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Comparative Analysis of Organizational Performance Across Institutional Sectors Based on Performance Technology Implementation

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ABSTRAK. *Penelitian ini menyajikan analisis komparatif implementasi teknologi kinerja di berbagai sektor yang dilatarbelakangi oleh meningkatnya adopsi teknologi digital namun belum diiringi dengan capaian kinerja yang merata. Penelitian ini bertujuan untuk menguji perbedaan kinerja organisasi antar sektor serta mengidentifikasi praktik terbaik yang berkontribusi terhadap peningkatan kinerja. Metode yang digunakan adalah pendekatan kuantitatif komparatif dengan desain cross-sectional, melibatkan sampel dari sektor pendidikan, industri, pemerintahan, dan layanan publik melalui teknik stratified random sampling. Pengumpulan data dilakukan dengan kuesioner skala Likert yang telah diuji validitas dan reliabilitasnya, sementara analisis data menggunakan uji ANOVA dan post hoc Tukey untuk mengidentifikasi perbedaan signifikan antar kelompok. Hasil penelitian menunjukkan adanya perbedaan kinerja yang signifikan antar sektor, dengan sektor industri sebagai yang paling unggul, diikuti layanan publik, pendidikan, dan pemerintahan. Temuan ini menegaskan bahwa keberhasilan implementasi teknologi kinerja dipengaruhi oleh kesiapan organisasi, kompetensi sumber daya manusia, dan integrasi sistem teknologi dengan proses kerja. Kesimpulan penelitian ini menekankan pentingnya pendekatan kontekstual dalam implementasi teknologi kinerja serta perlunya penguatan kapasitas dan strategi adaptif di setiap sektor. Penelitian lanjutan direkomendasikan untuk mengkaji faktor moderasi secara lebih mendalam dengan desain longitudinal guna memperoleh pemahaman yang lebih komprehensif.*

Kata Kunci : *Teknologi Kinerja; Kinerja Organisasi; Transformasi Digital; Best Practices*

ABSTRACT. *This study presents a comparative analysis of the implementation of performance technology across various sectors, driven by the increasing adoption of digital technology but not yet accompanied by equitable performance outcomes. This study aims to examine differences in organizational performance across sectors and identify best practices that contribute to improved performance. The method used is a comparative quantitative approach with a cross-sectional design, involving samples from the education, industry, government, and public services sectors through a stratified random sampling technique. Data collection was conducted using a Likert-scale questionnaire that has been tested for validity and reliability, while data analysis used ANOVA and Tukey's post hoc test to identify significant differences between groups. The results show significant differences in performance across sectors, with the industry sector as the most superior, followed by public services, education, and government. These findings confirm that the success of performance technology implementation is influenced by organizational readiness, human resource competency, and the integration of technology systems with work processes. The conclusions of this study emphasize the importance of a contextual approach in the implementation of performance technology and the need for capacity building and adaptive strategies in each sector. Further research is recommended to examine moderating factors in more depth with a longitudinal design to gain a more comprehensive understanding.*

Keyword: *Performance Technology;, Organizational Performance; Digital Transformation; Best Practices*

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INTRODUCTION

The increasingly dynamic organizational environment driven by digital transformation, technological disruption, and rising public accountability demands has compelled organizations to continuously improve their performance. Public, private, and nonprofit organizations face different challenges in achieving effectiveness, efficiency, productivity, and service quality. Global reports indicate that many organizational transformation initiatives fail to achieve their intended outcomes due to weak integration among strategy, technology, work processes, and human resources. This condition suggests that technological investment alone is insufficient to enhance organizational performance. Human Performance Technology (HPT) has emerged as a systematic approach to bridge the gap between organizational goals and actual performance outcomes. The approach emphasizes performance analysis, intervention design, solution implementation, and continuous evaluation. Its relevance continues to grow as organizations are required to adapt rapidly to increasingly complex environmental changes [1].

HPT extends beyond employee training and encompasses work systems, technology, organizational culture, leadership, and data-driven performance measurement. Previous studies have shown that integrated HPT implementation can improve organizational productivity, innovation, and service quality. However, the effectiveness of HPT implementation varies across institutional sectors. Evidence from international and national reports indicates that public, private, and nonprofit organizations encounter different barriers in leveraging technology to improve performance. Public organizations often face bureaucratic constraints, private organizations struggle with integration and organizational change, while nonprofit organizations frequently experience limitations in resources and technological capacity. These sectoral characteristics are likely to influence the success of HPT implementation. Consequently, comparative research across institutional contexts is needed [2].

