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Digital Leadership: Trends, Practices, and Future Directions

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Abstract

Information and communication technology development has changed the leadership paradigm in the digital era. Digital leadership is about mastering technology and understanding how that technology can be used to strengthen the organization's vision and mission. This paper describes the trends, concepts, characteristics, dimensional structures, practices, and future directions of digital leadership in various organizational contexts. This study uses a systematic literature review of 38 selected journals. The analysis identified key trends in digital leadership, including adaptation to technological change, an emphasis on collaboration and openness, and an increased focus on the human skills (soft skills) required for success in a digital environment. In addition, the study also discusses best practices in developing and implementing digital leadership, including strategies for building an organizational culture that supports innovation and continuous learning. The analysis in this study directs a look toward the future of digital leadership, and it highlights the importance of intelligent and sustainable integration of technology in leadership strategies. This article presents an in-depth understanding of the role of leadership in facing the challenges and opportunities presented by the digital revolution. It provides a framework for effective leadership development in the ever-evolving digital era.

Keywords

Digital leadership, Systematic literature review, Technology, Digital era

INTRODUCTION

Public Administration is a discipline and practice related to the management, organization, and implementation of policies, programs, and public services provided by the government to achieve specific goals in serving the interests of the community (Kirton & Wang, 2023). Public administration aims to achieve efficiency, effectiveness, and accountability in delivering public services and government policies (Nguyen et al., 2021). Leadership in the digital era has become an increasingly important subject in business and modern organizations. The development of information and communication technology has fundamentally changed the business landscape, forcing leaders to quickly adapt to continuous changes (Wang et al., 2022). In this context, the concept of digital leadership emerges as a new paradigm that combines traditional knowledge of leadership with the ability to manage complex technology and data.

Digital Transformation: Advanced times bring almost crucial changes to conventional open organizations (Türk, 2023). Digital transformation includes applying data and communication innovation in all perspectives of open organization, from information collection, examination, and decision-making to more efficient open administrations. Within the current period, each company is confronted with a complex commerce environment that requires them to be more creative, intuitive, and adaptable. The flare-up of COVID-19 in 2019 constrained each company to adjust its methodologies to proceed with its trade operations (Gkoros & Bratitsis, 2022). Pioneers have to keep up with innovative headways and obtain information about changes in organizational structure. These changes bring unavoidable prerequisites for organizations to end up a portion of digitalization. Consequently, the requirement for advanced administration rises as organizations change into digital entities.

Digital transformation has become a crucial aspect of the business world in the ever-changing digital era (Car et al., 2018). Organizations that aim to stay relevant and face increasing global competition must adopt and utilize digital technology effectively. To succeed in digital transformation, the business world must have leadership capable of guiding and leveraging modern technology (Purwoko et al., 2022). Digital leadership is essential in managing change, influencing employee performance, and ensuring overall business success (Darmawan et al., 2023).

Acknowledgment of alteration and advancement is one of the imperative characteristics of advanced authority. Pioneers within the advanced domain must get the most recent mechanical patterns and consolidate them into their commerce methodologies. They must proactively recognize modern openings made by computerized technology and be willing to convert conventional trade models to pick up a competitive advantage (Fauzi et al., 2023). Influential leaders within the advanced time are not anxious to require dangers, are willing to try with unused ideas and drive advancement throughout the organization. As innovation dominance becomes a driving figure of competitiveness during the Fourth Mechanical Transformation period, companies must ceaselessly enhance utilizing innovative progressions in their trade forms to attain competitiveness (Tulungen et al., 2022). In the current digital landscape, it is crucial for leaders to actively participate in digital platforms to engage with their team members, employees, customers, and other stakeholders. This entails utilizing various digital communication tools such as social media, online collaboration platforms, and other digital mediums to establish robust relationships and reinforce the brand's reputation (Banks et al., 2022). Making decisions based on data has become a standard practice in digital leadership. Leaders leverage data analysis to gain insights into market trends, consumer behavior, and organizational performance, empowering them to make informed and strategic decisions (Xu et al., 2022).

Digital leadership also requires leaders with a strong understanding of technology and the ability to lead in a constantly changing environment (Khumalo et al., 2022). Therefore, training and developing digital skills become crucial to ensure leaders have the necessary abilities to face future challenges. Additionally, digital leadership emphasizes the importance of collaboration among team members and departments. Leaders must foster an open, inclusive, collaborative work culture, allowing innovative ideas to emerge from various sources. In an era where cyber-attacks are increasingly common, digital leaders must prioritize the digital security of their organizations. This involves investing in robust security infrastructure, training employees on cyber security practices, and utilizing state-of-the-art security technologies to protect organizational data. In this regard, digital leaders must be prepared to adapt to rapid and unexpected changes in the business and technological environment. Leaders must think creatively, take calculated risks, and adjust strategies. In an increasingly digitally connected world, user experience is crucial to success. Digital leaders must focus on understanding and meeting the needs and expectations of users through sustainable product and service innovations. Therefore, current trends in digital leadership reflect the importance of adapting to technology and changes in how we work and interact. Successful pioneers within the advanced time can combine conventional administration with a solid understanding of innovation and the capacity to adjust to changes rapidly. In this respect, the investigation will examine the patterns, hones, and future bearings in digital leadership.

