the year is still ongoing. Overall, the total of 1,060 documents over the past six years demonstrates that this topic represents an active and continuously developing field of study.

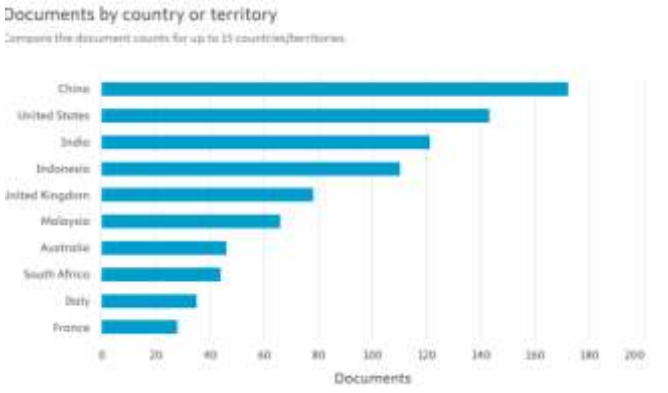


Fig 3. Distribution of articles from various countries

Based on Scopus data, China ranked first with 172 documents, followed by the United States (143), India (121), Indonesia (110), the United Kingdom (78), Malaysia (66), Australia (46), South Africa (44), Italy (35), and France (28). The distribution of publications indicates that research on Implementation Leadership in the Digital Era has developed strongly in Asia, particularly in China, India, and Indonesia. This reflects the high level of attention that countries undergoing rapid digital transformation pay to leadership in the digital era. The presence of Malaysia further strengthens Southeast Asia's position as an active region in this field of study. On the other hand, the contributions of developed countries such as the United States, the United Kingdom, and Australia remain significant, demonstrating that this topic has a global scope with varying levels of contribution across countries.

