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The Digital Divide Among Civil Servants in the DKI Jakarta Provincial Government: The Role of Age and Education in Digital Competency Readiness

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Abstract: The maturity of Indonesia's Electronic-Based Government System (SPBE) and the high level of internet penetration in DKI Jakarta do not necessarily translate into an even distribution of digital skills among public servants. This study analyses the second-level digital divide among civil servants (ASN) of the DKI Jakarta Provincial Government by examing their digital competence readiness and its association with age and educational attainment. A quantitative, cross-sectional design with descriptive and explanatory aims was used. Primary data were collected in 2026 through an on survey of 370 civil servants selected by combining the UTAUT and DigComp frameworks. The findings show that digital competence readiness is adequate, with 81,9% of respondent in the ready category. However, mastery is uneven across dimensions: digital communication and collaboration obtained the highest mean score (4,12), whereas digital content creation obtained the lowest (3,91). This variation indicates a second-level digital divide, even though all respondents already use digital systems in their work. Age and educational attainment are associated with readiness but are not sole determinants. Digital competence development for civil servants should therefore be tailored to the needs of each employee group, particularly in content creation and digital security. Because the sample was non-probability, the findings are not intended for statistical generalisation.

Keywords: *Second-Level Digital Divide: Digital Competence, Civil Servants, UTAUT, DigComp, DKI Jakarta Provincial Government.*

A. INTRODUCTION

Digital transformation is changing how governments deliver public services and manage their bureaucracies. In Indonesia, this change is streed through the Electronic-Based Government System (*Sistem Pemerintahan Berbasis Elektronic,* SPBE), whose maturity is evaluated annually by the Ministry of State Apparatus Utilization and Bureaucratic Reform (Kementerian PANRB). In the 2023 evaluation, the national SPBE index stood at 2.79, whereas the DKI Jakarta Provincial Government scored 4.21 and was rated "Satisfactory" (Kementerian PANRB, 2024). In addition, Java, including DKI Jakarta, has the highest internet penetration in Indonesia at 83,64%, above the national average of 79,5%, according to the 2024 survey by the Indonesian Internet Service Providers Association (APJII, 2024). DKI Jakarta therefore operates in an environment with relatively mature digital infrastructure and systems.

However, the availability of infrastructure does not automatically ensure that every employee can use it equally well. The digital divide literature distinguishes three levels. The first-level divide concerns inequality in access to technology. The second-level divide concerns inequality in capability, that is, differences in individuals' ability to use technology. The third-level divide concerns inequality in the outcomes obtained from technology use, such as learning and productivity (Wei et al., 2011). The notion of the second-level divide originates in Hargittai (2002), who highlighted differences in online skills among users who are already connected. The systematic review by Scheerder et al. (2017) found that most of the determinants examined relate to the second level and are dominated by sociodemographic and

socioeconomic factors.

This study focuses on the second-level digital divide for three reasons. First, in an environment with mature SPBE and high internet penetration, barriers to access are relatively small, so variation in readiness is more likely to reflect individual capacity. Second, the outcome divide is considered to stem from the capability divide (Wei et al., 2011); understanding who is less ready is therefore a prerequisite for assessing the consequences for performance. Third, capability can be addressed through competency development policies, which, under Law No. 20 of 2023 on the State Civil Apparatus, every civil servant is required to pursue continuously.

The problem at this level becomes visible in the heterogeneity of the civil service. The DKI Jakarta Provincial Government employs 65,795 civil servants (Aparatur Sipil Negara, ASN), of whom 44,390 are civil servants and candidate civil servants (PNS/CPNS) and 21,405 are government employees with work agreements (PPPK) (BKD DKI Jakarta, 2026). In the primary data of this study (n = 370), respondents' ages ranged from 21 to 59 years, and their highest educational attainment ranged from senior high school or equivalent to a doctoral degree. Age is commonly associated with digital proficiency through the notion of digital natives and digital immigrants (Prensky, 2001). However, this notion has been criticised because empirical evidence shows that digital proficiency is not determined by generation alone (Bennett et al., 2008). Age should therefore be analysed together with other factors, particularly education, which plays a role in shaping employees' competence.

Several previous studies provide a foundation while also revealing limitations. Silitonga (2023) surveyed 125 civil servants in DKI Jakarta, West Java, and the Special Region of Yogyakarta. About 79.2% of respondents judged that Generations Y and Z have no difficulty operating work applications, whereas about 45.6% judged that many civil servants of Generation X and the baby-boomer generation still face difficulties. These findings rest on respondents' perceptions and do not directly test the effects of age or education. Sarjito and Djati (2025) examined the digital competence of millennial civil servants in relation to digital bureaucratic reform, so their scope is limited to a single generation. Nguyen et al. (2024) applied the DigComp framework to 723 Vietnamese citizens and related digital competence to individual characteristics such as age and education, but their respondents were the general public rather than government employees. Expósito-López (2025) showed, through doctrinal and statistical analysis rather than individual-level testing, that the ageing of the public-sector workforce in Spain risks deepening the secondary digital divide, including vulnerability to cyber threats. Müller-Török and Hemker (2022) found that the digital competence content in the education of prospective public-sector employees in Germany remains insufficient and, in the worst cases, is not taught at all, which suggests that a higher level of education does not necessarily guarantee digital competence.

This review reveals a research gap. To the authors' knowledge, previous studies tend to (a) treat digital competence as a single score or examine only one age group, (b) rely on perceptions or crude generational categories, (c) not test whether education compensates for the effect of age, and (d) not examine civil servants in a local government with a high level of SPBE maturity.

The novelty of this study lies in four aspects. First, readiness is measured across nine dimensions, namely four UTAUT constructs (Venkatesh et al., 2003) and five DigComp competence areas (Vuorikari et al., 2022), so that the effects of age and education can be distinguished by dimension. The initial conjecture is that age matters more for dimensions that demand effort and technical skill, such as effort expectancy, content creation, and problem solving, than for performance expectancy or social influence. Second, the study tests the interaction between age and education to examine whether older, highly educated civil servants

remain as ready as their younger counterparts. Third, the setting of DKI Jakarta, with its mature SPBE, means that any age and education gaps found indicate that the problem lies in individual capacity rather than infrastructure. Fourth, age is analysed in five-year groups to identify the threshold at which readiness begins to decline, going beyond the native–immigrant dichotomy.

The urgency of this study lies in the need for well-targeted competency development programmes. Without detailed mapping by age, education, and competence dimension, training risks being uniform and failing to reach the groups and skills that lag furthest behind. Accordingly, this study aims to analyse the effects of age and education on the digital competence readiness of civil servants in the DKI Jakarta Provincial Government across nine dimensions, to test the role of education as a compensator for age, and to identify the age group at which readiness begins to decline. The main research question is: How do age and level of education affect the digital competence readiness of civil servants in the DKI Jakarta Provincial Government?

Theoretically, this study enriches research on the second-level digital divide in the Indonesian public sector by showing that the effects of age and education may differ across dimensions and may interact, thereby complementing studies that treat digital competence as a single score or examine only one generation. Practically, the findings can inform the Regional Civil Service Agency and relevant regional agencies in designing training tailored to age groups, education levels, and the competence dimensions that lag most. They can also offer policymakers in other regions insight into individual-capacity problems that persist even when digital infrastructure is adequate. The study covers civil servants working in the DKI Jakarta Provincial Government across its six administrative areas, including PNS/CPNS and PPPK. Primary data were collected through a questionnaire survey in 2026 from 370 respondents aged 21 to 59 years. The independent variables are age and highest level of education, and the dependent variable is digital competence readiness across the UTAUT and DigComp dimensions. The study is limited to the second-level digital divide and does not address the access divide (first level) or the outcome divide (third level).

