Jurnal Multidisiplin West Science
Vol. 5, No. 06, June 2026, pp. 1027-1037

The Role of Digital Leadership in Improving the Performance Productivity of State Civil Apparatus in the Era of Digital Transformation

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ABSTRAK

Transformasi digital di sektor publik membutuhkan Aparat Sipil Negara (ASN) untuk tidak hanya mahir dalam teknologi tetapi juga beroperasi dalam ekosistem birokrasi yang dipimpin secara adaptif, inovatif, dan berbasis data. Studi ini bertujuan untuk mengeksplorasi peran kepemimpinan digital dalam meningkatkan produktivitas kinerja ASN di era transformasi digital. Studi ini menggunakan pendekatan kuantitatif dengan desain survei eksploratif. Data dikumpulkan melalui kuesioner skala Likert 1–5 yang mencakup lima indikator kepemimpinan digital dan lima indikator produktivitas kinerja ASN di Kantor Penanaman Modal dan Pelayanan Terpadu Satu Pintu Kabupaten Banggai (DPMPTSP). Sampel penelitian terdiri dari 30 ASN. Analisis dilakukan menggunakan statistik deskriptif, uji validitas korelasi item-total, reliabilitas Cronbach's Alpha, korelasi Pearson dan Spearman, dan regresi linier sederhana. Hasil penelitian menunjukkan bahwa kepemimpinan digital berada pada kategori sangat tinggi dengan skor rata-rata 4,85, sedangkan produktivitas kinerja ASN juga berada pada kategori sangat tinggi dengan skor rata-rata 4,90. Instrumen tersebut menunjukkan reliabilitas yang baik, dengan alpha Cronbach untuk variabel kepemimpinan digital sebesar 0,889 dan produktivitas kinerja sebesar 0,968. Hubungan antara kepemimpinan digital dan produktivitas kinerja ASN bersifat positif dan signifikan menurut Pearson (r = 0,398; p = 0,030) dan Spearman (rho = 0,483; p = 0,007). Model regresi menghasilkan koefisien B = 0,362 dengan R^2 = 0,158, menunjukkan bahwa kepemimpinan digital menjelaskan sekitar 15,8% variasi dalam produktivitas kinerja. Namun, hasil ini perlu diinterpretasikan dengan hati-hati karena ukuran sampel yang terbatas dan kecenderungan efek batas atas (ceiling effect). Studi ini menekankan pentingnya kepemimpinan digital sebagai pendorong produktivitas ASN melalui arahan berbasis teknologi, adaptasi kerja digital, kolaborasi, dan pembentukan budaya inovasi.

Kata Kunci: *Kepemimpinan Digital, Produktivitas Kinerja, Aparat Sipil Negara, Transformasi Digital, SPBE*

ABSTRACT

Digital transformation in the public sector requires the State Civil Apparatus (ASN) to not only be proficient in technology but also operate in a bureaucratic ecosystem that is led in an adaptive, innovative, and data-driven manner. This study aims to explore the role of digital leadership in increasing the productivity of ASN performance in the era of digital transformation. This study used a quantitative approach with an explanatory survey design. Data were collected through a Likert 1–5 scale questionnaire that included five indicators of digital leadership and five indicators of ASN performance productivity at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP). The research sample consisted of 30 ASN. The analysis was carried out using descriptive statistics, the validity test of item-total correlation, the reliability of Cronbach's Alpha, the Pearson and Spearman correlation, and simple linear regression. The results showed that digital leadership was in the very high category with an average score of 4.85, while the productivity of ASN performance was also in the very high category with an average score of 4.90. The instrument showed good reliability, with Cronbach's alpha for the digital leadership variable of 0.889 and performance productivity of 0.968. The relationship between digital leadership and ASN performance productivity was positive and significant according to both Pearson (r = 0.398; p = 0.030) and Spearman (rho = 0.483; p = 0.007). The regression model yielded a coefficient of B = 0.362 with R^2 = 0.158, suggesting that digital leadership explains about 15.8% of the variation in performance productivity. However, these results need to be interpreted with caution due to the limited sample size and tendency of the ceiling effect. This study emphasizes the importance of digital leadership as a driver of ASN productivity through technology-based direction, digital work adaptation, collaboration, and the formation of a culture of innovation.