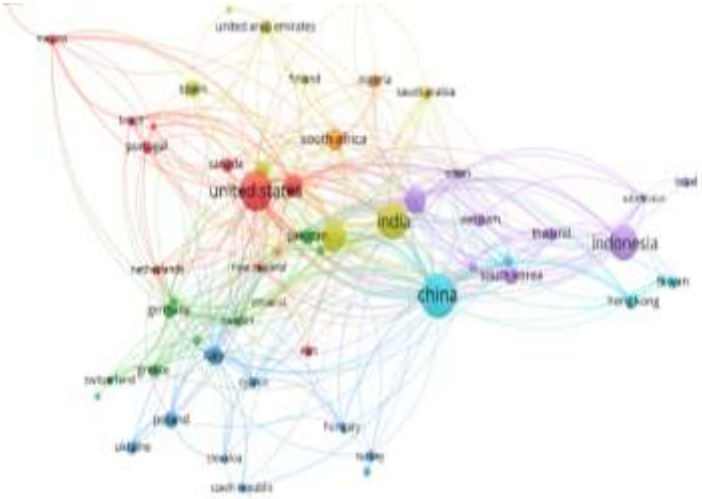


Fig 4. VOSviewer Country Collaboration

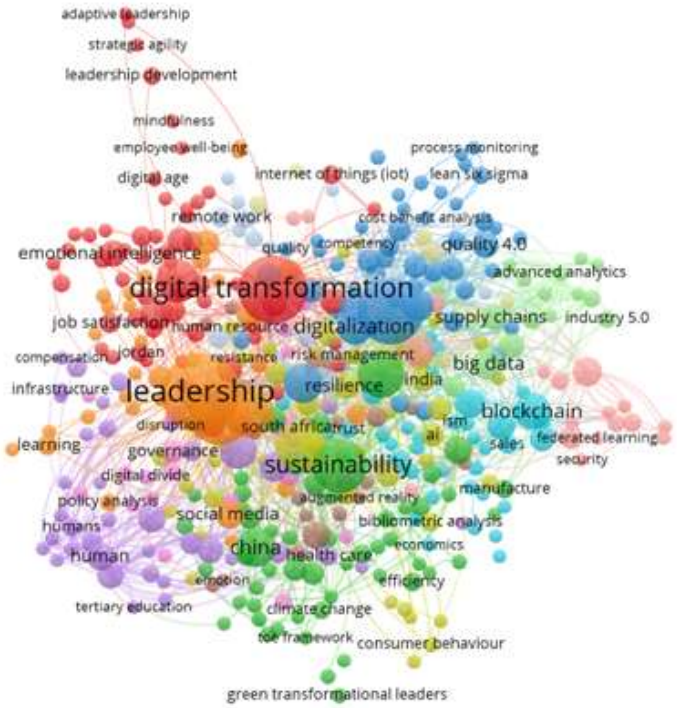


Fig 5. VOSviewer Keyword

Based on the country collaboration map, the United States, India, and China appear to be the most dominant countries in terms of research contribution and connectivity, as indicated by their large node sizes and extensive collaboration networks. These three countries serve as the main hubs of global collaboration in the topic under study. In addition, Indonesia plays a significant role through its connections with several countries, including Malaysia, Thailand, and South Korea, reflecting regional collaboration in Asia. European countries such as Germany, Italy, and Spain form their own cluster with strong collaborative relationships. Meanwhile, other countries such as the United Arab Emirates, Saudi Arabia, and South Africa also contribute to the global research network, although with a more moderate level of intensity. Overall, this visualization indicates that the research is internationally collaborative, with major countries dominant and developing countries actively participating in the global research network. In addition to the country-based analysis, this study examines the distribution of publications by institutional affiliation to identify the universities or institutions most active in research on employee performance in the era of digitalization. The data were obtained from Scopus via the “documents by affiliation” feature, using the study's selected keywords and filters.

DOI: http://dx.doi.org/10.36441/jamr

Table 1. VOSviewer Keyword

No	Keyword	Occurrences	Total Link Strength
1	Digital Transformation	72	50
2	Leadership	95	49
3	Industry 4.0	69	43
4	Sustainability	46	42
5	Innovation	43	41
6	Sustainable Development	34	25
7	Artificial Intelligence	43	23
8	Covid-19	58	22
9	Digital Leadership	30	20

Based on the VOSviewer visualization, digital transformation, leadership, and sustainability emerge as the most dominant topics and serve as central nodes within the research network, as indicated by their large node sizes and strong connections to other topics. In addition, several major clusters can be identified, including the technology cluster (big data, blockchain, artificial intelligence), the quality management cluster (quality 4.0, lean six sigma), and the human resource cluster (job satisfaction, emotional intelligence, human resource digitalization). Overall, the map demonstrates that the research has developed in a multidisciplinary manner, focusing on integrating leadership, digital transformation, and sustainability, and is supported by technological advancements and modern managerial approaches.

The keyword analysis results also reveal that leadership is the most dominant keyword, with 95 occurrences and a total link strength of 49. Other frequently occurring keywords include digital transformation (72), Industry 4.0 (69), and COVID-19 (58). In addition, sustainability appeared 46 times, while innovation and artificial intelligence each appeared 43 times. Other keywords, such as sustainable development (34), digital leadership (30), and human resource management and China (25 occurrences each), also demonstrate strong interconnections within the research network. These findings indicate that studies on Implementation Leadership in the Digital Era are closely associated with digital transformation, leadership, innovation, and sustainability in addressing technological advancements.