B. METHOD

This study employs a quantitative approach with a cross-sectional design that is both descriptive and explanatory. A quantitative approach was chosen because the second-level digital divide, that is, differences in the capability to use technology among users who are all already connected (Hargittai, 2002; Scheerder et al., 2017), can only be compared across groups when every civil servant is measured with a uniform instrument. As outlined in the Introduction, previous studies on civil servants (*Aparatur Sipil Negara*/ASN) have tended to rely on respondents' perceptions, to be qualitative in nature, or to cover only a single age group (Sarjito & Djati, 2025; Silitonga, 2023). By contrast, Setyawan et al. (2025) showed that the digital competence of ASN can be measured quantitatively using an established digital competence framework, and Nadjib et al. (2025) mapped civil servants' digital literacy readiness using a Likert-scale questionnaire. The present study extends this line of measurement by testing the effects of age and educational level on each readiness dimension. Data were collected at a single point in time, making this a cross-sectional design (Neuman, 2014), under a post-positivist paradigm, which holds that social reality can be measured empirically even though it can never be fully captured (Creswell & Creswell, 2018). The term "effect" is used here in a statistical sense, referring to the strength of the association between age or education and readiness scores, not to a causal relationship.

The study population comprises all ASN within the Jakarta Provincial Government, totaling 65,795 people, of whom 44,390 are civil servants and candidate civil servants (PNS/CPNS) (67.47%) and 21,405 are government employees with work agreements (PPPK)

(32.53%) (BKD DKI Jakarta, 2026). The minimum sample size was calculated using Slovin's formula at a 5% margin of error, which yielded 398 respondents; this was rounded up to 400 to allow for invalid data. The sample was drawn using a nonprobability technique, namely quota sampling based on employment status. Diversity in age and educational level was taken into account during questionnaire distribution so that every comparison group would be represented, following van Deursen and van Dijk (2011), who stratified their sample by gender, age, and education. From this target, 370 respondents aged 21–59 years, with highest educational attainment ranging from senior high school or equivalent to doctoral degree, met the criteria and provided data suitable for analysis. Because the sample was not randomly selected, the results are not intended to be statistically generalized to all ASN in the Jakarta Provincial Government. Respondent characteristics are presented in the Results section.

This study uses complementary primary and secondary data. Primary data were collected through a survey administered to ASN in 2026. An online survey was chosen because it can efficiently reach civil servants dispersed across many work units, and its administration followed guidelines for internet-based surveys (Dillman et al., 2014). Secondary data consist of findings from previous studies published between 2021 and 2025, identified using keywords such as "ASN digital competence," "ASN digital literacy," and "ASN readiness and performance" and supplemented by classic literature on the digital divide, as well as personnel data from BKD DKI Jakarta (2026) and Electronic-Based Government System (SPBE) evaluation results (Ministry of Administrative and Bureaucratic Reform, 2024). Secondary data were used as the basis for developing the instrument and as a point of comparison when interpreting the survey results, whereas conclusions about the level of readiness rest on the survey data.

The instrument is a structured questionnaire consisting of three parts: screening questions, respondent identity, and statements on digital competence readiness. Respondent identity covers age, highest educational level, gender, employment status, job position, work unit, length of service, and intensity of digital system use, with age and education as the main independent variables. Digital competence readiness was operationalized by combining the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) with the DigComp 3.0 digital competence framework (Cosgrove & Cachia, 2025), which is a refinement of DigComp 2.2 (Vuorikari et al., 2022). The DigComp framework has been used to measure the digital competence of ASN (Setyawan et al., 2025) and to link digital competence with individual characteristics such as age and education (Nguyen et al., 2024). The social influence and facilitating conditions dimensions of UTAUT capture organizational factors that, according to Pulkkinen et al. (2025), help shape civil servants' digital readiness. Combining the two frameworks means that readiness is viewed not only in terms of technical skill but also in terms of acceptance of the system and support from the work environment. The result is nine dimensions with 45 closed-ended statements.

The four UTAUT dimensions are measured with 20 items: performance expectancy, effort expectancy, and social influence with four items each, and facilitating conditions with eight items. Performance expectancy measures the belief that digital systems speed up work and improve its quality, whereas effort expectancy measures perceptions of how easy the systems are to understand and master. Social influence measures encouragement from colleagues and role modeling by leaders, whereas facilitating conditions measure the availability of devices, training, system access, and technical support. The five DigComp dimensions are measured with 25 items: five items for searching, evaluating, and managing information; eight for communication and collaboration; and four each for content creation, safety and responsible use, and problem solving. Each item is rated on a four-point Likert scale: Not Ready (1), Less Ready (2), Ready (3), and Very Ready (4). An even-numbered scale

without a midpoint was used so that respondents must commit to a clear leaning rather than take refuge in a neutral response (Horrigan, 2016; Zhang et al., 2024). This breakdown allows the effects of age and education to be compared separately for each dimension. Before the main data collection, the instrument was piloted with respondents whose characteristics were similar to those of the population, namely civil servants in government institutions. The pilot test aimed to assess item readability, identify confusing statements, and test validity and reliability before the instrument was used at full scale (van Teijlingen & Hundley, 2001). Construct validity was tested using Pearson product-moment correlations between each item score and the total score; an item was considered valid if its calculated r exceeded the critical r value at the 5% significance level and was positive. Reliability was tested using Cronbach's alpha for each dimension, with a minimum threshold of 0.60, which is commonly accepted for exploratory research, and a target above 0.90 (Hair et al., 2019). Items with low correlations were revised or removed until the criteria were met. Questionnaire data were edited, numerically coded, and processed using SPSS. The analysis began with descriptive statistics, namely frequency distributions and percentages for respondent characteristics. Means and standard deviations were calculated for each item, each dimension, and the overall index. The overall index was obtained by averaging the scores of the nine dimensions so that each dimension carries equal weight. Mean scores were grouped into four categories using a class width of 0.75: not ready (1.00–1.75), less ready (1.76–2.50), ready (2.51–3.25), and very ready (3.26–4.00). These categories help readers grasp the level of readiness without having to interpret raw numbers.

The credibility of the study was maintained in three ways. First, content validity was sought by deriving the items from established frameworks, namely UTAUT and DigComp, and the instrument was reviewed with the academic supervisor at the research design seminar. Second, construct validity and reliability were tested through the pilot test described above. Third, triangulation was carried out by comparing the survey results with personnel data, SPBE evaluation results, and findings from previous studies. In terms of ethics, participation was voluntary, and respondents' consent was obtained through a statement of willingness on the first page of the questionnaire. The questionnaire did not ask for respondents' names, all answers were kept confidential, and the data were used only for academic purposes. Respondents were also told that there were no right or wrong answers so that they would answer according to their actual circumstances.