MATERIALS AND METHODS

This study adopts the systematic literature review method proposed by Tranfield et al. (2003). The literature review method systematically gathers and analyzes existing research and literature on a specific topic. In the context of digital leadership, this method aims to uncover patterns, practices, and advancements in the field, specifically focusing on the capabilities required in the new digital era. To ensure the reliability and credibility of the data collected, reputable journal references such as ScienceDirect, Scopus, and Semantic Scholar are utilized as valuable resources. These platforms provide access to various scholarly articles and research papers on digital leadership. In this study, researchers employed a total of 38 journals, comprising articles from the period between 2016 and 2024.

In addition to academic sources, internet searches are conducted using relevant keywords such as digital leadership, digital transformation, digital era, and technology. This helps to identify additional sources of information, including websites, blogs, and industry reports, that offer insights into the qualities and skills required for effective digital leadership. However, not all websites and sources are considered equally reliable. Only pertinent websites that provide valuable and credible insights into digital leadership are selected for data analysis. This ensures the information is high quality and relevant to the research objectives. Once the data is collected from these various sources, it is synthesized and analyzed to identify common themes, trends, and patterns in digital leadership. This analysis helps to uncover the key capabilities and competencies that digital leaders need to possess to thrive in the digital era. By constructing a comprehensive model of digital leadership roles, the literature review method provides a solid foundation for understanding the evolving nature of leadership in the digital era. This model can then inform future research, guide organizational practices, and support the development of effective digital leadership strategies.

RESULTS AND DISCUSSION

The Trend of Digital Leadership

The concept of digital leadership is currently a prominent area of interest, along with technological advances and the increasing need for organizations to adapt to complex business environments. A bibliometric study by Tigre et al. (2023) found that digital leadership has yet to mature and continues to attract global attention. This indicates a significant gap for further exploration. The distinction between digital leadership and e-leadership has been discussed several times in the literature but has yet to be completely clear (Eberl & Drews, 2021). E-leadership is defined as a social influence process mediated by advanced information technologies (AIT) to produce a change in attitudes, feelings, thinking, behavior, and performance of individuals, groups, and organizations (Avolio et al., 2000).

The research conducted by Tigre et al. (2003), indicates that although both use technology, the application is different. E-leadership makes use of technology as a communication tool to lead and direct teams. Digital leadership

focuses on creating a business model fully supported by technology, so technology becomes an integral part of the business strategy. Digital leadership emphasizes the overarching digital transformation in achieving business goals. In contrast, e-leadership refers is concerned with the utilization of technology to enhance team interaction and management. Therefore, although both concepts are related to technology-influenced leadership, the approach and outcome are distinct. In addition to examining these definitional differences, the existing literature on digital leadership primarily highlights the impact of digital leadership, as illustrated in this study.

Furthermore, the relationship between digital leadership and other leadership styles, such as transformational and ethical leadership. Based on research, digital leadership, and other leadership styles are interrelated because the fundamental principles of these leadership styles can be adapted and applied in a digital context. The principles of transformational leadership, such as building strong communities, influencing behavior, and encouraging continuous engagement, are also crucial in digital leadership (Eitan & Gazit, 2024). By adopting these principles, digital leaders can effectively manage groups, create high engagement, and drive change and innovation in online communities.

In addition, the relationship between digital and ethical leadership is how the two can work together to address the challenges of transparency and the use of technology in the modern era (Gierlich-Joas et al., 2020). Digital leadership emphasizes using technology and data to optimize performance, communication, and engagement in the workplace. However, this technology can create ethical dilemmas like privacy violations or excessive surveillance. This is where ethical leadership plays a vital role in ensuring that the use of technology is carried out responsibly and fairly and respects employee rights. By integrating ethical leadership into digital leadership, leaders can implement transparency and data use in a way that builds trust, maintains integrity, and promotes employee empowerment. This creates a balance where leaders do not only rely on technology for control and efficiency but also place ethical values and concern for employee well-being as a top priority.

Definition of Digital Leadership
The definition of digital leadership based on the results of the researcher's search can be seen further in Table 1. The concept of digital leadership extends beyond the mere utilization of digital technology by leaders or the integration of traditional leadership skills with digital capabilities. This concept is broader, including the development of leader competencies and behaviors in a digital context and how leaders influence followers' thoughts, emotions, and behaviors to lead digital transformation, drive value creation, and ensure sustainable growth of the organization (Oberer & Erkollar, 2018). This concept emphasizes that digital leadership includes digital technology and organizational management, including changes in leaders' attitudes and behaviors to improve organizational effectiveness.