Keywords: *Digital Leadership, Performance Productivity, State Civil Apparatus, Digital Transformation, SPBE*

INTRODUCTION

Digital transformation has become a strategic agenda in modern governance because digital technology changes the way bureaucracies design policies, provide services, manage data, communicate with citizens, and evaluate apparatus performance. In the Indonesian context, the digital transformation of the public sector is becoming stronger through the Electronic-Based Government System (SPBE) policy, the national SPBE architecture, the acceleration of the integration of national digital services, and the bureaucratic reform agenda that emphasizes simple, fast, transparent, and integrated public services (Republic of Indonesia, 2018, 2022, 2023a; Ministry of PANRB, 2024a, 2024b). This change places civil servants as the main actors because the success of digital transformation is not only determined by applications, infrastructure, and regulations, but also by the ability of apparatus and bureaucratic leaders to change organizational work patterns.

Bureaucratic digitalization provides a great opportunity to increase ASN productivity. Technology can speed up coordination, reduce manual work, improve data accuracy and transparency, and expand access to public services. However, various studies on digital government show that digital transformation is not just a technical process, but also an organizational change related to strategy, culture, work processes, authority structures, employee competencies, and public legitimacy (Dunleavy et al., 2006; Gil-Garcia et al., 2018; Mergel et al., 2019; Tangi et al., 2021; Twizeyimana & Andersson, 2019). Therefore, digitalization that is not followed by a change in leadership often results only in the use of applications administratively, without a meaningful increase in productivity.

In public administration, ASN performance productivity is related to employees' ability to complete work on time, achieve targets, adapt to digital work systems, take initiatives, and collaborate through digital platforms. This orientation is in line with the performance management paradigm of ASN employees, which emphasizes achieving results, meeting leadership expectations, performance dialogue, and sustainable performance development (Ministry of PANRB, 2022; Republic of Indonesia, 2023b). ASN productivity can also be understood as a combination of output quantity, work quality, work behavior, adaptation, and employee contribution to organizational goals (Campbell & Wiernik, 2015; Koopmans et al., 2013, 2014; Robbins & Judge, 2022).

One factor that is increasingly relevant in explaining the productivity of civil servants in the digital era is digital leadership. Digital leadership refers to the ability of leaders to direct, influence, and move organizations by leveraging digital technology, building a culture of innovation, creating virtual collaborations, and ensuring that technology is used to generate public value. This concept is rooted in the study of e-leadership, which emphasizes leadership through technological media and then develops into digital transformation leadership that combines vision, agility, digital capabilities, and organizational culture change (Avolio et al., 2000, 2014; Cortellazzo et al., 2019; Van Wart et al., 2019; Westerman et al., 2014).

The academic debate on digital leadership points to two important perspectives. First, digital leadership is seen as an extension of transformational leadership because leaders play a role in building vision, inspiring, driving innovation, and driving change (Bass, 1985; Bass & Riggio, 2006; Porfírio et al., 2021). Second, digital leadership is a distinctive competency that demands technological understanding, data-driven decision-making, digital collaboration orchestration, information security, and the ability to manage rapid change (Kane et al., 2019; OECD, 2021; Van Wart et al., 2019; Botol, 2019). These two views complement each other because leaders of the digital bureaucracy need to have a human orientation and technological prowess.

Previous research has indicated that digital leadership is related to technology acceptance, digital culture, innovation, organizational transformation, and employee performance (AlNuaimi et al., 2022; Kalasindhu & Kuntonbutr, 2023; Kasmon et al., 2022; Nuryadin et al., 2023; Oct. 2025; Wang et al., 2025). However, empirical studies in the context of Indonesian civil servants need to be expanded, especially those that use simple but measurable questionnaire data to assess the direct relationship between employees' perceptions of digital leadership and performance productivity. This research gap is important because the Indonesian bureaucracy is in the phase of accelerating the integration of digital services, so leaders in government work units are expected not only to use applications but also to encourage employees to be more productive in the digital work system.

