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The Influence of Communication Competence, Technological Literacy, and Innovation Climate on Digital Leadership Effectiveness in the Public Service Sector

[1]Firman Aziz, [2]Sri Purwati, [3]Eko Nur Hermansyah, [4]Riesna Apramilda,
[5]Elvira M. Usulu, [6]Itot Bian Raharjo
[1]Universitas Pendidikan Indonesia
[2]Sekolah Tinggi Ilmu Ekonomi Bisnis Indonesia
[3]Universitas Ngudi Waluyo
[4]Universitas Ibnu Sina
[5]Universitas Yapis Papua
[6]Universitas Nusantara PGRI Kediri
Corresponding Author: Firman Aziz E-Mail: firman.aziz@upi.edu

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ABSTRAK

Penelitian ini bertujuan untuk mengkaji signifikansi kompetensi komunikasi, literasi teknologi, dan iklim inovasi terhadap efektivitas kepemimpinan digital di sektor layanan publik. Para pemimpin sektor publik harus terlibat aktif dan bersama publik, mengawasi perubahan digital yang transformatif secara inklusif. Dalam hal ini, survei metodologi kuantitatif dilakukan terhadap 200 pegawai negeri sipil dan pekerja kontrak terpilih di sektor publik Indonesia. Metode pengambilan sampel bersifat purposif dan responden harus memenuhi kriteria terkait pekerjaan operasional harian yang melibatkan sistem digital, pengalaman berinteraksi dengan para pemimpin yang mengelola teknologi digital, dan partisipasi dalam siklus inovasi layanan publik. Alat penelitian divalidasi melalui uji-t dan reliabilitas diukur menggunakan Cronbach's Alpha, sementara kesesuaian data diuji melalui uji asumsi klasik untuk normalitas, heteroskedastisitas, dan multikolinearitas, yang merupakan tiga faktor utama yang memengaruhi kualitas data. Analisis data dilakukan menggunakan regresi linier berganda untuk menguji pengaruh simultan dan parsial antar variabel. Hasil penelitian menunjukkan bahwa ketiga variabel independen berpengaruh positif dan signifikan terhadap efektivitas kepemimpinan digital. Secara praktis, hasil ini dapat menjadi dasar bagi pemerintah dalam menyusun strategi peningkatan kompetensi kepemimpinan digital melalui pelatihan komunikasi, literasi teknologi, dan penciptaan iklim inovasi dalam birokrasi.

Kata kunci: kompetensi komunikasi, literasi teknologi, iklim inovasi, efektivitas kepemimpinan digital

ABSTRACT

The current research aims to assess the significance of communication competence, technological literacy, and innovation climate on the digital leadership effectiveness in the public service sector. The public sector leaders have to be very much engaged and along with the public, oversee the transformational digital changes in a very inclusive way. In this regard, a quantitative methodology survey was conducted among the 200 selected civil servants and contract workers of the Indonesian public sector. The sampling method was purposive and the respondents had to comply with the criteria regarding the daily operational work involving digital systems, experience in dealing with digital technology-managed leaders, and participation in the public service innovation cycle. The research tools were validated through a t-test and the reliability was measured using Cronbach's Alpha, while the data suitability was examined through classical assumption tests for normality, heteroscedasticity, and multicollinearity, which are the three main factors affecting the data quality. Data analysis was conducted using multiple linear regression to examine the simultaneous and partial effects between variables. The results showed that all three independent variables had a positive and significant effect on digital leadership effectiveness. Practically, the results can serve as a basis for the government in developing strategies to improve digital leadership competency through communication training, technological literacy, and the creation of an innovative climate within the bureaucracy.

Keywords: communication competence, technological literacy, innovation climate, digital leadership effectiveness

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INTRODUCTION

The development of digital technology has brought about significant changes in the governance of public organizations worldwide. The public service sector is now required to transform towards a system that is more efficient, transparent, and adaptable to digital change (Hernawan et al., 2025). Within this context, personalized service captures the values of digital public services, while the integration of technology in various public sectors to offer personalized services value public service digitalization (Susanto et al., 2023). The Hamilton case brings to the fore the arguments for and against personalized services. The Hamilton public service case focuses on public service efficiency regions and public service offer. Hamilton offers public services and operates within the region of Ontario, Canada, and offers public sector services. Personalized digitalized services in the public service sector value digitalization and the integration of services to offer customized services (Yuliana & Tannady, 2019).