More than just the use of technology, digital leadership reflects the integration of digital technology with organizational management principles, thus underlining the importance of synergy between leadership and digitalization (Ju, 2021). Digital leadership can be understood as a holistic approach that includes reforming the role and skills of leaders to become digital leaders, restructuring organizations, processes, and business models in digital transformation efforts, and adjusting communication and collaboration patterns in digital workforce management (Jameson et al., 2022). Based on Table 1 below, most studies use the definition from El Sawy et al. (2016).

Table 1 Definitions of Digital Leadership

Definitions	Scholars
The leaders' ability to create a clear and meaningful vision for the digitalization process and the capability to execute strategies to actualize it	Larjovuori et al. (2016)
Using instructional technology, including digital devices, services, and resources, to inspire and lead school digital transformation, create and sustain digital learning culture, support and enhance technology-based professional development, provide and maintain digital organization management, and facilitate and manage digital citizenship	Zhong (2017)
The combination of digital culture and digital competencies	Mihardjo & Sasmoko (2019)
Complex construct aiming for a customer-centered, digitally enabled, leading-edge business model by (1) transforming the role, skills, and style of the digital leader, (2) realizing a digital organization, including governance, vision, values, structure, culture, and decision processes, and (3) adjusting people management, virtual teams, knowledge, and communication and collaboration on the individual level.	Eberl & Drews (2021)
Doing the right things for the strategic success of digitalization for the enterprise and its business ecosystem	El Sawy et al. (2016)
Creating an innovative vision by using technology effectively in managerial processes to create a sustainable change culture in the organization	Ordu & Nayir (2021)
Combining the leadership skill that consists of visionary leadership and transformational leadership with the digital attitude capabilities that consist of digital knowledge and digital experiences	Rudito & Sinaga (2017)
A capability that superiors or supervisors own to involve and develop all employees in utilizing digital technology to support companies in achieving business growth.	Saputra et al. (2021)

Source(s): Authors Own Creation

Characteristics of Digital Leadership

Experts have different views on the definition of digital leadership. However, after being traced by researchers regarding the key characteristics of digital leadership, it can be further summarized as collaboration, agility, openness, digital competence, courage to take risks, participation, networking, flexibility, and the ability to inspire and adapt. Digital leadership described as the ability of leaders to collaborate effectively with various parties that are not limited by region, country, or discipline (Magesa & Jonathan, 2022; Promsri, 2019). Collaboration allows leaders to build an inclusive and open work environment. This makes it easier for leaders to gather ideas from various parties to achieve organizational goals.

In addition, digital leadership also associated with agility (Petry, 2018; Promsri, 2019). Agility is essential for digital leaders because they must respond quickly to challenges or opportunities in this dynamic digital environment. Digital leadership is also closely related to innovative and creative abilities (Magesa & Jonathan, 2022). Digital leaders have the characteristics of being able to encourage their teams to be creative and innovative. Innovative leaders not only focus on solving problems in the organization but also proactive in seeking new opportunities, allowing the organization to survive in rapid change. Then, related to this creativity, leaders can implement innovative solutions that add value to the organization.

Digital leadership is also participatory (Petry, 2018). This means that leaders are actively involved in collaboration within the organization and the decision-making process. In building networks, digital leaders utilize networking skills to strengthen relationships with partners and stakeholders. In addition, flexibility is also a characteristic of digital leaders. In this case, flexibility allows leaders to adjust organizational strategies, structures, and processes according to the organization's needs (El Sawy et al., 2016). Motivating and inspiring followers is also essential for digital leaders because inspiration and motivation can encourage increased team members' enthusiasm, commitment, and involvement (Magesa & Jonathan, 2022). This plays a very positive role in the organization's performance output. Another characteristic is adaptation (Magesa & Jonathan, 2022). Consequently, digital leaders can adapt or adjust the structure and business model in the organization according to the needs of the times and technological developments. These characteristics help digital leaders face challenges in the VUCA (Volatility Uncertainty, Complexity, and Ambiguity) era so that the organization can survive and grow.

Table 2 Characteristic Digital Leadership

Scholars	Characteristic	Key Characteristic
Meier et al. (2017)	collaborative, social and integer, inspiring and open, resilience fostering, and digital meta-competences	Collaboration, agility, openness, digital competence, risk-taking, participation, networking, thinking, and the ability to inspire and adapt.
Promsri (2019)	digital knowledge and literature, vision, customer focus, agility, risk-taking, and collaboration	
El Sawy et al. (2016)	considering digital business strategies and collaborative platforms, optimizing the company's IT functions, focusing on innovation with relevant skills and digital knowledge, and considering work flexibility	
Petry (2018)	agile, participative, networking, and open leadership	
Magesa & Jonathan (2022)	1. Inspiration role (convincing, influencing, enthusiastic, trustworthy, motivational, and openness). 2. Innovation role (anticipatory, digital savvy, and risk taker). 3. Absorbing uncertainty role (collaborative and lobbyist). 4. Adaptation role (informed and planning).	