Table 2. Systematic Literature on Leadership Implementation in the Digital Era

No	Author/ Year	Title	Journal	Implications
1	(Banks et al., 2022)	*Leadership In The Digital Era: A Review Of Who, What, When, Where, And Why*	*The Leadership Quarterly*	This article examines the development of leadership concepts in the digital era, with a particular focus on emerging frameworks and novel methodologies for studying social influence processes. It also highlights the importance of understanding leadership within informal contexts, as well as its implications for evidence-based practice and policy formulation.
2	(Budiadi, 2026)	*A Literature Review On The Influence Of Transformational Leadership, Emotional Intelligence, And Organizational Culture On Employee Engagement In The Digital Era*	*Quality-Access to Success*	This study examines the influence of transformational leadership, emotional intelligence, and organizational culture on employee engagement in the digital era. It highlights the interplay among these factors in enhancing employee engagement and provides practical insights for leaders to foster greater engagement within technology-driven organizational environments.
3	(Peñarroya-Farell et al., 2025)	*A Complex Leadership Perspective On Generative AI Adoption In Smes: The Interplay Of Tam, Tmt, and RBV*	*Administrative Sciences*	This article examines the adoption of Generative Artificial Intelligence (GenAI) in small and medium-sized enterprises (SMEs), focusing on the dynamic interplay between leadership, motivation, and resource allocation. It proposes a conceptual framework that categorizes leadership profiles and highlights the importance of strategic alignment in overcoming adoption challenges.
4	(Suwandi et al., 2026)	*Agile Human Resource Strategy And Leadership For Innovation Performance In The Digital Era*	*SA Journal of Human Resource Management*	This study examines how human resource management strategies and leadership influence innovation performance in Indonesia's automotive industry, with particular emphasis on the mediating role of digital readiness. The findings suggest that organizations should enhance HRM practices and leadership development to foster innovation amid technological disruption.

No	Author/ Year	Title	Journal	Implications
5	(Alzoubi et al., 2026)	*AI-Era Leadership: Probing Leaders' AI Symbolization In Crisis Management In Jordan's Airline Industry*	*Cogent Business & Management*	This article examines the role of leaders' symbolic support for Artificial Intelligence (AI) in enhancing crisis management within organizations. The study highlights how leaders' symbolic endorsement of AI can promote knowledge sharing and employees' self-efficacy, which, in turn, improve organizational crisis response capabilities, particularly within Jordan's aviation sector.
6	(Suryadi et al., 2023b)	*Analysis Of Digital Leadership In Higher Education In Creating A World-Class University At State Universities*	*Corporate Governance and Organizational Behavior Review*	This article analyzes the role of digital leadership in higher education, emphasizing its importance in achieving world-class public universities. The study discusses the key skills and characteristics required of digital leaders, including digital literacy, strategic vision, and adaptability, in order to drive sustainable change and enhance institutional culture within educational organizations.
7	(Coleman, 2025)	*Conflict-Intelligent Leadership: Rescuing A World On Fire*	*Negotiation Journal*	This article advocates the importance of conflict-intelligent leadership (CIQ-L) as a critical approach for navigating an increasingly polarized world. The study emphasizes the need to reframe conflict as a source of innovation and outlines the RESCUE framework as a practical guide for leaders to build resilience and foster collaboration within organizations.