Based on this background, this research is entitled "The Role of Digital Leadership in Increasing the Performance Productivity of State Civil Apparatus in the Era of Digital Transformation." The purpose of this study is to analyze the level of digital leadership, the level of productivity of ASN performance, and the influence of digital leadership on the productivity of ASN performance at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP). This research is expected to make a practical contribution for leaders of government agencies in strengthening leadership patterns that are adaptive to technology, as well as an academic contribution to the development of digital leadership studies in Indonesian public administration.

LITERATURE REVIEW

A. Digital Leadership

Digital leadership can be understood as a leader's capacity to use technology as a means of influencing organizational behavior, establishing strategic direction, developing a digital work culture, and ensuring that organizational transformation generates value for stakeholders. Avolio et al. (2000) introduced e-leadership as a social influence process that is mediated by information technology. This concept extends from mere virtual communication to strategic capabilities in leading digital change, including strengthening vision, collaboration, decision-making speed, data integration, and service innovation (Avolio et al., 2014; Cortellazzo et al., 2019; Van Wart et al., 2019).

In public organizations, digital leadership has different complexities than in the private sector. Public leaders not only pursue internal efficiency but must also maintain accountability, access fairness, openness, data security, and public value. Therefore, digital leadership in bureaucracy needs to be positioned as the ability to direct technology to support public service missions, not just to introduce new applications (Cordella & Bonina, 2012; Gil-Garcia et al., 2018; OECD, 2021; United Nations, 2024).

The digital leadership indicators in this study include the use of digital technology by superiors, encouragement of the use of digital tools, flexibility and adaptation to technological changes, provision of direction through digital media, and the creation of technology-based innovations. The five indicators represent the dimensions of leader behavior that are relevant to digital transformation, namely, technology orientation, change support, digital communication, and innovation.

B. ASN Performance Productivity

Performance productivity refers to the ability of individuals to produce work output effectively and efficiently according to organizational standards. In the organizational behavior literature, individual performance is not only seen from the end result but also from task behavior, contextual behavior, adaptation, and employee initiative (Campbell & Wiernik, 2015; Koopmans et al., 2013). In the context of ASN, performance productivity is related to the fulfillment of work targets, service quality, punctuality, collaboration, and adaptability to changes in governance.

ASN performance management regulations emphasize that employee performance is a continuous process that involves planning, implementation, monitoring, coaching, assessment, and follow-up. Thus, civil servants' productivity cannot be separated from leadership quality, performance dialogue, leadership expectations, and work facilities that enable employees to work more effectively (Ministry of PANRB, 2022; Republic of Indonesia, 2023b). In the digital era, these work facilities are increasingly in the form of platforms, applications, dashboards, and online collaborative systems.

The performance productivity indicators in this study include completing tasks on time, achieving work targets, adaptability to digital work systems, initiatives at work, and collaboration through media or digital platforms. This indicator is compiled to capture the work productivity of civil servants who are not only administrative but also adaptive to the demands of digitalization.

Digital Transformation, Technology Acceptance, and Work Change Digital transformation is organizational change triggered by the use of digital technology to reshape processes, structures, strategies, and service models. Vial (2019) emphasizes that digital transformation creates a change in an organization's response to digital disruption, while Verhoef et al. (2021) place digital transformation as a multidisciplinary process that involves strategies, operating models, and relationships with users. In the public sector, digitalization is also related to service design, data integration, interoperability, and the government's ability to generate public value (Mergel et al., 2019; Tangi et al., 2021; Twizeyimana & Andersson, 2019).

Digital leadership is also related to technology acceptance theory. Davis (1989) shows that the usability and ease of use of technology affect user acceptance. Venkatesh et al. (2003) explained that performance expectations, business expectations, social influences, and facilitation conditions affect the use of technology. In bureaucracy, leaders can strengthen social influence and facilitation conditions by directing, providing support, building employee confidence, and ensuring that technology actually helps work.

Recent studies have shown that digital leadership can strengthen the acceptance of technology and innovative behaviors because leaders provide meaning, direction, and psychological support for digital change (Kalasindhu & Kuntonbutr, 2023; Kasmon et al., 2022; Wang et al., 2025). In other words, technology does not automatically increase

productivity; productivity arises when leaders are able to connect technology to work goals, form a learning culture, and reduce employee resistance or confusion.