Source(s): Authors Own Creation

Structural Dimensions of Digital Leadership

Previous studies have partly used the dimensions of digital leadership in their research. The structure of the dimensions of digital leadership can be seen in Table 3. For quantitative research, a questionnaire survey explores the attitudes, competencies, and behaviors required in a digital work environment. This approach also highlights the importance of having a clear vision regarding the digital transformation process and the ability to implement digital strategies. The main structural dimensions include visionary leadership, developing a learning culture in the digital era, professional practice excellence, systemic improvement, and digital citizenship, as outlined by Zeike et al. (2019) and Hamzah et al. (2021). In qualitative research, qualitative analysis methods were used to focus on aspects such as digital communication, socialization, change, teamwork, and trust. This qualitative perspective refers to Ju (2021). The last, grounded theory was used in qualitative research to emphasize digital vision, knowledge, rapid adaptation, empowerment, and managing diverse teams.

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Table 3 Structural Dimension Digital Leadership

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Research Methodology	Specific Methodology	Structural Dimension	Sources
Quantitative Research	Questionnaire Survey	1. attitudes, competencies, and behavior needed in digital working environments 2. a clear vision of digital transformation processes and capabilities to use and actualize digital strategies	Zeike et al. (2019)
		visionary leadership, digital era learning culture, professional practice excellence, systemic improvement, digital citizenship	Hamzah et al. (2021)
Qualitative Research	Qualitative Analysis	Digital communication, digital socialization, digital change, digital team, digital trust	Ju (2021)
	Grounded Theory	Digital vision, digital knowledge, failing fast, empowerment, and managing diverse teams	Imran et al. (2020)

Source(s): Authors Own Creation

Key Actions to be Effective Digital Leaders

Researchers have conducted searches on various sources related to how to implement effective digital leadership in organizations. Previous studies have discussed this, such as the study by Karippur and Balaramachandran (2022), which investigated the antecedents of effective digital leadership. These antecedents include leadership attributes, strategic priorities, organizational focus areas for exploration, and digital governance practices for exploitation. The components of each strategy can be seen in Table 4.

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Table 4 Effective Digital Leadership Strategy

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Effective Digital Leadership Strategy	Actions
Leadership Attributes	1. Digital visionary 2. Smart risk taker 3. Foster Innovation 4. Agility 5. Tolerance for ambiguity 6. Natural collaborator 7. Builds digital talent
Strategic Priorities	1. Prioritise new business models 2. Build competitive advantage 3. Keep pace with competitors 4. Cost Management
Organizational Focus Areas for Exploration	1. Diversify business models through creative partnerships 2. Facilitate data sharing and data analytics 3. Adopt new platforms to meet new business challenges 4. Identify the roles and stakeholder partnership in business value chain 5. Establish digital teams to foster digital innovation 6. Empower employees to adopt digital technologies
Digital Governance Practices for Exploitation	1. Regulatory compliance 2. Cyber security planning 3. Ethical data handling 4. Social media management 5. Employee collaboration

Source(s): Karippur and Balaramachandran (2022)

Impact of Digital Leadership

(1) Organizational Level

The effectiveness of digital leadership has been confirmed in research conducted in various countries and organizations. As found in the study by Senadjki et al. (2023) with research participants from various Malaysian business stakeholders involved in digital leadership and transformation. The results showed that digital leadership plays a role in digital transformation and firms' financial performance. In the South Korean industry, digital leadership improves organizational performance (Mollah et al., 2023). Furthermore, the findings of the research indicate that digital culture fully mediates the relationship between digital leadership and organizational performance. This indicates digital leadership must build a digital culture to achieve good organizational performance. When this digital culture is strong, all teams and organization members will be better prepared to use technology, innovate, and work together better.

Furthermore, the results of the study by Niu et al. (2022) with participants working in general companies in Korea and China revealed that digital leadership increases innovation in organizations and supports ESG management (environmental, social, and governance management). In line with this research, Benitez et al. (2022) found that digital

leadership drives innovation performance by relying on digital platforms. Other research related to the role of digital leadership was also studied in China with the results that digital leadership is positively related to exploratory innovation (the application of new knowledge to develop products or services that are different from existing ones) (Wang et al., 2022).

(2) Team Level

There still need to be studies examining the impact of digital leadership at the team level. After being investigated by researchers, research on digital leadership at the team level has been conducted in China on entrepreneurial teams in China. The results of the study showed that the lead entrepreneur's digital leadership has a positive role in the entrepreneurial team's digital entrepreneurial success, the entrepreneurial team's technology absorptive capacity, and the entrepreneurial team's technological innovation capability (Xia et al., 2023). Chee and Salamzadeh (2021) in their research conducted in Malaysia, found that digital leadership encourages virtual team effectiveness.