8	Risath Athamlebbe At Al (2025)	*Digital Leadership Competency Framework In Construction: The Case Of Entry-Level Positions*	*Journal of Engineering, Project, and Production Management*	This article proposes a digital leadership competency framework tailored to entry-level roles in the construction industry, emphasizing the growing need for digital capabilities to drive digital transformation. The study highlights the significance of digital literacy, technical proficiency, and sustainable project management, as well as the essential managerial and interpersonal competencies required for early-career professionals.
9	(Ding, 2026b)	*Digital Leadership, Digital Platform Capability And Digital Business Model Innovation Of Start-Ups*	*Journal of Innovation & Knowledge*	This article examines the impact of digital leadership on digital business model innovation in startups, focusing on the mediating role of digital platform capabilities and the moderating effect of digital self-efficacy. The findings highlight the importance of these factors in enhancing startups' competitiveness and improving organizational performance within the digital economy.
10	(Hu & Li, 2026)	*Digital Servitization And Sustainable Growth In The Era Of Generative AI: The Role Of Leadership, Knowledge Sharing, And Employee Attitudes*	*Journal of Innovation & Knowledge*	Explores the role of Generative Artificial Intelligence (GAI) in facilitating sustainable organizational transformation by promoting knowledge sharing and improving employees' attitudes toward AI. It also emphasizes the moderating role of digital leadership in this relationship, which ultimately enhances long-term organizational sustainability performance.
11	(Mangai & Ayodele, 2025)	*Reimagining Public Service Delivery: Digitalizing Initiatives For Accountability And Efficiency*	*Administrative Sciences*	This study investigates the critical success factors of digital transformation in public service delivery in South Africa, with particular attention to challenges such as infrastructure constraints and bureaucratic resistance. It proposes a framework that highlights the importance of policy alignment, robust infrastructure, and active citizen engagement in improving service quality and fostering public trust.
12	(Qiao et al., 2024)	*The Strategic Role Of Digital Transformation: Leveraging Digital Leadership To Enhance Employee Performance And Organizational Commitment In The Digital Era*	*Systems*	This study explores the pivotal role of digital leadership in improving employee performance and organizational commitment amid digital transformation. It emphasizes that leadership strategies aligned with digital initiatives can drive innovation and strengthen organizational resilience as organizations navigate ongoing digital change.
13	(Bauwens & Cortellazzo, 2025)	*The Different Faces Of E -Leadership: Six Perspectives On Leading In The Era Of Digital Technologies*	*Human Resource Management Review*	This article analyzes the multifaceted relationship between leadership and digital technologies through a systematic review of existing literature. It identifies six primary interaction dimensions and develops a conceptual model to deepen understanding of e-leadership, underscoring the importance of a multidisciplinary perspective and the influence of cultural differences.
14	(Ismandra et al., 2026)	*The Role Of Human Resource Management In Organizational Change During Digital Transformation*	*Quality-Access to Success*	This article explores the pivotal role of Human Resource Management (HRM) in facilitating organizational change during digital transformation processes. It highlights the significance of strategic HRM approaches in promoting employee adaptability, continuous learning, and leadership development, thereby aligning workforce competencies with technological advancements and evolving organizational objectives.