This study has several methodological limitations. First, quota sampling using a nonprobability technique limits statistical generalization to all ASN in the Jakarta Provincial Government. Second, the cross-sectional design describes conditions at only one point in time and therefore cannot explain changes in readiness over time. Third, differences between age groups cannot be clearly separated from cohort differences, because single-time-point data conflate age and generational effects. Fourth, self-perception-based measurement is potentially subject to social desirability bias, particularly for statements related to civil servant compliance and ethics. The results should therefore be understood as a picture of readiness according to respondents' perceptions, not as a measurement of skills through direct observation.

C. RESULT AND DISCUSSION

The empirical findings from the analysis of the collected questionnaire data will address the research questions, particularly in analyzing the level of digital competency readiness and examining the presence or absence of a “second-level digital divide” among civil servants (ASN) of the DKI Jakarta Provincial Government. To provide a comprehensive understanding before conducting an in-depth examination of the dimensions of digital skills, utilization, and security, the data presentation begins with a description of the respondents’

demographic characteristics. These basic characteristics which include age distribution, highest level of education, employment status, job position, and work unit are presented descriptively to illustrate the profile of the research sample and to serve as a basis for control variables in identifying variations in digital competency readiness within the local government bureaucracy.

1. Demographic Characteristics of Respondents

a. Age Distribution and Generational Groups of Civil Servants

Based on data from 370 civil service respondents within the DKI Jakarta Provincial Government, it was found that the respondents' ages ranged from 21 to 59 years. The age distribution shows that the majority of respondents fall within the 31-50 age group, accounting for 62.2% of all respondents. Based on individual age distribution, respondents aged 32 had the highest frequency, with 19 people (5.1%). Meanwhile, respondents aged 30 and 35 each numbered 18 people (4.9%).

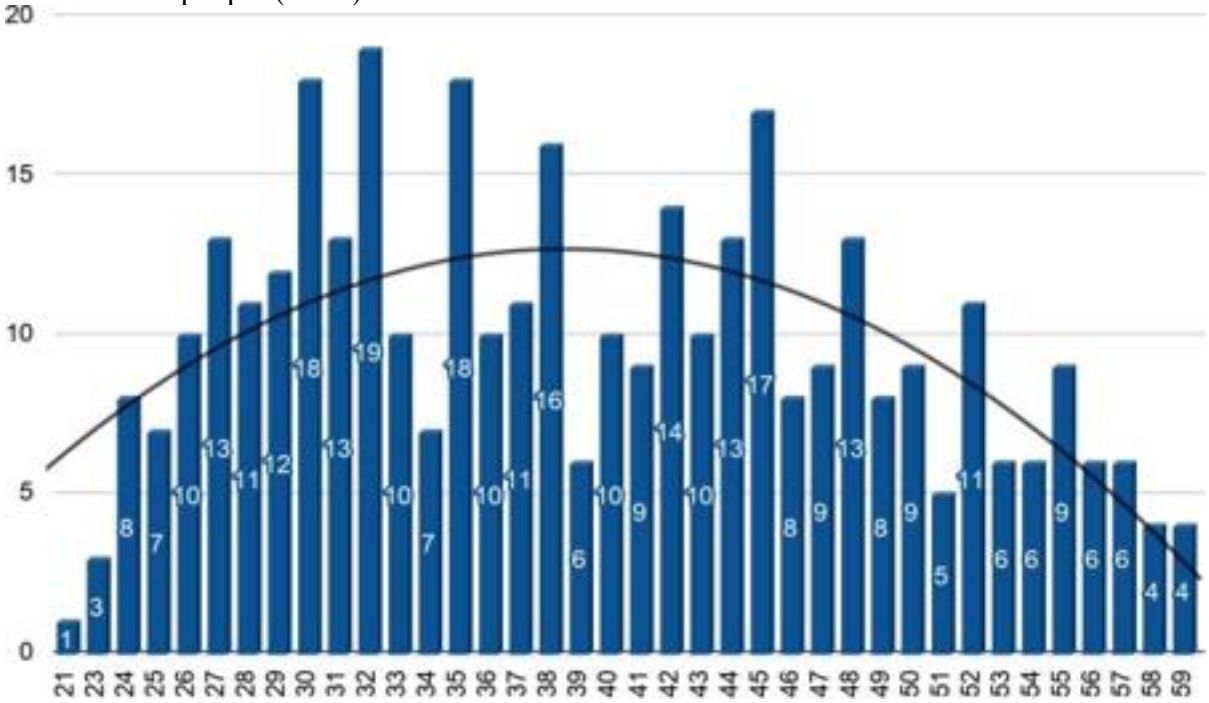


Figure 1. Age Distribution of DKI Jakarta Provincial Government Civil Servants

Source: Research data analysis results, 2026.

This age composition indicates that the study's respondents come from a diverse range of age groups. Age differences can be one of the characteristics to consider when assessing civil servants' digital competencies, particularly regarding individual experience in learning about and using digital technology.

Prensky (2001) introduced the concepts of "digital natives" and "digital immigrants" to describe differences in individuals' experiences with digital technology. However, this categorization cannot serve as the sole basis for determining an individual's digital competence. Bennett, Maton, and Kervin (2008) criticized the generalization of digital competence characteristics based on generation, as digital skills are also related to individuals' experiences and opportunities in using technology.

Thus, the age distribution in this study provides an overview of the diversity of respondents' characteristics, which can serve as one consideration in analyzing civil servants' digital competencies. The relationship between age and digital competency levels must be examined based on the results of the research data analysis.

b. Highest Level of Education

In addition to age characteristics, the highest level of education is one of the demographic aspects that must be considered when describing the profile of the study's respondents. Based on the results of data analysis of 370 civil servants within the DKI Jakarta Provincial Government, the respondents' educational backgrounds ranged from high school to higher education. The majority of respondents held a Diploma IV (D4) or Bachelor's degree (S1), totaling 252 individuals, or 68.1% of all respondents. Next, respondents with a Master's degree (S2) or Applied Master's degree numbered 50 (13.5%), 48 held a Diploma III (D3) (13%), 17 had a high school diploma or equivalent (4.6%), 2 held a Diploma I (D1) (0.5%), and 1 held a Doctorate (S3)/Applied Doctorate (0.3%).