C. Conceptual Framework and Hypothesis

The conceptual framework of this study uses digital leadership as the independent variable (X) and ASN performance productivity as the dependent variable (Y). The basic assumption is that the better the digital leadership behavior felt by employees, the higher the productivity of ASN performance. Leaders who actively utilize technology, encourage the use of digital tools, are adaptive to change, provide direction through digital media, and create technology-based innovations will make it easier for employees to complete tasks, achieve targets, adapt, take initiatives, and collaborate.

Digital Leadership (X)	→	**ASN(Y) Performance Productivity**

Figure 1. Conceptual framework of the research

The research hypothesis is formulated as follows: H1: Digital leadership has a positive and significant effect on the productivity of ASN performance in the era of digital transformation.

RESEARCH METHODS

A. Research Design

This study used a quantitative approach with an explanatory survey design. A quantitative approach was chosen because the research aimed to test the relationship and influence between variables based on numerical data. The explanatory design is used to explain the extent to which digital leadership plays a role in increasing the productivity of ASN performance at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP). The selection of this method is in line with the tradition of survey research in management and public administration, which requires the measurement of respondents' perceptions in a structured manner (Creswell & Creswell, 2018; Sekaran & Bougie, 2020; Scott, 2022).

B. Research Location and Time

The research was conducted at the One-Stop Integrated Services Investment Office (DPMPTSP) of the Banggai Regency, which is the agency responsible for the implementation of integrated licensing services. This location was chosen based on the consideration that the performance of the ASN within the DPMPTSP plays an important role in providing services to the community and investors. The research was conducted in the period of March 2026, in accordance with the period of data collection and report preparation

C. Population and Sample

The research population was the ASN at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP). Based on internal secretariat data, the number of ASN is 30. Because the population was relatively small and affordable, this study used the entire population as

a sample. This technique aims to obtain a comprehensive and accurate picture of ASN performance without election bias.

D. Research Instruments

The research instrument used a five-point Likert scale questionnaire, namely 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The digital leadership variable was measured using five items, while the productivity variable of ASN performance was measured using five items. Variable scores were obtained by summing the scores of each item. Thus, the total score of each variable ranged from 5 to 25.

Table 1. Operationalization of Research Variables

Variable	Indicator	Code	Scale
Digital Leadership	Utilization of digital technology in the work process	X1	Likert 1–5
Digital Leadership	Encouragement of the use of digital tools to complete tasks	X2	Likert 1–5
Digital Leadership	Flexibility and adaptation to technological changes	X3	Likert 1–5
Digital Leadership	Instructions for using digital media	X4	Likert 1–5
Digital Leadership	Digital technology-based innovation	X5	Likert 1–5
ASN Performance Productivity	Timely completion of tasks	Y1	Likert 1–5
ASN Performance Productivity	Achievement of work targets	Y2	Likert 1–5

E. Data Analysis Techniques

Data analysis was carried out in several stages. First, descriptive statistics were used to describe averages, standard deviations, minimum values, maximums, and categories of variables. The interpretation category using the Likert scale interval of 1–5:1.00–1.80, very low; 1.81–2.60, low; 2.61–3.40, moderate; 3.41–4.20, high; and 4.21–5.00, very high. Second, the validity of the items was tested through corrected item-total correlation, with a table r comparator of approximately 0.361 at n = 30 and a significance level of 5%. Third, the reliability of the instrument was tested using Cronbach's alpha, with values above 0.70 considered adequate. Fourth, the relationship between variables was tested using Pearson and Spearman correlations. Spearman is used as a comparator because the data show a highly concentrated distribution on high scores. Fifth, the influence of digital leadership on ASN performance productivity was tested through a simple linear regression with the equation $Y = a + bX$. The statistical procedure followed the general quantitative analysis rules of Ghozali (2021) and Hair et al. (2019).

RESULT AND DISCUSSION

A. Descriptive Statistics of Variables

The results of the descriptive analysis show that the respondents' perceptions of digital leadership and ASN performance productivity are in the very high category. The median value of both variables was at the maximum score, which indicated that most respondents gave a yes to strongly agree answer. This condition indicates a positive perception of the role of digital leaders and work productivity but also indicates a potential ceiling effect because the variation in answers is relatively limited to high scores.