DOI: http://dx.doi.org/10.36441/jamr

No	Author/ Year	Title	Journal	Implications
15	(Rustina et al., 2024b)	*The Partnerships And Logistics Leadership In The Smes: The Impact Of Digital Supply Chain Implementation*	*Uncertain Supply Chain Management*	This study explores the positive impact of digital supply chain implementation on logistics leadership and partnership development within small and medium-sized enterprises (SMEs). It underscores the importance of SMEs adopting digital solutions to enhance operational efficiency and strengthen competitiveness in an increasingly dynamic market environment.
16	(Senadjki et al., 2024b)	*Unlocking The Potential: The Impact Of Digital Leadership On Firms' Performance Through Digital Transformation*	*Journal of Business and Socio-economic Development*	This study examines the role of digital leadership in driving digital transformation and its subsequent impact on firms' financial performance. The findings indicate that leadership capabilities do not directly affect performance outcomes; Rather, their influence is mediated through the digital transformation process. Furthermore, the study highlights the importance of a green organizational culture and suggests the need for further investigation into specific leadership dimensions within this context.
17	(Musaigwa & Kalitanyi, 2023)	*Examining The Leadership Approaches Adopted By Fintech Management When Implementing Organizational Change Prompted By Digital Transformation*	*Technology audit and production reserves*	This study explores the role of leadership in the FinTech sector during digital transformation, highlighting that traditional leadership styles remain relevant despite the growing need for new digital competencies. The study emphasizes the importance of employee support and the integration of both traditional and digital leadership approaches to achieve effective change management in the financial sector.
18	(Magagula & Kanyangale, 2025)	*Competencies Of Strategic Leadership In An Academic Library During A Digital Era*	*Independent Research Journal in the Management Sciences*	This article examines the key competencies required for strategic leadership in academic libraries in South Africa's digital era. The study identifies eight essential competencies that leaders need to develop in order to effectively navigate digital change and enhance library services.
19	(Gaffley & Pelser, 2021)	*Developing A Digital Transformation Model To Enhance The Strategy Development Process For Leadership In The South African Manufacturing Sector*	*South African Journal of Business Management*	This study explores the essential skills required of business leaders in South Africa's manufacturing sector to drive digital transformation. It emphasizes the importance of data management and the critical role of CEOs in leading such transformations to maintain competitiveness in the digital economy.
20	(Musaigwa & Kalitanyi, 2024)	*Effective Leadership In The Digital Era: An Exploration Of Change Management*	*Technology audit and production reserves*	This study explores the significant role of diverse leadership styles, with a particular focus on inclusive leadership, in facilitating organizational change management. It emphasizes the importance of collaboration, servant leadership, and digital competencies in strengthening employee commitment and effectively addressing the complexities of change within an increasingly dynamic digital environment.
21	(Moloko & Toendepi, 2025)	*Meaning, Personal Purpose And The Big Five Personality Traits In Exploring Leader Effectiveness In South Africa's FMCG Sector During The Fourth Industrial Revolution*	*Journal of Economics and Management*	This article examines the role of personal meaning and purpose, alongside the five major personality dimensions, in shaping leadership effectiveness within the Fast-Moving Consumer Goods (FMCG) sector in South Africa during the Fourth Industrial Revolution. It emphasizes the need for leaders to adapt to digital-era demands while highlighting the importance of personal goals as a key driver of organizational success.
22	(Pandey et al., 2023)	*Role Of Digital Leadership Capability In Shaping IT Innovation: A Digital Agility Perspective*	*Journal of Global Information Management*	This article explores the significant role of digital leadership in promoting digital agility and information technology (IT) innovation within organizations. It highlights the importance of effective team coordination and notes that conceptual understanding of digital agility in the existing literature is still in its early stages.
23	(Baba et al., 2023)	*FinTech Adoption of Financial Services Industry: Exploring the Impact of Creative and Innovative Leadership*	*Journal of Risk and Financial Management*	This article investigates the relationship between creative and innovative leadership and the adoption of FinTech, with particular emphasis on the mediating effects of perceived ease of use (PEOU) and perceived usefulness (PU). It underscores the significance of user-friendly technological systems and strategic managerial approaches in promoting FinTech adoption within India's rapidly evolving digital environment.
24	(Mavunda, 2025)	*Organizational Change in the Digital Era*	*International Journal of Human Capital and Information Technology Professionals*	This article examines the role of leadership in driving successful organizational change in higher education in South Africa, emphasizing the integration of technology to enhance communication and decision-making processes. The study asserts that effective leadership is essential for addressing various challenges and achieving sustainable outcomes in the digital era.

No	Author/ Year	Title	Journal	Implications
25	(Velinov et al., 2025)	*The Impact Of Top Management Team Diversity On The Appointment Of Chief Digitalization Officers In German Firms*	*Polish Journal of Management Studies*	This article examines how diversity within Top Management Teams (TMTs) influences the appointment of Chief Digitalization Officers (CDOs) in German companies, revealing a strong positive correlation between TMT diversity and the appointment of digital leadership roles.

3.2. Discussion

RQ1: How has research on leadership in the digital age evolved over time?

The development of leadership in the digital era shows a shift from face-to-face interaction toward technology-based virtual interaction. Leadership is no longer limited to formal positions but also emerges through individual influence in digital spaces. This transformation has changed communication patterns, power structures, and the role of followers within organizations. Research on digital leadership has also continued to evolve. Initially, studies focused on transformational and transactional leadership. Subsequently, the concept of e-leadership emerged, emphasizing the role of technology in leader–follower relationships. Currently, digital leadership research encompasses data-driven decision-making, virtual leadership, and organizational digital transformation.