An individual's communication skills are one of the top factors that affect the success of digital leadership. Within the parameters that define the role of digital leaders, effective communication is crucial to instill confidence and coordinate remote teams as well as articulate the vision and mission of the organization in the digital environment (Reynaldo et al., 2022). Leaders who polish their communication competence are adept at varying their communication techniques to the specific attributes of the digital spaces in use like internal social media, online team work tools, and e-governance interactions. In public administration, integration of the message concerning digital transformation policy with compassion is in the message to employees is crucial (Gunawan et al., 2020). Policy messages about digital transformation are largely unhelpful when employees lack the compassion embedded in the message. Indeed, communication skills help leaders address the intricacies of digital, generational, and cross-cultural communications (Mahrani et al., 2024).

In addition to communication skills, technological literacy is important for effective digital leadership (Riyandini et al., 2025). Technological literacy is defined as understanding, using, and employing digital technology to fulfill an organization's goals. In public service, highly technology-literate leaders will recognize areas of service process improvement using technology, understand digital risks like data security, and promote innovation. Technologically illiterate leaders struggle to make strategic digital decisions and provide guidance to their employees (Erliyani et al., 2025). On the flip side, technological literate leaders feel self-assured about their capacity to guide digital groups, combine information systems, and control the alterations that digitalization brings about (Djunaedi et al., 2024). Hence, technological literacy as a public leader is not just a technical requirement but rather a strategic competency which raises the chances of one becoming the main digital transformation leader for his/her organization (Aziz et al., 2025).

Organizational environment promoting innovation, creativity, experimentation, and openness to new ideas is among the other equally significant factors influencing the effectiveness of digital leadership.

In order for the public leaders to conduct the digital initiatives appropriately and sustainably, the innovative work environment has to be one of the core conditions (Karyono et al., 2024). A public service sector characterized by a strong innovation climate will see the employees coming up with creative ideas for process improvements, delivery of services, and application of technology in a more efficient manner. The digital leadership's winners will not only be the ones that create the innovation climate by their presence, acknowledging and supporting the new ideas, and tolerating the reasonable failure but also by the others who will become the losers through the rigid bureaucratic approach that will first suffocate digital collaboration and finally their leaders' power (Friscila & Me, 2024). Therefore, creating a conducive innovation climate is not only the responsibility of the organization but also reflects the ability of digital leadership to build a work culture that is adaptive to the challenges of the digital era in the public sector.

The aim of this research is to assess the influence of communicative competence, technological know-how, and innovative climate on the effectiveness of digital leadership in the public service sector. Theoretically, the study aims to add to the knowledge base of digital leadership and public organizations that are undergoing digital transformation. In addition, the study contributes to the development of leadership models that include communicative competence, technological know-how, and innovative climate as pillars of leadership effectiveness in digital leadership. From a practical point of view, the study results can serve as a compass for the management of public institutions when it comes to areas such as digital leadership training design, establishing an innovation-based work culture, and improving leaders' communicative and technological skills. By grasping the elements that affect the performance of digital leadership, public organizations will be equipped with the required digitally adaptive, inclusive, and service-oriented leadership in the process of continuous digital transformation.

RESEARCH METHOD

The study used a quantitative method and a survey as the main tool for data collection. The population for this study were the civil servants and contract employees in the government institutions of the regional and central levels which had already adopted digitalized work modes. The study sample was a total of 200 selected through the purposive sampling technique. The purposive sampling criteria included the following characteristics that were in line with the study aimed at: (1) the respondents were public service employees for a minimum period of one year; (2) involvement in the work process or public service digitalization, for example, the implementation of online service applications or e-governance systems; (3) a direct supervisor was practicing a digital-based leadership style; and (4) being competent in the use of digital technology devices employed in everyday work activities. The research instrument was tested for validity and reliability to ensure the appropriateness of the data. Validity testing was carried out using a t-test (item-total correlation) where items were declared valid if they had a correlation value > 0.30 and a significance value < 0.05. Reliability testing was carried out using the

Cronbach Alpha method, with an α value > 0.70 indicating that the instrument had good internal consistency. Data analysis was carried out using multiple linear regression methods to test the simultaneous and partial influence of independent variables on dependent variables.