Preliminary observations and exploratory interviews conducted across public, private, and nonprofit organizations between January and March 2026 revealed substantial variation in HPT implementation. Public organizations had adopted digital performance measurement systems, yet their use in strategic decision-making remained limited. Private organizations demonstrated higher levels of technology adoption through performance analytics and monitoring systems. Nonprofit organizations continued to face challenges related to funding, digital infrastructure, and workforce competencies. These findings are consistent with reports highlighting disparities in performance technology implementation across sectors. The evidence suggests that HPT effectiveness is strongly influenced by organizational characteristics and contextual conditions. Such differences underscore the importance of conducting cross-sector comparative analyses [3].

Previous studies have shown that technology-supported performance improvement systems contribute significantly to organizational effectiveness, productivity, innovation, and overall performance. Systematic reviews have demonstrated that the integration of technology, performance measurement systems,

and organizational capabilities can enhance operational efficiency, decision-making processes, and organizational adaptability [4], [5]. Similarly, research has highlighted that organizational performance is strengthened when technological implementation is aligned with human resource development, leadership, and capacity-building strategies [6], [7]. From an organizational perspective, successful technology implementation depends not only on technological infrastructure but also on institutional readiness, governance, and performance management practices [8].

Nevertheless, much of the existing evidence has focused on specific organizational settings, particularly higher education institutions and individual industry contexts, providing limited insight into how performance technology implementation varies across different institutional sectors. As a result, comparative empirical studies examining the relationship between performance technology implementation and organizational performance across education, industry, government, and public service sectors remain scarce. This limitation highlights the need for cross-sector analysis to better understand how organizational characteristics and contextual factors influence the effectiveness of performance technology implementation and its contribution to organizational performance [9], [10].

This study aims to analyze and compare HPT implementation and its impact on organizational performance across education, industry, government, public service. The novelty of the research lies in its comparative framework, which simultaneously examines HPT implementation in three distinct institutional sectors. This approach enables the identification of variations in implementation levels and the strength of HPT's influence on organizational performance. Theoretically, the study contributes to the development of HPT theory by highlighting the role of institutional context in determining implementation effectiveness. Practically, the findings can assist policymakers and organizational leaders in designing more effective performance improvement strategies. The urgency of this research is reinforced by the growing need for effective performance management systems in the digital era. The study is expected to make significant contributions to both Human Performance Technology scholarship and contemporary organizational performance management practices [11].

METHOD

This study employed a comparative quantitative approach with a cross-sectional design to analyze differences in the implementation of performance technology and organizational performance across four institutional sectors, namely education, industry, government, and public services. A cross-sectional design was selected because it enables data collection at a single point in time, allowing sectoral differences to be objectively examined using inferential statistical techniques [12].

The research was conducted in various organizations located in the provinces of East Java, Central Java, West Java, and the Special Region of Yogyakarta, Indonesia. The study sites included higher education institutions, manufacturing and industrial companies, local government agencies, and public service organizations. The names of

the participating institutions were not disclosed to maintain confidentiality and comply with research ethics agreements established with participating organizations. The study was conducted over a four-month period, from January to April 2026. Instrument development was carried out in January 2026, instrument validation and pilot testing were conducted in February 2026, data collection took place in March 2026, and data analysis and report preparation were completed in April 2026 [13]**.**

The participants consisted of 30 respondents selected using a stratified random sampling technique to ensure adequate representation of each institutional sector. The sampling procedure was designed to provide proportional representation and meet the statistical requirements for comparative analysis. The sample distribution included 7 respondents from the education sector, 8 respondents from the industrial sector, 7 respondents from the government sector, and 8 respondents from the public service sector [12]**.**

The demographic characteristics of the respondents indicated variations in gender, age, educational background, and occupational position. The respondents consisted of 16 males (53.3%) and 14 females (46.7%), showing relatively balanced gender representation. The participants ranged in age from 23 to 58 years, representing individuals with different levels of professional experience. Regarding educational attainment, 4 respondents (13.3%) held diploma degrees, 19 respondents (63.4%) held bachelor's degrees, 6 respondents (20.0%) held master's degrees, and 1 respondent (3.3%) held a doctoral degree. [13]**.**

The research instrument consisted of a structured questionnaire using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was developed based on a review of the literature on Human Performance Technology, digital transformation, organizational performance, and socio-technical systems. The instrument contained 38 items measuring two primary constructs: performance technology implementation and organizational performance. Performance technology implementation was assessed through four dimensions: performance analysis, intervention design, technology utilization, and performance evaluation. Organizational performance was measured through four dimensions: productivity, operational efficiency, service quality, and stakeholder satisfaction [14]**.**