Leadership in the digital era is not only about the use of technology but also about changes in how leadership is practiced in dynamic, complex environments (Banks et al., 2022). Leaders are required to manage change, encourage collaboration, and strategically integrate technology to support organizational digital transformation (Peñarroya-Farell et al., 2025). The relationship between leadership and technology is reciprocal. Technology is not merely a tool but also influences how leaders interact and make decisions. Therefore, leaders act as "digital architects," directing organizational digital transformation in alignment with strategic objectives.

RQ2: What leadership styles are relevant in today's digital era?

The digital era not only brings technological innovation but also transforms the way leaders think, particularly in data-driven decision-making (Peñarroya-Farell et al., 2025). The successful implementation of AI in crisis management depends not only on the technology itself but also on leaders' ability to shape employees' perceptions and behaviors toward it. This is consistent with Contingency Theory, which posits that leadership effectiveness is influenced by the compatibility among leadership style, environmental conditions, and situational complexity (Alzoubi et al., 2026). In addition, the development of digital technology has also changed leadership dynamics and styles (Bauwens & Cortellazzo, 2025).

Transformational leadership has become one of the most important leadership styles because it can inspire and motivate employees amid rapid digital change (Budiadi, 2026). Furthermore, agile leadership is also essential as it emphasizes adaptability, collaboration, and strategic vision in responding to technological disruption (Suwandi et al., 2026). Conflict-based leadership also plays a significant role in creating psychological safety, enhancing collaboration, and encouraging innovation (Coleman, 2025). A study involving 376 startup companies in China found that digital leadership positively influences digital business model innovation by strengthening digital platforms (Ding, 2026). These findings indicate that digital leadership is not solely focused on technology but also on the ability to build a digital vision and an adaptive organizational culture (Qiao et al., 2024).

In virtual teams, leaders face challenges such as limited direct interaction and high communication ambiguity. Therefore, transformational and digital leadership have become increasingly relevant for maintaining team engagement and performance. On the other hand, technological advancement may also create technostress and disrupt work–life balance. Consequently, e-leadership is understood as a flexible and collaborative leadership concept shaped by interactions among humans, technology, and organizations.

RQ3: How does leadership in the digital era impact company performance?

Digital transformation is no longer understood merely as the implementation of technology, but also as encompassing changes in work processes, interaction patterns, and organizational values. In dynamic and

uncertain situations, transformational leadership becomes increasingly important because it requires adaptability, change management, and the creation of a work environment that supports trust and employee empowerment. Its impact can be seen in increased employee satisfaction, commitment, and organizational effectiveness in achieving competitive advantage (Budiadi, 2026). Furthermore, organizational success in the digital era is influenced by leaders' ability to manage complexity, build a sense of urgency, and develop the organization's internal capabilities. Leadership that supports continuous learning, cross-functional collaboration, and technology integration is considered more effective in driving digital transformation (Peñarroya-Farell et al., 2025).

Leadership support for the use of AI also plays an important role in fostering a work environment that encourages collaboration and data-driven decision-making, particularly during crises. When leaders demonstrate commitment to technology, employees tend to become more confident and more adaptable in utilizing AI (Alzoubi et al., 2026). From a company performance perspective, digital leadership has both direct and indirect impacts. Effective leadership can improve operational efficiency, decision-making quality, and the organization's responsiveness to market changes. In addition, digital leadership promotes a culture of innovation, strengthens technological capabilities, and increases employee engagement, all of which contribute to improved company performance. Therefore, strengthening leaders' digital competencies, supporting technological infrastructure, and fostering an adaptive organizational culture are essential factors in enhancing company performance in the digital era (Suryadi et al., 2023).

4. CONCLUSION

The development of leadership in the digital era demonstrates a shift from face-to-face interaction toward technology-based virtual interaction. This transformation affects how leaders communicate, power structures, and the roles of organizational members. Leadership no longer depends solely on formal positions but has become more flexible and collaborative through digital networks. Leadership studies have also evolved from transformational and transactional approaches toward e-leadership and digital leadership, which integrate information systems, organizational psychology, and data science. In this context, technology functions not only as a tool but also influences how individuals think, make decisions, and interact. Therefore, transformational, digital, and conflict-intelligent leadership styles have become essential in supporting innovation, collaboration, and employee well-being amid the challenges of digital work.