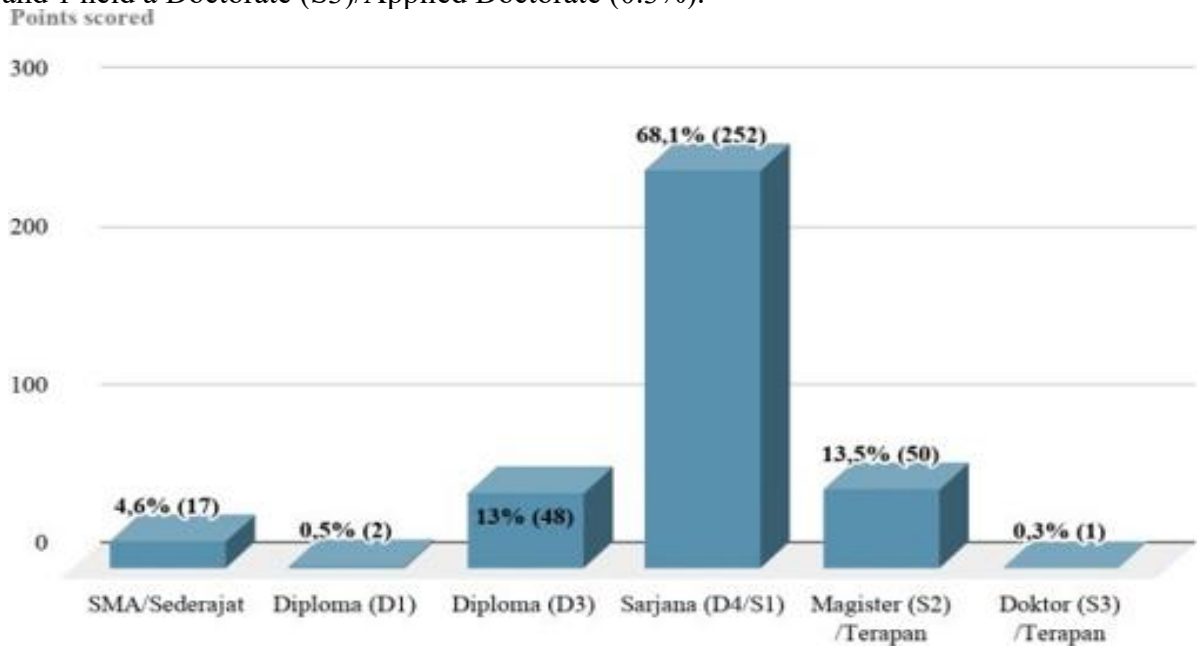


Figure 2. Distribution of the Highest Level of Education Among Civil Servants of the DKI Jakarta Provincial Government

Source: Research data analysis results, 2026

The predominance of respondents with a D4/S1 educational background indicates that the majority of the research sample has completed higher education. Meanwhile, the presence of respondents ranging from high school to S3 levels demonstrates the diversity of educational backgrounds among DKI Jakarta Provincial Government civil servants. This composition provides insight into the variation in formal educational levels held by respondents in performing their official duties.

These educational characteristics are relevant to consider in research on civil servants' digital competencies. Cahyadi et al. (2026) show that the implementation of education and training is positively correlated with civil servants' competencies, which encompass aspects of knowledge, skills, and work attitudes. Meanwhile, Eurostat data (2024) reveal a correlation between formal education levels and individuals' digital skills. In 2023, the proportion of the European Union population with higher education who possessed at least basic digital skills reached 80%, compared to 34% among those with no formal education or a low level of education. Both sources provide support from different contexts regarding the relevance of the educational process and educational background in discussions of competencies. Nevertheless, the level of formal education cannot be used as the sole indicator to determine an individual's mastery of digital competencies. Therefore, the educational distribution of the respondents in this study is one of the characteristics that must be considered when analyzing variations in civil servants' digital competency readiness.

c. Other Supporting Characteristics

In addition to age distribution and educational level, the profiles of the respondents in this study were also examined based on employment status, job position, and work unit. These three characteristics provide an overview of the respondent composition based on their positions and work environments within the DKI Jakarta Provincial Government.

Based on employment status, the majority of respondents were Civil Servants (PNS), totaling 280 people (75.7%), while respondents with Government Employee with a Work Agreement (PPPK) status numbered 90 people (24.3%). Of the 280 respondents in the PNS/CPNS category, 221 (79%) were PNS and 59 (21%) were CPNS. This composition indicates that the study's respondents came from the two main groups of civil service status, with a larger number of respondents holding PNS/CPNS status compared to PPPK.

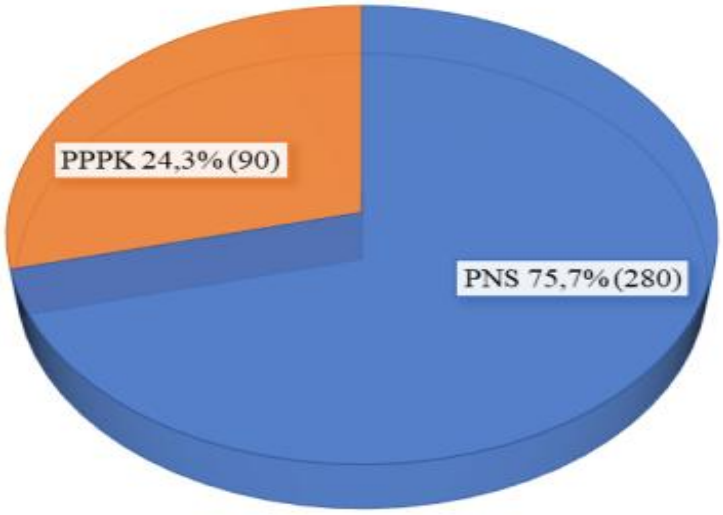


Figure 3. Distribution of Respondents by Employment Status
Source: Research data analysis results, 2026.

When examined by position category as defined by Law No. 20 of 2023 on the Civil Service, the respondents were predominantly in Non-Managerial Positions, totaling 314 individuals (85%), while Managerial Positions numbered 56 individuals (15%). Of the 314 respondents in the non-managerial position group, 154 held executive positions and 160 held functional positions. These figures account for approximately 49% and 51%, respectively, of the entire non-managerial group. This composition indicates that the majority of respondents held non-managerial positions, either as operational staff or functional officers.

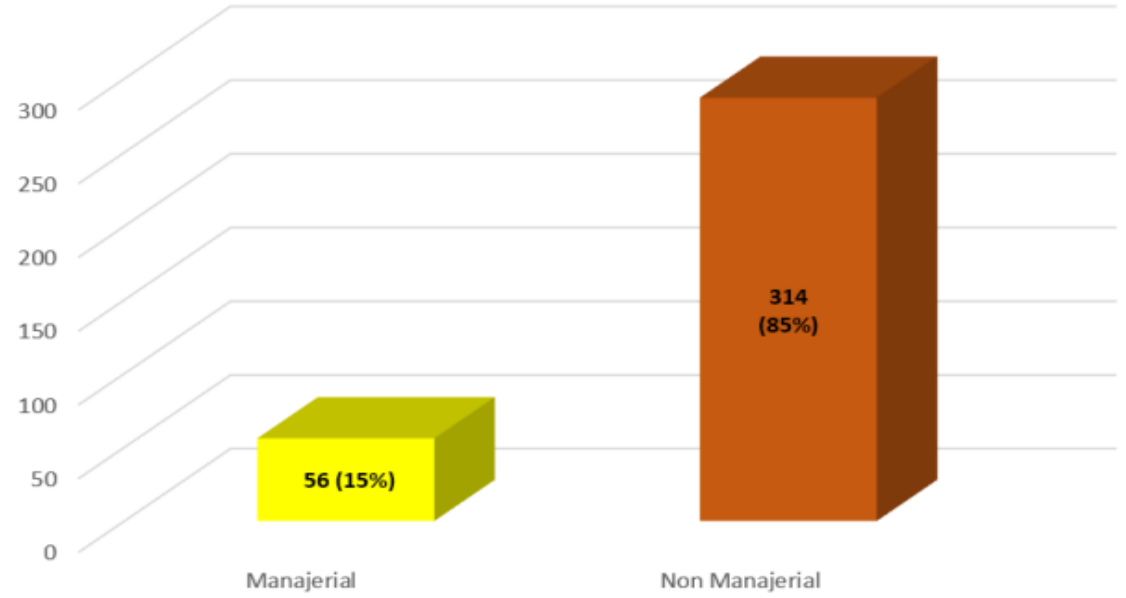


Figure 4. Distribution of Respondents by Job Position
Source: Research data analysis, 2026.

