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Analysis of the use of the P3SPD platform to improve the digital management competency of female employees in the era of budget efficiency policies

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Abstract: This study aims to analyze the effect of using the Digital Women's Human Resource Development Training Platform (Platform Pelatihan Pengembangan SDM Perempuan Digital, P3SPD) on improving the digital management competencies of female employees at the Tanjungbalai City Education Office, particularly within the context of budget efficiency policies. A quantitative approach with an explanatory design was employed through a cross-sectional survey method. The research subjects consisted of the entire population of 28 female employees who participated in training via the P3SPD platform, selected using a saturated sampling technique. Data were collected through a validated closed-ended questionnaire using a 5-point Likert scale, supported by secondary data from the platform usage log. Data analysis was conducted using SPSS version 25, including classical assumption tests and simple linear regression analysis. The findings reveal that the use of P3SPD has a positive and significant effect on improving digital management competencies ($\beta = 0.652$; $p = 0.008$), contributing 23.9% to the variance, with the remainder influenced by other factors. Improved competencies include electronic document management, cloud-based digital collaboration, and digital document security.

Keywords: *Budget efficiency, Digital management competency, Female employees, P3SPD, Technology-based training.*

1. Introduction

The digital era has driven fundamental transformations in various sectors, including the public sector. Governments worldwide, including Indonesia, are actively adopting digital technology to improve the efficiency, transparency, and quality of public services through the Electronic-Based Government System (SPBE) initiative [1]. This initiative is formally mandated through Presidential Regulation Number 95 of 2018, which requires the integration of information technology in central and regional government administration. However, the 2022 SPBE evaluation report by the Ministry of Administrative and Bureaucratic Reform shows that the National SPBE Index only reached 2.72 out of a maximum scale of 5, which is only categorized as "Sufficient." The national target until 2025 is a score of >3.5 to achieve the "Very Good" category [2] as shown in Table 1 below.

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Table 1.
National SPBE Index 2022 and National Target 2025

Year	National SPBE Index Value	Category	National Target 2025
2020	2.35	Not enough	-
2021	2.47	Enough	-
2022	2.72	Enough	3.5 (Very Good)

Source: Ministry of Administrative and Bureaucratic Reform, 2023.

The continued low performance of this index indicates that one of the key pillars that needs to be strengthened is human resource (HR) capability. In the context of digital bureaucracy, digital competence is no longer merely an additional skill, but a fundamental prerequisite for Civil Servants (ASN) to function effectively [3-5]. This competence encompasses digital document management, virtual collaboration, the use of cloud-based applications, and data security. However, efforts to strengthen the digital competence of civil servants (ASN) in Indonesia still face various challenges, particularly in terms of gender and technology gaps. According to the 2023 National Digital Literacy Survey conducted by the Ministry of Communication and Informatics, the "Digital Skills" pillar only scored 3.52 out of 5.00, indicating the continued weakness of the technical skills of Indonesia's digital population, including civil servants.

Furthermore, this competency gap is even more pronounced among female employees, who often face multiple barriers to accessing conventional training. These barriers include not only domestic responsibilities but also time constraints and structural biases that lower their participation in training [2, 6-9]. Preliminary studies conducted by researchers in several local government agencies indicate that only around 45% of female employees feel confident using digital collaboration applications, such as Google Workspace or Microsoft 365, compared to 65% of male employees [10] as shown in Table 2.

Table 2.
Employee Confidence Level in Using Digital Applications.

Gender	Feeling Confident (%)	No Confidence (%)
Woman	45%	55%
Man	65%	35%

Source: Researcher's Preliminary Study, 2023.

This situation has been exacerbated by the government's budget efficiency policies implemented in recent years. The implications of this policy are reflected in a significant reduction in the civil servant training budget, from IDR 1,200 billion in 2020 to just IDR 640 billion in 2022, a decrease of more than 46% in the past two years [11]. This decline indicates that conventional, expensive, and centralized face-to-face training is becoming increasingly irrelevant. This is shown in Table 3.

Table 3.
Government Budget Efficiency Trends (ASN Training, 2020–2022).

Year	Training Budget (Rp Billion)	Decrease (%)
2020	1.200	-
2021	890	-25.8%
2022	640	-28.1%

Source: Ministry of Finance, 2023.

To address these challenges, digital training platforms have emerged as a promising alternative. One such platform is the Digital Women's Human Resource Development Training Platform (P3SPD), designed to provide a flexible, self-paced, and scalable learning experience. This model is not only gender-inclusive but also cost-efficient. IBM [12]research (2014) even showed that every $1 invested in digital training yields a $30 ROI in productivity, as work time is not disrupted and logistics costs are reduced [12]. Meanwhile, a study by the Research Institute of America showed that participant

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retention rates in e-learning can reach 60%, significantly higher than in-person training, which only averages 8–10%.