Empirically, digital leadership has been shown to influence organizational performance by improving work efficiency, decision-making quality, and responsiveness to change. In addition, digital leadership promotes a culture of innovation, strengthens technological capabilities, and increases employee engagement. This study confirms that leaders not only utilize technology but also act as digital architects who build employee trust and understanding of technology, including artificial intelligence. Future research may focus on testing digital leadership models across sectors and examining the negative impacts of technology, such as technostress, within organizations.

REFERENCES

Alzoubi, R. H., Abo Murad, M., Shnaikat, B. G., Al Kloub, R. S., ALhumeisat, E. K. I., Alafaghni, H. M. A., & Alkarabsheh, O. H. M. (2026). AI-era leadership: Probing leaders' AI symbolization in crisis management in Jordan's airline industry. *Cogent Business & Management*, *13*(1), 2630414. https://doi.org/10.1080/23311975.2026.2630414

Baba, M. A., Haq, Z. U., Dawood, M., & Aashish, K. (2023). FinTech Adoption of Financial Services Industry: Exploring the Impact of Creative and Innovative Leadership. *Journal of Risk and Financial Management*, *16*(10), 453. https://doi.org/10.3390/jrfm16100453

Banks, G. C., Dionne, S. D., Mast, M. S., & Sayama, H. (2022). Leadership in the digital era: A review of who, what, when, where, and why. *The Leadership Quarterly*, *33*(5), 101634. https://doi.org/10.1016/j.leaqua.2022.101634

Bauwens, R., & Cortellazzo, L. (2025). The different faces of e-leadership: Six perspectives on leading in the era of digital technologies. *Human Resource Management Review*, *35*(1), 101058. https://doi.org/10.1016/j.hrmr.2024.101058

Budiadi. (2026). A Literature Review on the Influence of Transformational Leadership, Emotional Intelligence, and Organizational Culture on Employee Engagement in the Digital Era. *Quality-Access to Success*, *27*(210). https://doi.org/10.47750/QAS/27.210.32

Coleman, P. T. (2025a). Conflict-Intelligent Leadership: Rescuing a World on Fire. *Negotiation Journal*, *41*.

Ding, X. (2026a). Digital leadership, digital platform capability, and digital business model innovation of start-ups. *Journal of Innovation & Knowledge*, *14*, 100970. https://doi.org/10.1016/j.jik.2026.100970

Ding, X. (2026b). Digital leadership, digital platform capability, and digital business model innovation of start-ups. *Journal of Innovation & Knowledge*, *14*, 100970. https://doi.org/10.1016/j.jik.2026.100970

Gaffley, G., & Pelser, T. G. (2021). Developing a digital transformation model to enhance the strategy development process for leadership in the South African manufacturing sector. *South African Journal of Business Management*, *52*(1). https://doi.org/10.4102/sajbm.v52i1.2357

Gaile, A., Zaumane, I., Stibe, A., & Kivipõld, K. (2026). Expanding the success factors of change management by incorporating crisis preparedness in the emerging AI world. *Review of Managerial Science*. https://doi.org/10.1007/s11846-026-00979-1

Hu, J., & Li, Y. (2026). Digital servitization and sustainable growth in the era of generative AI: The role of leadership, knowledge sharing, and employee attitudes. *Journal of Innovation & Knowledge*, *15*, 100977. https://doi.org/10.1016/j.jik.2026.100977

Ismandra, A. N., & Susilo, A. (2026). The Role of Human Resource Management in Organizational Change During Digital Transformation. *Quality-Access to Success*, *27*(210). https://doi.org/10.47750/QAS/27.210.38

Magagula, M. P., & Kanyangale, M. (2025). Competencies of strategic leadership in an academic library during a digital era. *Independent Research Journal in the Management Sciences*.