Table 2. Descriptive Statistics of Research Variables

Variable	N	Minutes	Max	Average total	Total SD	Average per item
Digital Leaders hip (X)	30	20	25	24,27	1,57	4,85
ASN Performance Productivity (Y)	30	20	25	24,50	1,43	4,90

Table 3. Average Score of Each Indicator

Code	Simple Indicators	Means	SD	Categories
X1	Utilization of digital technology	4,87	0,35	Very high
X2	Encouragement of the use of digital tools	4,87	0,35	Very high
X3	Adaptation to technological changes	4,83	0,46	Very high
X4	Instructions through digital media	4,87	0,35	Very high
X5	Technology-based innovation	4,83	0,38	Very high
Y1	On-time tasks	4,90	0,31	Very high
Y2	Achievement of work targets	4,90	0,31	Very high
Y3	Adaptation of digital work systems	4,93	0,25	Very high
Y4	Work initiatives	4,90	0,31	Very high
Y5	Digital collaboration	4,87	0,35	Very high

B. Instrument Validity and Reliability Test

A validity test was performed using a corrected item-total correlation. All items in the digital leadership and productivity variables of ASN performance have a correlation value greater than the r-table so that all items can be maintained in the analysis. The reliability test showed that both variables had excellent internal consistency.

Table 4. Summary of Item Validity

Variable	Code	r Total Corrected Items	p-value	Verdict
Digital Leadership	X1	0,829	<0.001	Applicable
Digital Leadership	X2	0,829	<0.001	Applicable
Digital Leadership	X3	0,536	0,002	Applicable
Digital Leadership	X4	0,829	<0.001	Applicable
Digital Leadership	X5	0,724	<0.001	Applicable
ASN Performance Productivity	Y1	0,978	<0.001	Applicable
ASN Performance Productivity	Y2	0,978	<0.001	Applicable
ASN Performance Productivity	Y3	0,793	<0.001	Applicable
ASN Performance Productivity	Y4	0,978	<0.001	Applicable
ASN Performance Productivity	Y5	0,842	<0.001	Applicable

Table 5. Reliability Test

Variable	Number of Points	Alpha Cronbach	Interpretation
Digital Leadership	5	0,889	Excellent reliability
ASN Performance Productivity	5	0,968	Excellent reliability
Combination of instruments	10	0,904	Excellent reliability

C. Normality and Correlation Test

The Shapiro-Wilk test showed that the total score of digital leadership was not normally distributed ($W = 0.521$; $p < 0.001$), and the total score of ASN performance productivity was also not

normally distributed (W = 0.388;p <0.001). This abnormality is mainly due to the dominance of answers with high scores. Therefore, correlation analysis was performed using Pearson and Spearman. Pearson's results showed a positive and significant relationship between digital leadership and ASN performance productivity (r = 0.398; p = 0.030), while Spearman's results showed a positive and significant relationship (rho = 0.483; p = 0.007).

Table 6. Correlation Test Results

Types of correlation	Coefficients	p-value	Direction of contact	Verdict
Pearson	0,398	0,030	Positive	Significant
Spear	0,483	0,007	Positive	Significant

D. Simple Linear Regression Results

The results of a simple linear regression show that digital leadership has a positive effect on ASN performance productivity. The regression equation obtained was Y = 15.721 + 0.362X. A regression coefficient of 0.362 means that every one-point increase in the digital leadership score is followed by an increase in average performance productivity of 0.362 points. An R^2 value of 0.158 indicates that digital leadership explains approximately 15.8% of the variation in ASN performance productivity, while the rest is explained by other factors outside the model, such as digital competencies, organizational culture, reward systems, job design, technology infrastructure, workload, and organizational support.