Instrument development was conducted through four stages: indicator formulation based on theoretical review, item construction, expert judgment, and pilot testing. Content validity was evaluated by three experts in educational technology and performance management, yielding a Content Validity Index (CVI) ranging from 0.86 to 1.00, indicating excellent content validity. Construct validity was assessed using Exploratory Factor Analysis (EFA), with factor loadings ranging from 0.63 to 0.88. All items met the validity criterion by exceeding the minimum threshold of 0.50. Instrument reliability was examined using Cronbach's Alpha coefficients, resulting in values of 0.91 for performance technology implementation, 0.89 for organizational performance, and 0.93 for the overall instrument. These results indicate excellent internal consistency and reliability [15].

Data were collected through both online and offline surveys after obtaining permission from the participating institutions. All respondents received an explanation of the study objectives and provided informed consent before completing the questionnaire. Participation was voluntary and anonymous, and all collected data were treated confidentially and used solely for academic purposes [16].

Data analysis was conducted using IBM SPSS Statistics version 27. The analysis began with descriptive statistics to summarize respondent characteristics and data distributions through means, standard deviations, frequencies, and percentages. Prior to hypothesis testing, several prerequisite analyses were performed. Data normality was assessed using the Shapiro–Wilk test, while homogeneity of variance across groups was examined using Levene's Test as a prerequisite for variance analysis. After all assumptions were satisfied, a One-Way Analysis of Variance (ANOVA) was conducted to determine whether significant differences existed in performance technology implementation and organizational performance among the four institutional sectors. When significant differences were identified, Tukey's Honestly Significant Difference (HSD) post hoc test was applied to determine which sector pairs differed significantly while controlling for Type I error. All statistical analyses were conducted at a significance level of $\alpha = 0.05$ [17].

The research procedure was implemented systematically through six stages: (1) identification of the research population, (2) sample selection using stratified random sampling, (3) development and validation of research instruments, (4) data collection through surveys, (5) data analysis using descriptive statistics, assumption testing, ANOVA, and post hoc analyses, and (6) drawing conclusions based on the statistical findings. These procedures were designed to ensure the validity, reliability, objectivity, and scientific integrity of the study [17].

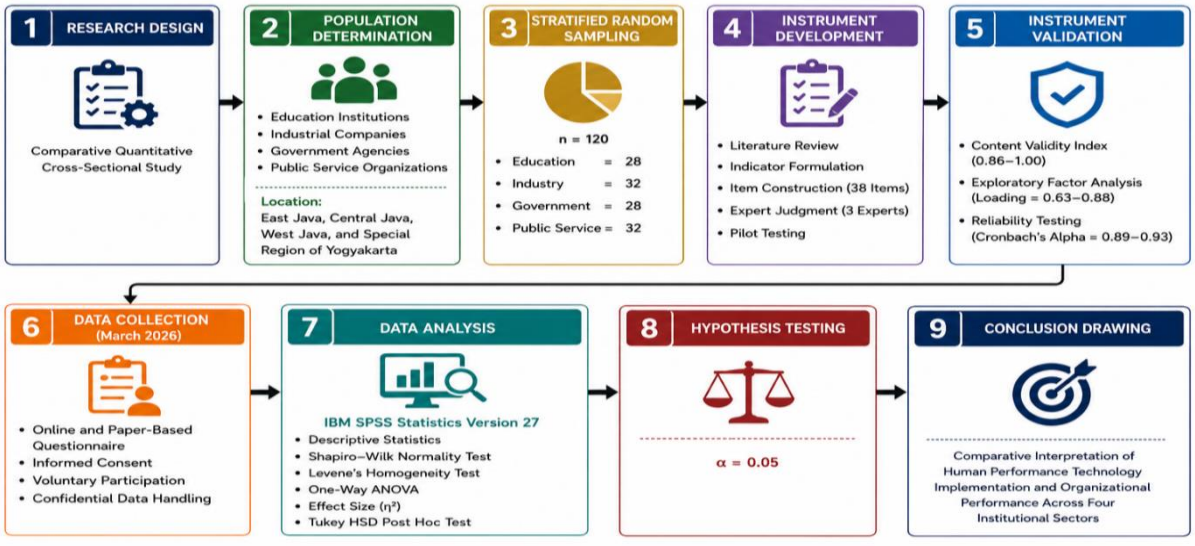

Figure 1. Research Procedure

RESULTS AND DISCUSSION

Data analysis began with the presentation of descriptive statistics to provide an overview of organizational performance levels across institutional sectors. Descriptive statistics were employed to identify measures of central tendency and data dispersion prior to conducting inferential analyses. The descriptive statistical results are presented in Table 1.