Mangai, M. S., & Ayodele, A. A. (2025). Reimagining Public Service Delivery: Digitalizing Initiatives for Accountability and Efficiency. *Administrative Sciences*, *15*(12), 477. https://doi.org/10.3390/admsci15120477

Mavunda, N. A. (2025). Organizational Change in the Digital Era. *International Journal of Human Capital and Information Technology Professionals*.

Moloko, L. D., & Toendepi, J. (2025). Meaning, personal purpose and the Big Five personality traits in exploring leader effectiveness in South Africa's FMCG sector during the Fourth Industrial Revolution. *Journal of Economics and Management*, *47*, 138–163. https://doi.org/10.22367/jem.2025.47.06

Musaigwa, M., & Kalitanyi, V. (2023). Examining the leadership approaches adopted by Fintech management when implementing organizational change prompted by digital transformation. *Technology Audit and Production Reserves*, *4*(4(72)), 20–27. https://doi.org/10.15587/2706-5448.2023.286627

Musaigwa, M., & Kalitanyi, V. (2024). Effective leadership in the digital era: An exploration of change management. *Technology Audit and Production Reserves*, *1*(4(75)), 6–14. https://doi.org/10.15587/2706-5448.2024.297374

Pandey, J., Majumdarr, S., Hassan, Y., & Benuyenah, V. (2023). Role of Digital Leadership Capability in Shaping IT Innovation: A Digital Agility Perspective. *Journal of Global Information Management*, *31*(8), 1–20. https://doi.org/10.4018/JGIM.333168

Peñarroya-Farell, M., Vaziri, M., Soto Rivera, S. K., & Miralles, F. (2025). A Complex Leadership Perspective on Generative AI Adoption in SMEs: The Interplay of TAM, TMT, and RBV. *Administrative Sciences*, *15*(12), 494. https://doi.org/10.3390/admsci15120494

Qiao, G., Li, Y., & Hong, A. (2024). The Strategic Role of Digital Transformation: Leveraging Digital Leadership to Enhance Employee Performance and Organizational Commitment in the Digital Era. *Systems*, *12*(11), 457. https://doi.org/10.3390/systems12110457

Rustina, E., Tarigan, S. T., Makbul, Y., Ie, M., Pratiwi, H., Irmawati, I., Cahyani, N., & Wening, N. (2024a). The partnerships and logistics leadership in the SMEs: The impact of digital supply chain implementation. *Uncertain Supply Chain Management*, *12*(2), 1307–1316. https://doi.org/10.5267/j.uscm.2023.11.006

Senadjki, A., Au Yong, H. N., Ganapathy, T., & Ogbeibu, S. (2024a). Unlocking the potential: The impact of digital leadership on firms' performance through digital transformation. *Journal of Business and Socio-Economic Development*, *4*(2), 161–177. https://doi.org/10.1108/JBSED-06-2023-0050

Suryadi, S., Muslim, A. Q., & Praja, B. A. (2023a). Analysis of digital leadership in higher education in creating a world-class university at state universities. *Corporate Governance and Organizational Behavior Review*, *7*(4), 119–126. https://doi.org/10.22495/cgobrv7i4p10

Suwandi, S., Ekhsan, M., Daspar, D., Syahira, A. D., & Aisaturahma, A. (2026). Agile human resource strategy and leadership for innovation performance in the digital era. *SA Journal of Human Resource Management*, *24*, a3350. https://doi.org/10.4102/SAJHRM.v24i0.3350

Velinov, E., Gergova, N., Strouhal, J., Konovalova, N., & Strach, P. (2025). The Impact Of Top Management Team Diversity On The Appointment Of Chief Digitalization Officers In German Firms. *Polish Journal of Management Studies*, *32*(2), 237–252. https://doi.org/10.17512/pjms.2025.32.2.15