Table 7. Summary of Simple Linear Regression Results

Models	B	OR	T	p-value	Verdict
Constant	15,721	-	-	-	-
Digital Leadership →	0,362	0,158	2,293	0,030	Significant

Discussion

The results show that digital leadership and ASN performance productivity are both very high. These findings indicate that respondents perceived leaders to have utilized digital technology, encouraged the use of digital tools, were adaptive to technological changes, provided direction through digital media, and created technology-based innovations. At the same time, respondents also rated themselves as being able to complete tasks on time, achieve targets, adapt to digital work systems, take initiatives, and collaborate through digital platforms.

The positive relationship between digital leadership and ASN performance productivity supports the argument that leadership has a central role in ensuring that technology is actually used to improve performance, not just as an administrative tool. These findings are in line with the e-leadership literature that places technology as a medium of social influence (Avolio et al., 2000; Van Wart et al., 2019), as well as the digital transformation literature that emphasizes the importance of organizational strategy, culture, and capabilities (AlNuaimi et al., 2022; Botol, 2019; Warner & Wäger, 2019).

In the context of civil servants, digital leaders function as a link between government digitalization regulations and the daily work behavior of employees. The Presidential Regulation on SPBE and the acceleration of digital transformation provide macro policy direction, but implementation in work units is greatly influenced by the way leaders translate these policies into directions, priorities, work systems, and employee development. Thus, digital leadership has

become an organizational mechanism that transforms technology from a passive device into a work practice that increases productivity.

The R^2 value of 15.8% shows that digital leadership is an important factor, but not the only determinant of ASN's performance productivity. Performance productivity can also be influenced by digital competencies, work experience, motivation, organizational culture, quality of information systems, workload, reward systems, infrastructure support, and clarity of performance goals. This is consistent with the view that digital transformation is a sociotechnical change, and that its success is determined by the interaction between technology, people, processes, and organizational structures (DeLone & McLean, 2003; Mergel et al., 2019; Verhoef et al., 2021).

Practically, the results of the study indicate that government agencies need to strengthen digital leadership at the work unit leadership level, not only at the national policy level. Leaders need to be role models in the use of technology, ensure that employees understand the benefits of applications, provide learning spaces, build clear digital communication, and encourage innovation based on real work problems. In this way, digital transformation can move from application usage compliance to increased productivity and quality of public services.

However, this study also has limitations. First, the number of respondents was relatively small, so the generalization of the results must be done carefully. Second, the distribution of answers was highly concentrated on high scores; therefore, there was a potential ceiling effect that could limit data variations. Third, the available data do not contain demographic or organizational characteristics, such as age, gender, position, working period, work unit, level of digital competency, and intensity of application use. Fourth, cross-sectional designs cannot strongly prove a causal relationship. Therefore, follow-up research is recommended using a larger sample, cross-agency data, mediating variables such as digital competence and digital culture, and SEM or multiple regression analysis.

CONCLUSION

This study concludes that the digital leadership and productivity of ASN performance at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP) are in the very high category. The research instrument had adequate grain validity and excellent reliability. Digital leadership is positively and significantly related to the productivity of ASN performance, based on both Pearson and Spearman. The regression results showed that digital leadership had a positive effect on the productivity of ASN performance, with an explanatory contribution of 15.8%.

The theoretical implication of this study is to strengthen the evidence that digital leadership is relevant as a perspective for explaining the performance of apparatus in the era of digital transformation. The practical implication is that government agencies must develop digital leadership capacity through training, coaching, strengthening data literacy, digital communication, change management, and service innovation. ASN leaders must be role models for the use of technology and build a work climate that supports employees in learning, adapting, and collaborating.

The main limitations of this study lie in the limited number of samples, the unavailability of demographic variables, and the distribution of answers that are skewed

towards high scores. This condition makes the research results more appropriately positioned as an initial study based on the available questionnaire data. In the final version of the publication, researchers must add respondents, balance the variety of work units, and equip instruments with indicators of digital competence, digital culture, and infrastructure support.

ACKNOWLEDGMENTS

We would like to express our deepest gratitude to the civil servants at the Banggai Regency Investment and One-Stop Integrated Services Office (DPMPTSP) who participated in this study. We would like to express our sincere gratitude to the research team and individuals who provided valuable insights and support during this study. We also express our appreciation to the editorial team and reviewers for their constructive feedback and guidance, which greatly improves the quality of this article.

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