Furthermore, based on their work units, respondents came from various organizational units within the DKI Jakarta Provincial Government. The largest group of respondents came from Regional Agencies, totaling 101 people (27.30%), followed by Educational Units with 87 people (23.51%), Sub-Agencies with 71 people (19.19%), Secretariats, Agencies, and Special Implementation Units (67 people, 18.11%), and Subdistricts and Neighborhoods (44 people, 11.89%). This distribution indicates that respondents came from diverse work environments, ranging from regional government agencies to educational institutions and local administrative units.

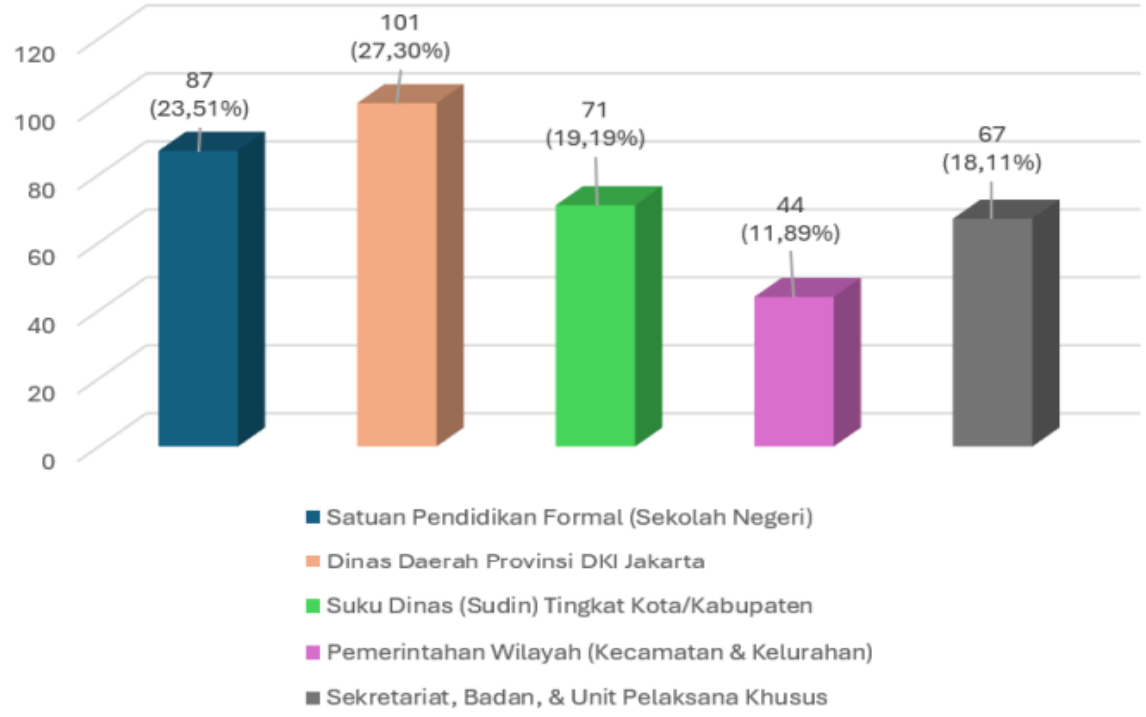


Figure 5. Distribution of Respondents by Work Unit
Source: Research data analysis results, 2026.

Overall, the characteristics of civil service status, job positions, and work units provide an overview of the structural background of the study's respondents. This diversity serves as supporting information for understanding the profile of civil servants participating in the study on digital competencies within the DKI Jakarta Provincial Government.

2. Level of Digital Competence Among ASN in the DKI Jakarta Provincial Government

This section presents the results of data analysis regarding the digital competency levels of civil servants within the DKI Jakarta Provincial Government. The discussion begins with a comparison of average scores across the five dimensions of digital competency, followed by the distribution of overall digital competency levels among civil servants based on predefined categories.

a. Comparison of Average Scores Across the Five Dimensions of ASN Digital Competency

In this study, civil servants' digital competency was measured across five main dimensions: information and data literacy; digital communication and collaboration; digital content creation; digital security and problem-solving; and digital competency development. A comparison of the average scores for these five dimensions is presented in Figure 6.

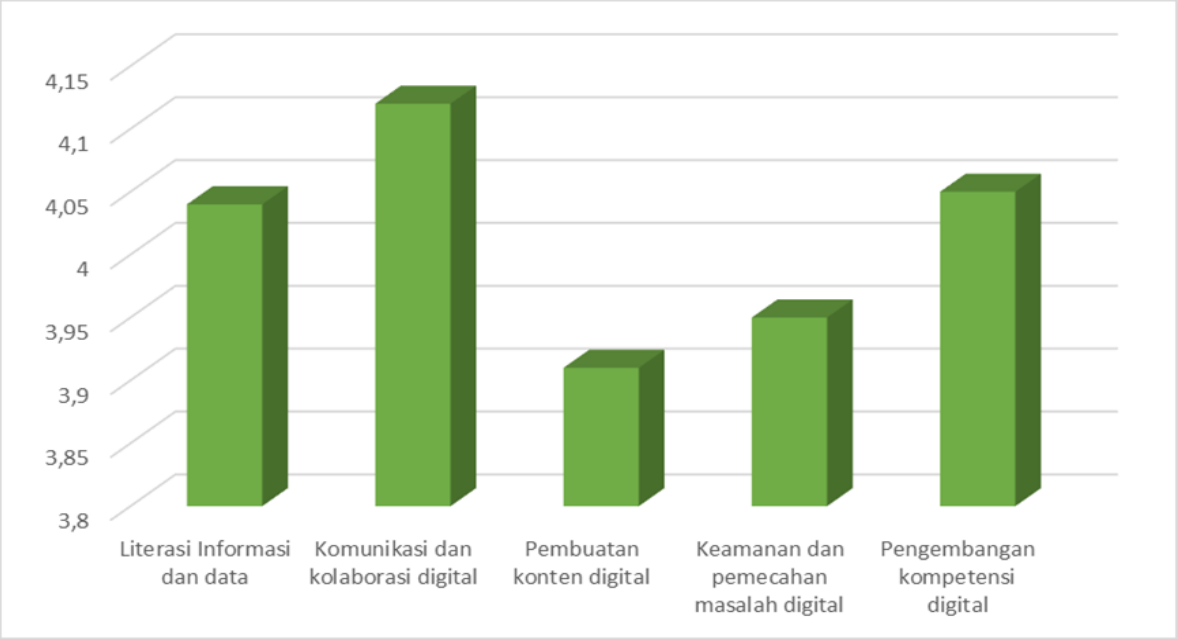


Figure 6. Comparison of Average Scores for the Five Dimensions of ASN Digital Competence

Source: Research data analysis results, 2026.

Based on Figure 6, the average scores for the five dimensions of civil servants' digital competencies range from 3.91 to 4.12 on a scale of 1–5. The Digital Communication and Collaboration dimension recorded the highest average score, at 4.12. This indicates that respondents demonstrate the highest level of proficiency in utilizing digital platforms to communicate, coordinate, and collaborate both with coworkers and with other parties within their agency. Meanwhile, the Digital Competency Development dimension ranked second with an average score of 4.05, followed by the Information and Data Literacy dimension with a score of 4.04. These two dimensions indicate that respondents are fairly adept at searching for, evaluating, and managing digital information, and are mindful of the need to continuously develop their digital skills in line with job requirements.