(3) Individual Level

In addition to increasing innovation at the team and organizational level, digital leadership also encourages innovation at the individual level or in the employees themselves. Like the research of Fatima & Masood (2024) on employees of telecom and IT companies, digital leadership has a positive impact on knowledge sharing, innovation capability, and open innovation in employees. Supporting this research, Ahmed et al. (2024), conducted in France, found that digital leadership also has a positive effect on employee innovative work behavior. In addition, digital leadership plays a role in increasing learning orientation and innovation capabilities. Öngel et al. (2024) also conducted a study on the impact of digital leadership on individual innovation in a sample of 400 postgraduates in Istanbul and found significant results. Digital leadership not only plays a role in innovation but also in employee creativity. In the research of Zhu et al. (2022), it was found that digital leadership encourages job crafting and employee creativity. Different from the results of previous studies, Sun et al. (2024), in their research conducted on employees in various fields in China, revealed that digital leadership not only encourages direct innovation but also fosters employees' ambition and confidence in innovating, which then strengthens their likelihood of engaging in deviant innovation, which may deviate from the norm but remains constructive.

Several studies have examined the impact of digital leadership on employee performance. In the research results of Wang et al. (2024), it was found that digital leadership does not have a direct effect on employee digital performance but must go through a mediator, namely high-involvement human resource management practices (HI-HRMPs). In other words, to improve employee digital performance, companies need to implement human resource management practices that provide space for maximum employee involvement and participation in their work. This practice helps create an environment where employees feel more involved and empowered, which in turn enhances their digital performance. This is in line with the findings of Li et al. (2024), which show that digital leadership from middle managers' digital leadership plays an important role in improving employee work engagement. The study was conducted on employees from 11 companies in China. In addition, digital leadership is also positively related to employee well-being(Alkhayyal & Bajaba, 2024).

CONCLUSION AND FUTURE DIRECTION

Conclusion

Digital leadership is a relatively new and evolving field that has gained significant attention in recent years due to the rapid advancements in technology and its impact on organizations. This research paper aims to provide a comprehensive review of the literature on digital leadership, focusing on current trends, practices, and potential future advancements in this field. The primary objective of this study is to contribute to the existing body of knowledge on digital leadership by providing valuable recommendations for further research. By synthesizing and analyzing the existing literature, this paper aims to identify gaps and areas for future exploration in digital leadership. The results of the research are summarized as follows.

First, in terms of characteristics, digital leaders need to have adaptive skills, high flexibility, and a strong understanding of technology to support innovation and encourage collaboration within the organization. Second, related to effective digital leadership strategies, research shows that leaders must be able to design and implement digital strategies that align with the organization's long-term goals and can integrate digital technology into work processes to improve efficiency and productivity. Third, in terms of the impact of digital leadership, this study found that effective digital leadership can influence organizational culture, improve employee well-being, and support organizational sustainability amid rapid technological change.

Overall, this research paper provides a comprehensive review of the literature on digital leadership, highlighting current trends, practices, and potential future advancements in this field. The findings suggest that digital leadership is a complex and multifaceted concept requiring leadership skills and technological proficiency. The paper also emphasizes the need for further research to advance our understanding of digital leadership and provide valuable insights for organizations and practitioners in this rapidly evolving digital era.

The Future Direction of Digital Leadership

In the future, the direction of digital leadership will shift toward a more strategic and technology-based approach, where leaders need to have a digital-first mindset to integrate technology into every aspect of the organization. This leadership not only focuses on the implementation of new technology but also the transformation of organizational culture and structure to be more flexible, responsive, and innovative. A leader in the digital era needs to develop high adaptive capabilities in responding to rapid technological changes, with the readiness to explore new business models, such as automation, big data, artificial intelligence (AI), and cloud-based solutions.

In addition, the direction of digital leadership in the future will be more inclusive and focused on cross-disciplinary collaboration. Leaders will be encouraged to empower employees through an open work culture, encouraging continuous learning and safe experimentation to create innovation. This is important because the dynamic digital environment demands strong collaboration and a human-centered approach to maintain employee engagement while maintaining the company's relevance in the market. Based on the literature study that has been conducted, the success of digital leadership will be determined by the ability to manage digital risks, strengthen cybersecurity, and ensure compliance with evolving digital regulations so that companies can grow responsibly in this increasingly connected and complex era. Although there has been progress in previous research, further exploration of the topic of digital leadership still needs to be carried out, which can be done as follows.