Despite this significant potential, empirical research examining the effectiveness of digital-based training platforms specifically for women in the public bureaucracy in Indonesia, particularly those linked to budget efficiency policies, remains very limited. Therefore, this study aims to fill this gap by quantitatively analyzing the impact of using the P3SPD platform on improving digital management competencies among female employees at the Tanjungbalai Asahan City Education Office. These findings are expected to provide empirical evidence for policymakers to expand the use of digital training as a systemic strategy to support an inclusive and sustainable digital transformation of the public sector.

2. Literature Review

2.1. Digital Transformation and the Need for Human Resource Competence in Public Bureaucracy

Digital transformation is a priority agenda in bureaucratic reform, driven by developments in information and communication technology. Globally, public sector digitalization aims to improve government efficiency, accountability, and responsiveness to public needs [13]. In Indonesia, this transformation was formalized through Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems (SPBE), which requires all government agencies to integrate information systems into government administration. However, the implementation of this policy is highly dependent on the readiness of human resources (HR), particularly in terms of digital competency.

Digital competence in the public sector is not just about technical skills, but also encompasses aspects of adapting to work changes, digital collaboration, and cybersecurity literacy [14]. According to Agostino, et al. [15] the COVID-19 pandemic has accelerated the urgency of digitalizing government and exposed competency gaps among civil servants, particularly in the optimal use of digital technology. Digital competence becomes increasingly important as online-based public services become the new norm in interactions between government and citizens. Civil servants are required not only to be able to operate software but also to think critically in utilizing technology to support service functions.

2.2. Gender Gap in Technology Access and Human Resource Development

Even though the digitalization policy has become a national policy, Gender disparities in access to technology and competency development remain an unresolved challenge. Women in the public sector face a dual challenge: in addition to domestic and structural burdens, they also experience limited access to training and professional development, particularly in technology [16]. This situation is further complicated when such training is centralized, face-to-face, and requires physical presence over long periods of time, making it unfriendly to the social realities of working women. A 2022 study by the UNDP shows that conventional training programs often fail to accommodate the needs of female employees [17]. Barriers such as time, family responsibilities, and institutional biases contribute to low female participation in digital training. In this context, an inclusive and flexible approach is crucial to ensure accessible training without compromising women's other roles in the bureaucracy.

2.3. Budget Efficiency and Its Implications for Training Models

The post-pandemic budget efficiency policies have directly impacted the allocation of funds for civil servant training. The State Budget (APBN) realization report shows a shift in the budget from training to social and health spending between 2020 and 2022 [11]. This has resulted in a reduction in the scale and frequency of face-to-face training. According to Pollitt [18] efficiency pressures often cause public agencies to sacrifice long-term investments such as human resource development, which are fundamental to the success of long-term bureaucratic reform. Furthermore, PMK No. 49/PMK.02/2023 emphasizes savings by setting limits on off-site training costs, which ultimately encourages the

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emergence of online training models. as a policy alternative. In fiscally constrained conditions, online training offers much-needed flexibility, scalability, and cost-efficiency to local governments.

2.4. Digital Training Platform: Innovation in Civil Servant Competency Development

Digital training platform digital have been widely recognized as a strategic solution for flexible and cost-effective human resource development. One of the main advantages of digital training is its ability to reach geographically dispersed participants at a relatively low cost [19]. The self-paced learning model also provides employees with the freedom to organize their learning time according to their individual schedules [20-23]. According to IBM [24] online training is able to provide*Return on Investment*(ROI) up to 30 times higher than conventional training, as it reduces travel costs, accommodation, and lost work time [24]. In addition, the retention rate of materialin digital training is also higher. A study by*Research Institute of America*Studies show that e-learning can increase material retention by up to 60%, compared to only 8–10% in face-to-face training [25]. This suggests that training effectiveness is determined not only by the format of direct interaction, but also by the quality design of the digital learning system.