The Digital Security and Problem-Solving dimension received an average score of 3.95, while the Digital Content Creation dimension recorded the lowest score at 3.91. Nevertheless, both scores still fall within the "high" category on a 1–5 scale, meaning respondents generally possess adequate skills in these two dimensions.

The differences in scores across dimensions indicate that civil servants' mastery of digital competencies is not entirely uniform. Respondents tend to be stronger in the areas of communication and collaboration, which are the digital activities most frequently used in their daily work. Conversely, the areas of digital content creation and digital security received relatively lower scores, which may indicate that these two areas have not yet become a habit or a top priority in the use of digital technology for most respondents.

Thus, the results of this comparison of average scores across the five dimensions indicate that the digital competencies of civil servants in the DKI Jakarta Provincial Government are generally at a high level, though there is still room for improvement, particularly in the areas of digital content creation and digital security. These findings can serve as a basis for agencies to design digital competency development programs that are more specifically targeted at areas that still require strengthening.

b. Overall Distribution of Civil Servants' Digital Competency Levels

In addition to examining comparisons across dimensions, civil servants' digital competency levels were also analyzed as a whole by categorizing respondents into four groups based on their digital competency scores. The distribution of respondents across each category is presented in Figure 7.

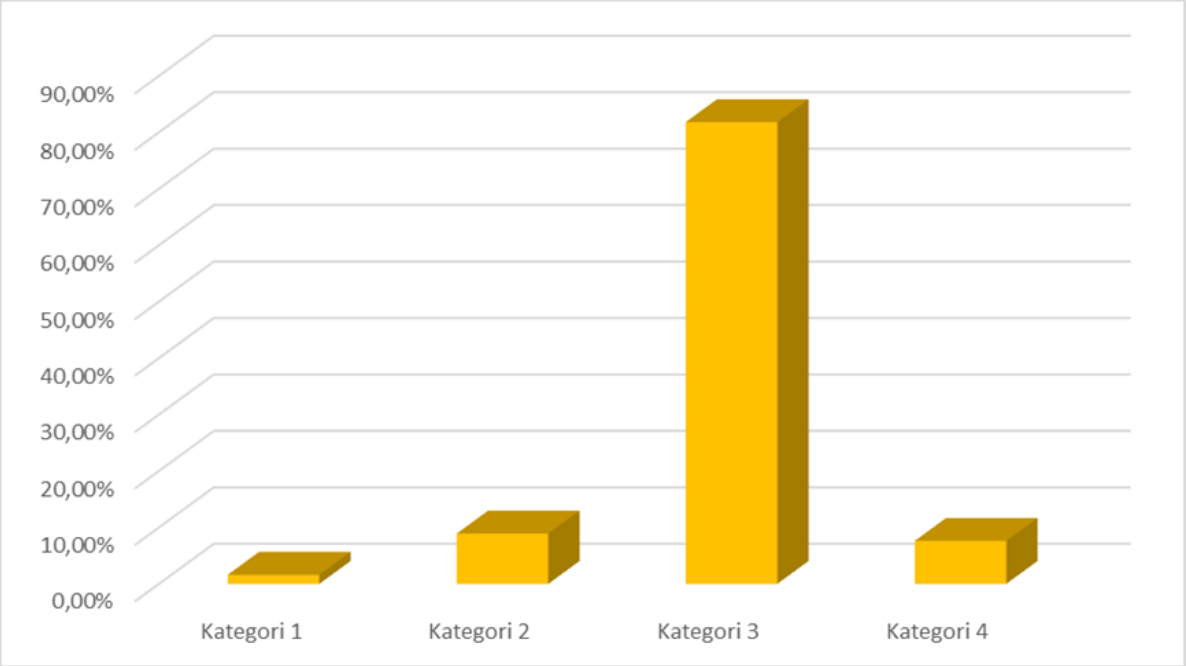


Figure 7. Overall Distribution of Civil Servants' Digital Competency Levels
Source: Research data analysis results, 2026.

Based on Figure 7, out of a total of 370 respondents, the majority 303 people, or 81.9% of all respondents fall into Category 3. The second-largest group is in Category 2, with 33 people (8.9%), followed by Category 4 with 28 people (7.6%). Respondents in Category 1 constitute the smallest group, totaling 6 people (1.6%).

The dominance of respondents in Category 3 indicates that, in general, civil servants of the DKI Jakarta Provincial Government have achieved an adequate level of digital competency. Respondents in this category were assessed as capable of using digital technology to support their work, whether in terms of information retrieval, communication, document

management, or the use of official applications. However, their proficiency has not yet fully reached the most advanced level, so there is still room for development toward greater innovation and self-reliance.

In terms of distribution, the number of respondents in Categories 1 and 4 is relatively small, at 1.6% and 7.6%, respectively. This indicates that, in general, there are no extreme disparities among the respondents. The majority of civil servants are at the intermediate level, while the groups at the very low and very high levels are limited in number. This situation can be interpreted as a fairly positive sign, as the majority of civil servants have already reached the basic to intermediate stage of proficiency in the use of digital technology.

The overall distribution of digital competency levels among civil servants in the DKI Jakarta Provincial Government shows that the majority of respondents possess adequate digital readiness to support their work; however, further development efforts are still needed to elevate these competencies to higher levels. Furthermore, the relationship between digital competency levels and other factors such as age, years of service, position, or educational background requires further analysis.

3. Analysis of the Second-Level Digital Divide Among DKI Jakarta Civil Servants

The second-level digital divide is a form of digital divide related to differences in individuals' abilities and skills in utilizing information and communication technology. Unlike the first-level digital divide, which emphasizes differences in access to technology, the second-level digital divide focuses on how individuals use technology and the extent to which they are able to utilize it to meet their needs and support their activities. Thus, equal access to technology does not necessarily indicate equal levels of digital skills among individuals (Hargittai, 2002).

Hargittai (2002) explains that internet users possess varying levels of skill in searching for and finding information online. These differences indicate that the ability to use technology cannot be measured solely based on a person's status as an internet user. Furthermore, Van Deursen and van Dijk (2014) explain that the digital divide has shifted from an issue of access to differences in the use of technology. This demonstrates that the quality of technology utilization is a crucial aspect in understanding the digital divide in society.

In the context of the Civil Service (ASN) within the DKI Jakarta Provincial Government, the second-level digital divide is relevant for study because the use of digital technology has become an integral part of daily work activities. Based on the results of a study of 370 respondents, all respondents have used digital systems in their work. This indicates that the use of technology has become an integral part of ASN work activities. However, this usage alone does not directly reflect uniformity in the digital capabilities possessed by all respondents. Therefore, further analysis of ASN digital skills and competency mastery is required.

The research results show that civil servants' digital competencies vary across the five measured dimensions: information and data literacy; digital communication and collaboration; digital content creation; digital security and problem-solving; and digital competency development. Based on a comparison of average scores, the digital communication and collaboration dimension received the highest score of 4.12, while the digital content creation dimension received the lowest score of 3.91. Meanwhile, the digital competency development dimension scored 4.05, information and data literacy scored 4.04, and digital security and problem-solving scored 3.95.

These differences in average scores indicate that civil servants' mastery of digital competencies is not yet fully consistent across all dimensions. The fact that digital communication and collaboration received the highest score suggests that respondents are

relatively more accustomed to using technology to support interaction, coordination, and the exchange of information in their work. Conversely, the lower score for digital content creation indicates room for improvement in the ability to produce and manage digital content. However, these score differences do not necessarily mean that civil servants lack competence in certain dimensions; rather, they reflect variations in proficiency levels across dimensions.