First, validation of the digital leadership construct needs to be done. Only a few studies have tested the construct validity of this scale (Benitez et al., 2022; Magesa & Jonathan, 2022). Scale validity aims to assess the extent to which the measurement instrument can represent the main dimensions of digital leadership. With strong construct validity, the measurement results will be more reliable. They can be the basis for further research and provide a deeper understanding of the characteristics and skills that define effective leaders in a digital context. Second, there needs to be more research that discusses the impact of digital leadership at multilevel (organization, team, and individual). Most studies still focus on aspects of digital leadership from a single perspective, so they cannot describe its comprehensive effects in various contexts and levels. A multilevel approach is needed to understand how digital leadership affects various organizational elements, such as improving overall organizational performance, strengthening collaboration and adaptation at the team level, and encouraging individual productivity and engagement. Thus, multilevel research can provide deeper insights into the mechanisms of digital leadership and its contribution to achieving organizational goals in an increasingly complex digital landscape.

Third, the topic of antecedents of digital leadership has yet to receive much attention. Understanding the factors that influence the formation of digital leadership is very important for designing effective leadership development strategies in the digital era. Further research needs to explore various antecedents that have the potential to shape digital leadership competencies, such as the ability to adapt to technology, digital intelligence, organizational culture support for innovation, and technology-related experience and education. Fourth, further research can link digital leadership with other leadership styles. Thus, this study will enrich the literature on leadership dynamics in the digital era and provide useful insights for organizations in choosing and developing leadership styles that best suit digital needs and challenges. In addition, further research can link it with well-being by HR Trends in recent years. Further research can link it with psychological well-being variables, thriving at work, or flourishing.

DECLARATION OF CONFLICT

The authors declare that have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

REFERENCES

1. Ahmed, F., Naqshbandi, M. M., Waheed, M., & Ain, N. ul. (2024). Digital leadership and innovative work behavior: impact of LMX, learning orientation and innovation capabilities. *Management Decision*, 1–26. https://doi.org/10.1108/MD-04-2023-0654
2. Alkhayyal, S., & Bajaba, S. (2024). Countering technostress in virtual work environments: The role of work-based learning and digital leadership in enhancing employee well-being. *Acta Psychologica*, *248*, 1–11. https://doi.org/10.1016/j.actpsy.2024.104377
3. Avolio, B. J., Kahai, S., & Dodge, G. E. (2000). E-Leadership: Implications for Theory, Research, and Practice. *Leadership and Organization Development Journal*, *11*(4), 616–658. https://doi.org/10.1007/978-3-319-05248-9_1
4. 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. *Leadership Quarterly*, *33*(5), 101634. https://doi.org/10.1016/j.leaqua.2022.101634

5. Benitez, J., Arenas, A., Castillo, A., & Esteves, J. (2022). Impact of digital leadership capability on innovation performance: The role of platform digitization capability. *Information and Management*, *59*(2), 1–54. https://doi.org/10.1016/j.im.2022.103590

6. Car, L. T., Kyaw, B. M., & Atun, R. (2018). The role of eLearning in health management and leadership capacity building in health system: A systematic review. *Human Resources for Health*, *16*(1), 1–9. https://doi.org/10.1186/s12960-018-0305-9

7. Chee, C. S., & Salamzadeh, Y. (2021). The Impact of Digital Leadership Competencies on Virtual Team Effectiveness in MNC Companies in Penang, Malaysia. *Journal of Entrepreneurship, Business and Economics*, *8*(2), 219–253.

8. Darmawan, D., Anitha, M. M., Tinambunan, P., Si, M., Choliq, A., Sriharyati, S., Sos, S., Hamid, H., Estiana, R., Pt, S., Zulkifli, M. M., Mohammad, I., Sono, G., Ramli, A., Pd, M., Sondeng, S., Sigit Mareta, M. M., Ak, M., Marjani, S. P., … Utami, R. T. (2023). *Manajemen Sumber Daya Manusia Era Digital* (E. Efitra & A. Juansa (eds.)). PT. Sonpedia Publishing Indonesia. www.sonpedia.com

9. Eberl, J. K., & Drews, P. (2021). Digital Leadership – Mountain or Molehill? A Literature Review. *Innovation Through Information System*, *3*, 223–237. https://doi.org/10.1007/978-3-030-86800-0_17

10. Eitan, T., & Gazit, T. (2024). Explaining transformational leadership in the digital age: The example of Facebook group leaders. *Technology in Society*, *78*, 1–12. https://doi.org/10.1016/j.techsoc.2024.102637

11. El Sawy, O. A., Kræmmergaard, P., Amsinck, H., & Vinther, A. L. (2016). How LEGO Built the Foundations and Enterprise Capabilities for Digital Leadership. *MIS Quarterly Executive*, *15*(2), 141–166. https://aisel.aisnet.org/misqe/vol15/iss2/5

12. Fatima, T., & Masood, A. (2024). Impact of digital leadership on open innovation: a moderating serial mediation model. *Journal of Knowledge Management*, *28*(1), 161–180. https://doi.org/10.1108/JKM-11-2022-0872