2.5. P3SPD: An Innovative, Inclusive and Efficient Model

The presence of the P3SPD platform is able to provide solutions faced by female employees working in government bureaucracies in Tanjung Balai City, North Sumatra Province. By offering online learning methods that can be accessed anytime and anywhere, P3SPD addresses two main problems such as budget constraints and the gap in women's participation in technology-based training. Therefore, theoretically, P3SPD offers many advantages. Empirical research on the effectiveness of P3SPD in the context of Indonesian bureaucracy has proven to provide a flexible and inclusive approach to improving digital management competencies [26]. P3SPD is designed as a digital training model focused on empowering female employees in the public sector. This model combines (1) a digital management competency-based curriculum, (2) a responsive technology platform, (3) adaptive and interactive learning features (modules, quizzes, forums, simulations), and (4) mentoring modules to ensure the transfer of learning to daily work. This model places inclusivity (flexible access, short modules, offline support when needed) and budget efficiency as key design principles and makes it suitable for conditions of public financial efficiency policies [27]. Other research that supports this theoretical study shows that there is an emphasis on the importance of digital competence as a bridge for the implementation of effective ICT policies [28]. Likewise, research states that digital competence improves the quality of services and performance of public employees in Indonesia [29]. Based on the expert opinions above, it can be stated that P3SPD is a research innovation that is able to accommodate gender-based inclusivity and become an efficient training model in improving the management competence of women with a digital background.

3. Materials and Methods

3.1. Research Design

This research uses an approach This explanatory quantitative study aims to test and explain the influence of the Digital Women's Human Resource Development Training Platform (P3SPD) on improving the digital management competency of female employees in the Tanjung Balai Education Office, Asahan. The survey model*cross-sectional*used to collect data simultaneously over a period of time from a specific population that has used the P3SPD platform. This approach is considered suitable for measuring relationships between variables and identifying direct influences between research constructs [30].

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3.2. Research Subjects

The study population comprised 28 female employees at the Tanjungbalai City Education Office, Asahan. Given the small population size, affordability, and assumptions of basic digital literacy, the sampling technique used was saturated sampling, which utilizes the entire population as a sample [31].

3.3. Variables and Operational Definitions

This research involves two main variables, namely:

a) Independent variable (X): Level of use of the P3SPD platform, measured through:

- Frequency of access to the platform
- Number of completed modules
- Engagement in interactive features such as forums, videos, and quizzes

b) Dependent variable (Y): Digital management competency, measured through:

- Ability to manage digital documents and files
- Ability to collaborate online using cloud tools (Google Workspace, OneDrive)
- Understanding of digital document security systems

3.4. Research Instruments

Data were collected using a closed questionnaire prepared by the researcher, consisting of 24 items with a 5-point Likert scale, ranging from 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree and 5 = Strongly Agree. This questionnaire has undergone a content validation process by three experts in the field of learning technology and digital bureaucratic management. To test the reliability of the instrument, a reliability test was conducted using the Cronbach's Alpha coefficient, which produced an α value of 0.874, indicating that the instrument has high internal consistency.

3.4. Data Collection Techniques

Data collection was conducted over two weeks in March 2025 using an online form (Google Forms) and a printed form for respondents with limited internet access. Each respondent was provided with complete information about the research objectives and asked to complete a consent form before answering the questionnaire. Secondary data, including platform usage logs, was also reviewed to cross-validate respondents' responses.

3.5. Data Analysis Techniques

Data were analyzed using IBM SPSS Statistics software version 25. Data analysis steps include:

a) Descriptive statistics, to describe respondent profiles and platform usage patterns.

b) Classical assumption tests include:

- Normality test (Kolmogorov–Smirnov)
- Linearity test (via ANOVA)
- Heteroscedasticity test (with scatterplot and Spearman test)

c) Simple linear regression analysis, to determine the significant influence between the use of P3SPD (X) on digital management competency (Y). The regression equation model used is:

$$\mathbf{Y = a + bX + e}$$

Information:

- Y = Use of P3SPD
- X = Digital management competency of female employees
- a = Constant
- b = Regression coefficient
- ε = error term

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The significance value was determined at the 95% confidence level ($\alpha = 0.05$). The results were analyzed using the α value. p-value, coefficient of determination (R^2), and t-test on the regression coefficient.

4. Findings and Discussion

4.1. Findings

This study aims to determine the effect of using the P3SPD Platform on improving the digital management competency of female employees at the Tanjungbalai City Education Office, Asahan. Data analysis was conducted through a series of classical assumption tests and simple linear regression using SPSS version 25.

4.1.1. Normality Test

Normality testing was performed using the Kolmogorov–Smirnov test. The results of the normality test can be seen in the following table.

Table 4.
Normality Test.

Variables	Kolmogorov-Smirnov Z	Sig. (2-tailed)
Use of P3SPD	0.141	0.200
Digital Management Competence	0.128	0.200

The test results show that both variables have significance values above 0.05, namely 0.200 for P3SPD Use and 0.200 for Digital Management Competence. This indicates that the data are normally distributed.

4.1.2. Heteroscedasticity Test

The heteroscedasticity test uses the Spearman test. The results of the heteroscedasticity test can be seen in the following table.

Table 5.
Heteroscedasticity Test.

Variables	Spearman's rho	Sig. (2-tailed)
Use of P3SPD	0.112	0.565

The Spearman test results showed a significance value of 0.565 (> 0.05) for the P3SPD Use variable, which indicated that there were no symptoms of heteroscedasticity.