These findings align with the study by Scheerder, van Deursen, and van Dijk (2017), which explains that the second-order digital divide relates to differences in internet skills, usage patterns, and the outcomes derived from technology use. Digital skills are multifaceted and cannot be represented by a single type of technology-use activity. Thus, someone accustomed to using technology for communication does not necessarily possess the same level of proficiency in managing information, creating content, ensuring digital security, or resolving technical issues.

In addition to differences in proficiency across dimensions, the overall distribution of digital competency levels also provides insight into the state of civil servants' digital competencies. The majority of respondents fell into the most dominant competency category in the study's results. This indicates that, in general, respondents' digital competency levels are relatively concentrated within that category. However, the overall measurement results still need to be understood in conjunction with a comparison of the scores across the five dimensions. This is because while the overall score provides a general picture, it does not necessarily indicate that all aspects of digital competency have been mastered in a balanced manner.

When considered in relation to the concept of the second-level digital divide, this situation indicates that the challenges of digital transformation within the DKI Jakarta Provincial Government environment lie not only in the use or availability of digital systems but also in the equitable distribution of civil servants' skills in utilizing technology. The use of official applications and digital devices in the workplace must be supported by the ability to search for and evaluate information, communicate and collaborate, produce digital content, ensure information security, and continuously develop skills. Thus, the use of technology is not merely an administrative routine but can also contribute to the effectiveness of work performance.

Based on these overall results, the second-level digital divide among civil servants in the DKI Jakarta Provincial Government can be understood through variations in the mastery of digital competencies across the five dimensions studied. Although the use of digital systems has become part of the respondents' work activities and the average competency scores indicate relatively high results, there are still differences in the level of mastery in certain aspects. Therefore, efforts to improve digital competencies among civil servants should be directed not only toward improving their ability to use technology but also toward ensuring an equitable distribution of skills so that all dimensions of digital competency can develop more optimally.

4. Digital Competency Readiness of Civil Servants

Digital competency readiness is a key aspect in supporting the implementation of digital transformation within the government sector. This readiness is not only demonstrated through the ability to use digital devices or applications but also encompasses the ability to manage information, communicate and collaborate, create digital content, ensure security, and resolve issues related to technology use. Within the framework of the Digital Competence Framework for Citizens (DigComp 2.2), digital competencies are grouped into five main areas: information and data literacy, communication and collaboration, digital content creation, security, and problem-solving (Vuorikari et al., 2022).

In the context of this study, these five areas were used as the basis for assessing the digital competence readiness of civil servants in the DKI Jakarta Provincial Government. The results of data analysis on 370 respondents showed that the average scores across the five dimensions ranged from 3.91 to 4.12 on a 1–5 scale. These results indicate that respondents generally possess a relatively high level of digital competency. However, differences in average scores across dimensions suggest that the level of digital competency among civil servants is not yet entirely uniform.

The information and data literacy dimension received an average score of 4.04. This result indicates that civil servants generally possess strong abilities in accessing, searching for, evaluating, and managing digital information to support their work. These abilities are crucial because government activities require proper information management whether in administrative processes, document preparation, or decision-making.

Within the DigComp 2.2 framework, information and data literacy encompasses the ability to identify information needs, search for and access digital data, evaluate the credibility of sources, and manage information systematically (Vuorikari et al., 2022). Therefore, the results of this study indicate that civil servants already possess a fairly solid foundation of skills in utilizing digital information for their work needs. However, these skills still need to be developed so that civil servants are not only able to obtain information but can also assess its accuracy and relevance before using it to perform their duties.

The dimension of digital communication and collaboration received the highest average score, at 4.12. This result indicates that communication and coordination via digital media are among the aspects of competence that respondents have mastered relatively well. In a government setting, these skills play a crucial role in supporting information exchange, coordination among employees, and the execution of tasks involving various work units.

The high score in this dimension can be attributed to the nature of civil servants' work, which frequently involves ongoing interaction and coordination. The use of communication applications, collaboration platforms, and official information systems enables the exchange of information to occur more easily and quickly. DigComp 2.2 also identifies communication and collaboration as one of the key areas of digital competency, encompassing the ability to interact, share information, collaborate through digital technology, and apply ethics in online communication (Vuorikari et al., 2022).

The research findings indicate that digital communication and collaboration skills are one of the strengths of the digital competencies of civil servants in the DKI Jakarta Provincial Government. Nevertheless, mastery of these aspects must be balanced with the ability to uphold communication ethics, understand information security, and utilize collaboration platforms appropriately according to job requirements.

The digital content creation dimension received an average score of 3.91, making it the dimension with the lowest score compared to the other four dimensions. Nevertheless, this score still indicates a relatively high level of proficiency based on the interpretation of the research results. The lowest score indicates that digital content creation skills are one aspect that still has room for improvement.

In the execution of government work, digital content creation is not only related to the ability to produce publication materials but also encompasses the preparation and processing of digital documents, presentations, informational materials, and various forms of content used to support organizational activities. DigComp 2.2 explains that digital content creation competencies include the ability to develop and edit digital content, integrate information, understand copyright, and apply programming principles as needed (Vuorikari et al., 2022).

Based on the research findings, relatively lower scores in this dimension indicate that the ability to produce and develop digital content is not yet as strong as communication and

collaboration skills. This situation warrants attention in the development of civil servant competencies, particularly through improving skills in document processing, creating digital materials, and utilizing productivity tools. However, these results cannot yet be used to conclude the causes of the low scores, as additional information regarding the respondents' experiences and training needs is required.

The dimensions of digital security and problem-solving received an average score of 3.95. These results indicate that respondents generally possess relatively strong abilities in addressing security aspects and issues related to the use of digital technology. Both of these aspects play a crucial role in the government environment, as civil servants handle various official information and documents that must be managed with care.

The digital security aspect encompasses awareness regarding the protection of devices, data, digital identities, and information used in work activities. Meanwhile, digital problem-solving skills relate to the ability to identify technical obstacles, determine appropriate solutions, and adapt technology use to job requirements. In DigComp 2.2, security and problem-solving are two complementary competency areas that support the safe and effective use of technology (Vuorikari et al., 2022). Although these dimensions received relatively high scores, they still require attention because information security is a vital component of digital government governance. Competencies can be strengthened by raising awareness regarding data protection, the responsible use of technology, and the ability to address technical challenges that arise during the course of work.

The digital competency development dimension received an average score of 4.05 and ranked second highest after digital communication and collaboration. These results indicate that respondents generally have a good understanding of the importance of developing digital skills to adapt to technological advancements and job requirements. Digital competency development is not only related to participation in formal training but also encompasses individual initiatives to learn new technologies, improve skills, and adapt to changes in digital systems. In the context of government, the ability to continuously learn is crucial because technological advancements can impact work processes, administrative systems, and service delivery to the public.

The high scores in this dimension paint a positive picture of civil servants' awareness of the need to improve their digital competencies. However, this awareness must be supported by adequate learning opportunities, the availability of relevant training, and organizational support to ensure that the competency improvement process can proceed sustainably.