13. Gierlich-Joas, M., Hess, T., & Neuburger, R. (2020). More self-organization, more control—or even both? Inverse transparency as a digital leadership concept. *Business Research*, *13*(3), 921–947. https://doi.org/10.1007/s40685-020-00130-0

14. Gkoros, D., & Bratitsis, T. (2022). E-Leadership and Distance Education in Greece during Covid-19 Pandemic. *Management in Education*, 1–13. https://doi.org/10.1177/08920206221081611

15. Hamzah, N. H., Khalid, M., & Wahab, J. A. (2021). The effects of principals' digital leadership on teachers' digital teaching during the covid-19 pandemic in malaysia. *Journal of Education and E-Learning Research*, *8*(2), 216–221. https://doi.org/10.20448/journal.509.2021.82.216.221

16. Imran, F., Shahzad, K., Butt, A., & Kantola, J. (2020). Leadership Competencies for Digital Transformation: Evidence from Multiple Cases. In *Advances in Intelligent Systems and Computing*. Springer International Publishing. https://doi.org/10.1007/978-3-030-50791-6_11

17. Jameson, J., Rumyantseva, N., Cai, M., Markowski, M., Essex, R., & McNay, I. (2022). A systematic review and framework for digital leadership research maturity in higher education. *Computers and Education Open*, *3*, 1–27. https://doi.org/10.1016/j.caeo.2022.100115

18. Ju, Y. (2021). Digital leadership matrix and its improvement path in the digital era. *Leadership Science*, *8*, 47–50.

19. Karippur, N. K., & Balaramachandran, P. R. (2022). Antecedentes of Effective Digital Leadership of Enterprises in Asia Pacific. *Australasian Journal of Information Systems*, *26*, 1–35.

20. Khumalo, N., Dumont, K. B., & Waldzus, S. (2022). Leaders' influence on collective action: An identity leadership perspective. *Leadership Quarterly*, *33*(4). https://doi.org/10.1016/j.leaqua.2022.101609

21. Kirton, J., & Wang, A. X. (2023). China's Complex Leadership in G20 and Global Governance: From Hangzhou 2016 to Kunming 2021. In *Chinese Political Science Review* (Vol. 8, Issue 3). Springer Singapore. https://doi.org/10.1007/s41111-022-00213-9

22. Larjovuori, R.-L., Makiniemi, J.-P., & Heikkila-Tammi, K. (2016). The Role of Leadership and Employee Well-Being in Organizational Digitalization. *Proceedings of the 26th Annual RESER Conference*, 1159–1172.

23. Li, Z., Yang, C., Yang, Z., & Zhao, Y. (2024). The impact of middle managers' digital leadership on employee work engagement. *Frontiers in Psychology*, *15*, 1–13. https://doi.org/10.3389/fpsyg.2024.1368442

24. Magesa, M. M., & Jonathan, J. (2022). Conceptualizing digital leadership characteristics for successful digital transformation: the case of Tanzania. *Information Technology for Development*, *28*(4), 777–796. https://doi.org/10.1080/02681102.2021.1991872

25. Meier, C., Sachs, S., & Stutz, C. (2017). Establishing a Digital Leadership Barometer for Small and Medium Enterprises (Sme). *International Conference 2017 Technology, Innovation and Industrial Management, 17-19 May 2017*, *May*, 103–109. http://www.toknowpress.net/ISBN/978-961-6914-21-5/papers/ML17-009.pdf

26. Mihardjo, L. W. W., & Sasmoko, S. (2019). Digital Transformation: Digital Leadership Role in Developing Business Model Innovation Mediated by Co-Creation Strategy for Telecommunication Incumbent Firms. In *Strategy and Behaviors in the Digital Economy*. Intech Open. https://doi.org/10.5772/intechopen.82517

27. Mollah, M. A., Choi, J. H., Hwang, S. J., & Shin, J. K. (2023). Exploring a Pathway to Sustainable Organizational Performance of South Korea in the Digital Age: The Effect of Digital Leadership on IT Capabilities and Organizational Learning. *Sustainability*, *15*(10), 1–18. https://doi.org/10.3390/su15107875

28. Nguyen, P. V., Huynh, H. T. N., Lam, L. N. H., Le, T. B., & Nguyen, N. H. X. (2021). The impact of entrepreneurial leadership on SMEs' performance: the mediating effects of organizational factors. *Heliyon*, *7*(6), e07326. https://doi.org/10.1016/j.heliyon.2021.e07326

29. Niu, S. J., Park, B. Il, & Jung, J. S. (2022). The Effects of Digital Leadership and ESG Management on Organizational Innovation and Sustainability. *Sustainability*, *14*(23). https://doi.org/https://doi.org/10.3390/su142315639