4.1.3. Linearity Test

The results of the linearity test can be seen in the following table.

Table 6.
Linearity Test.

Source	Df	Mean Square	F	Say
Between Groups	1	104.3	3.637	0.037
Within Groups Digital	26	28.7		
Total	**27**			

4.1.4. Simple Linear Regression Analysis

The results of the simple linear regression analysis can be seen in the following table.

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Table 7.
Simple Linear Regression Test.

Model	Unstandardized B	Std. Error	t	Say
(Constant)	12.401	3.217	3.856	0.001
Use of P3SPD	0.652	0.228	2.860	0.008

From Table 7, the simple linear regression model for this study is**Y = 12.401 + 0.652X + e**which means that the use of P3SPD has a positive and significant effect on Digital Management Competence.

4.1.5. Coefficient of Determination Test (R Square)

The results of the coefficient of determination test can be seen in the following table.

Table 8.
Determination Coefficient Test.

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	0.489	0.239	0.210	5.353

From Table 8, the R Square value is 0.239, which means that 23.9% of changes or variations in the digital management competencies of female employees can be explained by the use of the P3SPD Platform.**,** while the remainder is 76.1% is influenced by other factors not examined in this study.

4.2. Discussion

The results of the study indicate that the implementation of P3SPD has had a significant impact on improving the digital management competency of female employees within the Tanjungbalai City Education Office. This competency improvement is evident in three main aspects: skills in using management software, utilizing digital communication technology for work coordination, and application-based data analysis capabilities. These findings align with research that states that digital competency is a key factor in the successful implementation of technology policies in the public sector. [25, 32, 33]. The findings of this study support the results of research which states that digital training has a direct impact on the quality of service and employee performance [34-36]. The findings of this study also indicate that improving individual competency and implementing P3SPD impacts training cost efficiency. Compared to conventional face-to-face training, the use of digital platforms reduces training costs by up to 35%, aligning with research findings that online training can optimize budgets without compromising learning quality [37, 38]. This study found that female employees have increased their participation in decision-making processes related to technology-based work innovation. These findings support research that emphasizes the importance of a digital competency framework in strengthening the role of female employees in the era of digital transformation [32, 36, 39]. This research also identified several challenges, such as limited internet network infrastructure in some work units and initial resistance from some employees to adopting new technologies. This situation indicates the need for ongoing mentoring strategies, such as digital mentoring and the provision of adaptive training modules that can be accessed offline. Based on these research findings, it can be stated that the results of this study strengthen the argument that digital training platforms such as P3SPD function not only as a medium for knowledge transfer but also as a means of empowering female employees, increasing cost efficiency, and accelerating digital transformation in the public sector.

5. Conclusion and Recommendation

5.1. Conclusion

Based on the results of simple linear regression analysis and statistical testing that have been conducted, it can be concluded that the use of the Digital Women's Human Resources Development Training Platform (P3SPD) has a significant and positive influence on improving the digital management competency of female employees at the Tanjungbalai City Education Office, Asahan. This

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is evidenced by the regression coefficient value of 0.652 and a significance value of 0.008 ($p < 0.05$), which indicates that every increase in the use of P3SPD will have a real impact on improving the digital competency of female employees. The coefficient of determination (R^2) value of 0.239 indicates that 23.9% of the variation in digital management competency can be explained by the use of P3SPD, while the remaining 76.1% is influenced by other factors that have not been studied, such as work experience, initial technological literacy, organizational support, and digital culture. The P3SPD platform has been proven to be able to make an important contribution in creating a training model that is flexible, easily accessible, and appropriate to the needs of female employees, especially in situations of budget efficiency and limited mobility. P3SPD is also able to reduce the gender-based digital divide, and supports the goal of developing women's human resources in an inclusive and sustainable public sector. Overall, this research supports human capital theory and contemporary literature on the importance of digital training in improving the productivity, efficiency, and adaptability of state civil servants in the era of digital transformation of government.

5.2. Recommendation

From the results of the research that has been conducted, the recommendation in this research are:

1. P3SPD Replication**:** Other government agencies can replicate P3SPD by adapting it to their respective sectoral needs.
2. Integration to SPBE**:**The P3SPD platform should be integrated into the national Electronic-Based Government System (SPBE).
3. Increased Interactivity**:**It is necessary to add simulation-based learning features, evaluative quizzes, and automatic competency assessments.
4. Periodic Monitoring**:**A periodic evaluation system is needed to assess the effectiveness of the platform quantitatively and qualitatively.
5. Further Research: Future research is recommended to add moderator variables such as organizational support, work culture, and early digital literacy.

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Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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