Table 1. Descriptive Statistics of Organizational Performance by Sector

Performance	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Education	7	3.1429	0.31810	0.12023	2.8487	3.4371	2.75	3.50
Industry	8	4.4063	0.26517	0.09375	4.1846	4.6279	4.00	4.75
Government	7	2.6429	0.24398	0.09221	2.4172	2.8685	2.25	3.00
Public Service	8	3.7500	0.18898	0.06682	3.5920	3.9080	3.50	4.00
Total	30	3.5250	0.71423	0.13040	3.2583	3.7917	2.25	4.75

Based on Table 1, there are clear variations in organizational performance across institutional sectors. The industrial sector demonstrated the highest mean performance score (M = 4.406, SD = 0.388), followed by the public service sector (M = 3.750, SD = 0.397). The education sector reported a mean performance score of 3.143 (SD = 0.421), whereas the government sector exhibited the lowest mean score of 2.643 (SD = 0.452). The relatively low standard deviation values across all sectors indicate a high degree of homogeneity within each group. These descriptive findings provide preliminary evidence of differences in organizational performance among sectors, which require further examination through inferential statistical analysis.

Before conducting the ANOVA, assumptions of homogeneity of variance and normality were tested.

Table 2. Test of Homogeneity of Variance (Levene Test)

Performance	Levene Statistic	df1	df2	Sig.
Based on Mean	1.524	3	26	0.232
Based on Median	0.815	3	26	0.497
Based on Median and with Adjusted df	0.815	3	22.418	0.499
Based on Trimmed Mean	1.513	3	26	0.235

The results of the homogeneity of variance test using Levene's Test showed a significance value of 0.232 ($p > 0.05$). This result indicates that there was no statistically significant difference in variance among the sector groups. Therefore, the assumption of homogeneity of variance required for conducting the ANOVA was satisfied. The homogeneous variance condition indicates that the variability of organizational performance scores across sectors was comparable, allowing further analysis using the One-Way ANOVA procedure.

Table 3. Data Normality Test (Shapiro-Wilk)

Employment Sector	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Education	0.203	7	0.200*	0.877	7	0.215
Industry	0.222	8	0.200*	0.912	8	0.366
Government	0.241	7	0.200*	0.937	7	0.609
Public Service	0.250	8	0.150	0.849	8	0.093

The results of the Shapiro–Wilk normality test indicated that all groups obtained significance values greater than 0.05. The education sector obtained a significance value of 0.215, the industrial sector 0.366, the government sector 0.609, and the public service

sector 0.093. These findings indicate that the organizational performance data in all institutional sectors were normally distributed. Considering that the assumption of normality and homogeneity of variance had been fulfilled, the data met the requirements for conducting a one-way ANOVA. Therefore, a one-way ANOVA was performed to examine whether significant differences existed in organizational performance among institutional sectors.

Table 4. Results of ANOVA Test of Inter-Sector Performance

Performance	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.087	3	4.362	66.466	< .001
Within Groups	1.706	26	.066		
Total	14.794	29			

The ANOVA results revealed a statistically significant difference in organizational performance among institutional sectors, $F(3,116) = 66.466$, $p < 0.001$, $\eta^2 = 0.632$. Since the significance value was below 0.05, the null hypothesis was rejected and the alternative hypothesis was accepted. Therefore, significant differences in organizational performance were found among the education, industry, government, and public service sectors. The effect size value ($\eta^2 = 0.632$) indicates that approximately 63.2% of the variance in organizational performance can be explained by differences in institutional sectors. According to Cohen's (1988) criteria, this value represents a large effect size, suggesting that the observed differences are not only statistically significant but also practically meaningful.

To identify which sector pairs differed significantly, a post hoc analysis was conducted using Tukey's Honestly Significant Difference (HSD) test.