30. Oberer, B., & Erkollar, A. (2018). Leadership 4.0: Digital Leaders in the Age of Industry 4.0. *International Journal of Organizational Leadership*, *7*(4), 404–412. https://doi.org/10.33844/ijol.2018.60332

31. Öngel, V., Günsel, A., Gençer Çelik, G., Altındağ, E., & Tatlı, H. S. (2024). Digital Leadership's Influence on Individual Creativity and Employee Performance: A View through the Generational Lens. *Behavioral Sciences*, *14*(1), 1–18. https://doi.org/10.3390/bs14010003

32. Ordu, A., & Nayir, F. (2021). What is digital leadership? A suggestion of the definition. *E-International Journal of Educational Research*, *12*(3), 68–81. https://doi.org/10.19160/e-ijer.946094

33. Petry, T. (2018). Digital Leadership. *Knowledge Management in Digital Change*. https://doi.org/https://doi.org/10.1007/978-3-319-73546-7_12

34. Promsri, C. (2019). Developing Model of Digital Leadership for a Successful Digital Transformation. *GPH - International Journal of Business Management (IJBM)*, *2*(8), 1–8.

35. Rudito, P., & Sinaga, M. (2017). *Digital Mastery: Membangun Kepemimpinan Digital Untuk Memenangkan Era Disrupsi*. Gramedia Pustaka Utama.

36. Saputra, N., Nugroho, R., Aisyah, H., & Karneli, O. (2021). Digital Skill During Covid-19: Effects of Digital Leadership and Digital Collaboration. *Journal of Applied Management*, *19*(2), 272–281. https://doi.org/10.21776/ub.jam.2021.019.02.04

37. Senadjki, A., Au Yong, H. N., Ganapathy, T., & Ogbeibu, S. (2023). 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

38. Sun, Z. Y., Li, J. M., Li, B., & He, X. Y. (2024). Digital leadership and deviant innovation: the roles of innovation self-efficacy and employee ambitions. *Current Psychology*, *43*(26), 22226–22237. https://doi.org/10.1007/s12144-024-06030-4

39. Tigre, F. B., Curado, C., & Henriques, P. L. (2023). Digital Leadership: A Bibliometric Analysis. *Journal of Leadership and Organizational Studies*, *30*(1), 40–70. https://doi.org/10.1177/15480518221123132

40. Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. *British Journal of Management*, *14*(3), 207–222. https://doi.org/10.1111/1467-8551.00375

41. Tulungen, E. E. W., Saerang, D. P. E., & Maramis, J. B. (2022). Transformasi Digital : Peran Kepemimpinan Digital. *Jurnal EMBA : Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, *10*(2), 1116–1123. https://doi.org/10.35794/emba.v10i2.41399

42. Türk, A. (2023). Digital leadership role in developing business strategy suitable for digital transformation. *Frontiers in Psychology*, *13*(January), 1–11. https://doi.org/10.3389/fpsyg.2022.1066180

43. Wang, G., Mansor, Z. D., & Leong, Y. C. (2024). Linking digital leadership and employee digital performance in SMEs in China: The chain-mediating role of high-involvement human resource management practice and employee dynamic capability. *Heliyon*, *10*(16), e36026. https://doi.org/10.1016/j.heliyon.2024.e36026

44. Wang, T., Lin, X., & Sheng, F. (2022). Digital leadership and exploratory innovation: From the dual perspectives of strategic orientation and organizational culture. *Frontiers in Psychology*, *13*(September), 1–20. https://doi.org/10.3389/fpsyg.2022.902693

45. Xia, Y., Liu, X., Wang, X., Deng, H., Han, C., Liu, Z., & Tsai, S. (2023). The power of role models in a team : The impact of lead entrepreneur ' s digital leadership on digital entrepreneurial success. *Information Processing and Management*, *60*(6), 1–15. https://doi.org/10.1016/j.ipm.2023.103498

46. Xu, N., Ghahremani, H., Lemoine, G. J., & Tesluk, P. E. (2022). Emergence of shared leadership networks in teams: An adaptive process perspective. *Leadership Quarterly*, *33*(6), 101588. https://doi.org/10.1016/j.leaqua.2021.101588

47. Zeike, S., Bradbury, K., Lindert, L., & Pfaff, H. (2019). Digital leadership skills and associations with psychological well-being. *International Journal of Environmental Research and Public Health*, *16*(14), 1–12. https://doi.org/10.3390/ijerph16142628

48. Zhong, L. (2017). Indicators of Digital Leadership in the Context of K-12 Education. *Journal of Educational Technology Development and Exchange*, *10*(1), 27–40. https://doi.org/10.18785/jetde.1001.03

49. Zhu, J., Zhang, B., Xie, M., & Cao, Q. (2022). Digital Leadership and Employee Creativity: The Role of Employee Job Crafting and Person-Organization Fit. *Frontiers in Psychology*, *13*, 1–12. https://doi.org/10.3389/fpsyg.2022.827057