Based on the discussion of these five dimensions, it can be concluded that the digital competency readiness of civil servants in the DKI Jakarta Provincial Government generally shows a relatively good condition. The dimension of digital communication and collaboration is the aspect with the highest proficiency, while digital content creation is the aspect with the relatively lowest score. This disparity indicates that civil servants' digital readiness must not only focus on improving their ability to use technology for communication and coordination but also on strengthening productive skills, cybersecurity, and digital problem-solving.

Therefore, the development of civil servants' digital competencies must be carried out comprehensively, taking into account the needs in each dimension. These efforts are expected to promote equitable mastery of digital competencies so that civil servants are not only able to use technology in their daily work but also utilize it productively, securely, and adaptively to support the execution of government duties.

5. The Role of Demographic Characteristics on Digital Competency Readiness

Demographic characteristics are one aspect that can provide insight into variations in civil servants' digital competency readiness. In this study, the demographic characteristics

discussed include age and educational level. Both aspects are important to consider because they may be related to experience, learning opportunities, and an individual's ability to understand and utilize digital technology in performing their work.

From the perspective of age, differences among age groups can provide insight into the diversity of civil servants' experiences in interacting with advancements in digital technology. Younger civil servants may have had experience using digital technology from an early age, while those in older age groups may possess more extensive work experience and institutional knowledge. However, age differences do not automatically indicate differences in digital competency levels. Mastery of technology is also influenced by learning opportunities, experience using digital systems, and support from the work environment.

This aligns with the study by Van Deursen and Van Dijk (2011), which explains that internet skills are a key aspect of the digital divide. Differences in digital competence are not only related to access to technology but also to an individual's ability to use technology effectively. Thus, age should be understood as one characteristic that may be related to digital experience, not as the sole determinant of a person's competence.

In addition to age, educational level is also a relevant characteristic in understanding civil servants' digital competency readiness. Educational background can be linked to experiences in acquiring information, developing knowledge, and building the ability to understand and solve problems. However, formal educational level does not always directly reflect mastery of digital competencies. Such competencies also require continuous learning and practical experience.

In the context of this study, the diversity in respondents' educational levels indicates that civil servants' digital competency readiness must be understood by taking into account their varying educational backgrounds. The development of digital competencies should not rely solely on formal education but should also be supported through training, mentoring, and opportunities to practice using technology in daily work.

Overall, age and educational characteristics provide context for understanding the diversity in the digital competency readiness of civil servants in the DKI Jakarta Provincial Government. These two characteristics can be taken into account when designing competency development programs that are more inclusive and tailored to employees' needs. Therefore, efforts to improve digital competencies must provide equal learning opportunities for all age groups and educational backgrounds, so that every civil servant can develop digital skills in line with the demands of their job.

6. Implications of the Digital Divide on Public Services

The second-level digital divide among civil servants has implications for the delivery of public services, particularly because the success of government digital transformation is determined not only by the availability of technology and information systems but also by employees' ability to utilize such technology. Civil servants' digital competencies are a key factor in ensuring that digital systems can be used effectively to support administrative processes, coordination, and the delivery of services to the public.

Based on the research findings, all respondents have used digital systems in their work. However, the results of the assessment of the five dimensions of digital competency indicate differences in proficiency levels. The dimension of digital communication and collaboration received the highest average score of 4.12, while the dimension of digital content creation received the lowest average score of 3.91. These differences indicate that civil servants' digital readiness is not yet fully consistent across all aspects of competence. This situation warrants attention because digital public services require a diverse range of skills, ranging from

accessing and managing information, communicating via digital platforms, creating content, to maintaining security and resolving technological issues.

The next implication relates to the need for competency development through ongoing training and mentoring. Digital competency development should not only be carried out through general training but also tailored to the job requirements and proficiency levels of each civil servant. Employees who still face difficulties using certain applications or systems need practical guidance so they can perform their duties more effectively. Meanwhile, civil servants who already possess stronger digital skills can be encouraged to share their knowledge and assist their colleagues in adapting to new technologies.

This training need aligns with the research by Lopes, Sargento, and Farto (2023), which examines the digital competencies of public sector workers and the training needs they perceive. Digital skills development must address employees' actual needs so that training can benefit their job performance. Thus, improving digital competencies requires more than just organizing training activities; it must also focus on the application of acquired skills in the workplace.

In addition to improving individual capabilities, organizational support and the availability of digital infrastructure are also critical factors. Civil servants require adequate work devices, a stable internet connection, and user-friendly, integrated application systems. If the infrastructure is insufficient or the applications in use are not well-integrated, digital work processes risk becoming less efficient. Therefore, the improvement of employee competencies must go hand in hand with improvements to facilities and infrastructure as well as the development of digital government systems.

Research by Edelmann, Mergel, and Lampoltshammer (2023) on competencies supporting the digital transformation of public administration emphasizes the importance of understanding the competencies required by public sector employees. This indicates that digital transformation requires both human resource readiness and organizational support simultaneously. In the context of the DKI Jakarta Provincial Government, the development of civil servant competencies must be part of a digital transformation strategy that takes into account the needs of each work unit and the characteristics of service tasks.

The research findings also indicate that strengthening a digital culture requires attention. The use of technology in the workplace is not only about the ability to operate applications but also encompasses the willingness to continuously learn, adapt to change, maintain information security, and use technology responsibly. A work culture that supports learning and collaboration can help civil servants navigate system changes and technological advancements, including the use of new technologies such as artificial intelligence in government work.

The implications of the second-level digital divide on public services indicate that digital transformation cannot be achieved solely through the provision of applications and infrastructure. The DKI Jakarta Provincial Government must also prioritize the equitable development of civil servants' digital competencies through needs-based training, mentoring, infrastructure enhancement, system integration, and the fostering of a digital work culture. These efforts are expected to improve the effectiveness of civil servants' performance while supporting public services that are more responsive, efficient, and of higher quality.

D. CONCLUSION

This study shows that the digital competency readiness of civil servants in the DKI Jakarta Provincial Government is considered adequate, with 81.9% of respondents falling into the "ready" category. However, this readiness is not yet evenly distributed across all dimensions of digital competency. Digital communication and collaboration received the

highest score of 4.12, while digital content creation received the lowest score of 3.91, followed by digital security and problem-solving, each with a score of 3.95. These findings indicate that civil servants' abilities in digital communication and collaboration are relatively more developed compared to their abilities in producing content and managing digital security and issues.

These disparities in achievement across dimensions indicate the continued existence of a second-order digital divide within the civil service of the DKI Jakarta Provincial Government. Although all respondents have used digital systems in performing their work, the level of competency in utilizing these technologies still varies. Thus, the maturity of the SPBE infrastructure and high internet penetration do not yet fully reflect the equitable distribution of digital skills among civil servants. Furthermore, age and educational level show a correlation with digital competency readiness, but neither can be considered a sole determining factor. The categorization of "digital natives" and "digital immigrants" does not fully account for the variation in digital capabilities among employees. Similarly, formal education does not automatically guarantee a higher level of digital competency. Therefore, the development of civil servants' digital capacity must take into account the competency needs of each employee group, particularly in the areas of content creation and digital security.

This study has limitations related to the use of a quota sampling technique, which does not allow for random selection of respondents; a cross-sectional research design; and competency measurements based on respondents' self-perceptions. Future research is recommended to use probability sampling techniques, a longitudinal design, and more objective digital competency measurement instruments to obtain a more comprehensive picture of civil servants' digital competency readiness.

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