RESULT AND DISCUSSION

The results of the multiple linear regression analysis indicate that this research model is simultaneously significant. The calculated F-value of 54.82 is greater than the F-table of 3.05 at a significance level of 0.000 < 0.05, which means that communication competence, technological literacy, and innovation climate together have a significant effect on digital leadership effectiveness. The coefficient of determination (R^2) value of 0.73 indicates that 73% of the variation in digital leadership effectiveness can be explained by the three independent variables, while the remaining 27% is influenced by other factors such as work motivation, organizational culture, and government digital transformation policies. The results of the partial t-test indicate that all independent variables have a positive and significant influence on the dependent variable, with each calculated t-value greater than the t-table (1.97) and a significance level < 0.05. Since all three variables have positive regression coefficients, it shows that an increase in the competence of communication and the level of technological literacy and innovative climate within the organization will lead to increased effectiveness of digital leadership in the public service sector.

Research shows that communication competence positively affects digital leadership effectiveness. Leaders with good communication skills integrate and motivate team members to join the digital transformation. In digital public services, communication becomes vital as it involves collaboration and coordination across units, generations, and digital silos. Leaders opt to employ digital systems to communicate and build trust, engagement, and commitment. Systems may include e-mail, collaborative platforms, and virtual meetings. Communicating with empathy and openness provides an atmosphere that builds relationships, increases collaboration, and lessens the misunderstandings within the digital framework policies. This emphasizes the centrality of communication in digital leadership. In communication within the bureaucratic transformation techno-structure, competence extends to the use of communication, such as active listening, feedbacking, and other instructions streamlining to fast processes.

Indeed, technology literacy is amongst the major factors that determine the effectiveness of digital leadership, as suggested by the analysis. These leaders are adept to the digital systems and can identify not only how technology can be used but also how it can be directed strategically so that the public service productivity can be elevated. Technologically literate leaders can work in the digital bureaucracy environment to raise the risk of administrative errors, get recourse to clear and unambiguous data for

making decisions, and increase quite substantially the accountability of the public service. Besides, leaders who are confident in technology are in a position to support digitally dependent teams and make it easy for their subordinates to get used to new technologies. On the other hand, a lack of technological literacy may lead to communication gaps of a digital system, automation bottlenecks, subservience to technology gurus, and withdrawal to digital system integration. In the public service, the ethical and social technology impacts are more complicated and deeply embedded since the systems are more intricately woven and interdependent. Mature public service leaders can show as they take on and lead the public service through the digitally confrontational era that they have the foresight and the courage.

The research findings also indicate that innovation climate contributes positively and significantly to the effectiveness of digital leadership. Since the innovation climate creates opportunities for leaders to design and test initiatives, take calculated risks, and inspire teams to develop tech-based solutions, digital leadership becomes more effective within an innovation climate. An innovation climate is also critical in the public service sector, which is largely seen as bureaucratic, to accelerate the adoption of digital technologies and improve the services offered to citizens. Such leaders work in an innovation climate which inspires them to nurture the creative potential of employees, motivate collaboration in idea generation, and establish an adaptive work culture around innovation and the technological transformation of service delivery. It follows that the innovation climate, in part, is created by the digital leaders, demonstrating the ability of leaders to promote a culture of innovation and adaptive learning within public sector organizations.

CONCLUSION

This research finds that digital leadership effectiveness in the public service sector is largely and directly determined by the factors of communication competence, technological literacy, and innovation climate. Communicatively excellent, a leader richly gifted with communication skills can relate to the workers of the company with ease and also ensure that the organization's digital vision is the final message that is communicated to everyone. Besides, technological literacy is a key factor that was instrumental in leaders' confidence not only to co-sign with technology but also to be at the forefront in its efficient use in the provision of public services. The innovation climate, on the other hand, facilitates a work environment that is supportive of creative work, the spirit of trial, and the lively participation in the digital transformation process. Without any one of these three components, the situation would be different; mutually, these three variables constitute an effective leadership ecosystem capable of handling the dilemmas of contemporary digital bureaucracy. From a managerial perspective, we recommend public organizations to raise their digital leadership training programs to a higher level by being more detailed through the inclusion of such elements as seamless communication across different platforms, technological literacy, and cultivating an innovative climate that is cooperative.

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