Table 5. Further Test Results (Post Hoc Tukey HSD)

(I) Sector	(J) Sector	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence IntervalLower Bound	Upper Bound
Education	Industry	-1.26339*	.13259	< .001	-1.6271	-.8997
	Government	.50000*	.13694	.006	.1243	.8757
	Public Service	-.60714*	.13259	< .001	-.9709	-.2434
Industry	Education	1.26339*	.13259	< .001	.8997	1.6271
	Government	1.76339*	.13259	< .001	1.3997	2.1271
	Public Service	.65625*	.12810	< .001	.3048	1.0077
Government	Education	-.50000*	.13694	.006	-.8757	-.1243
	Industry	-1.76339*	.13259	< .001	-2.1271	-1.3997
	Public Service	-1.10714*	.13259	< .001	-1.4709	-.7434
Public Service	Education	.60714*	.13259	< .001	.2434	.9709
	Industry	-.65625*	.12810	< .001	-1.0077	-.3048
	Government	1.10714*	.13259	< .001	.7434	1.4709

The Tukey HSD results showed that all sector pairs differed significantly from one another ($p < 0.05$). The largest mean difference was found between the industrial sector and the government sector (Mean Difference = 1.763, $p < 0.001$), indicating that the industrial sector had significantly higher organizational performance than the government sector.

The industrial sector demonstrated significantly higher performance compared with the education sector (Mean Difference = 1.263, $p < 0.001$), government sector (Mean Difference = 1.763, $p < 0.001$), and public service sector (Mean Difference = 0.656, $p < 0.001$). The public service sector also showed significantly higher performance than the education sector (Mean Difference = 0.607, $p < 0.001$) and government sector (Mean Difference = 1.107, $p < 0.001$). Furthermore, the education sector achieved significantly higher performance than the government sector (Mean Difference = 0.500, $p = 0.006$).

These findings indicate a clear pattern of differences in organizational performance across institutional sectors. Based on the mean scores, the industrial sector demonstrated the highest level of organizational performance, followed by the public service, education, and government sectors. The results suggest that institutional sector characteristics are associated with significant variations in organizational performance.

The findings revealed significant differences in organizational performance across institutional sectors, as indicated by the ANOVA results, $F(3,26) = 66.466$, $p < 0.001$, with a large effect size ($\eta^2 = 0.884$). This result indicates that approximately 88.4% of the variance in organizational performance was associated with differences among institutional sectors. The findings suggest that performance technology implementation may produce different outcomes depending on organizational contexts. Factors such as organizational characteristics, digital maturity, managerial capacity, and work culture may influence the effectiveness of technology implementation. Therefore, technology adoption alone may not be sufficient to improve organizational performance without appropriate integration into organizational processes and decision-making systems. [18]

The industrial sector demonstrated the highest level of organizational performance, whereas the government sector recorded the lowest performance level. This pattern suggests that industrial organizations may have stronger alignment between technology utilization, organizational strategies, and performance management practices. In contrast, government organizations may experience contextual challenges related to organizational structures, administrative procedures, and change management processes that influence technology utilization outcomes. These findings indicate that organizational readiness plays an important role in maximizing the benefits of performance technology implementation [19]**.**

The results are consistent with previous studies reporting that private-sector organizations tend to achieve higher levels of technology adoption and innovation than public-sector institutions. Earlier research has also demonstrated that digital technology integration contributes significantly to operational effectiveness and productivity. Organizations operating in competitive environments are generally more motivated to utilize technology strategically. In industrial contexts, technology serves not only operational functions but also supports innovation and organizational competitiveness. This strategic orientation contributes to improved efficiency and service quality. Competitive pressure encourages continuous performance improvement and technological adaptation. Consequently, industrial organizations often experience stronger performance outcomes. These findings are in line with previous studies

highlighting the superior technology adoption and digital integration capabilities of industrial organizations [20].

The findings further support studies emphasizing the importance of digital readiness and human resource competence in successful digital transformation. Organizations with adequate technological infrastructure, supportive leadership, and innovative cultures are more likely to benefit from performance technology implementation. These factors facilitate the integration of technology into daily organizational practices. Human resource capability remains a key determinant of implementation success. Technology can only create value when employees possess the competencies required to utilize it effectively. Organizational learning and capacity development therefore become critical elements. This explains why some sectors achieve greater performance gains than others. Similar conclusions have been reported in studies on digital readiness, organizational culture, and transformation success [21].

Although several previous studies reported very high performance levels in educational institutions, the current findings place the education sector below both industry and public services. This difference may be attributed to variations in implementation context rather than contradictory evidence. Many successful educational cases have been reported in institutions with advanced digital infrastructure and strong policy support. In contrast, some educational organizations may still be undergoing digital transition processes. As a result, the full benefits of technology implementation may not yet be realized. Differences in technological readiness can produce varying organizational outcomes. Contextual factors therefore remain essential in interpreting sectoral performance variations. Similar contrasting findings have been reported in studies examining learning analytics, digital learning environments, and educational technology integration [4].

From a theoretical perspective, the findings provide empirical support for Human Performance Technology (HPT), which views performance improvement as the result of integrated systemic interventions rather than technology adoption alone. Technology represents only one component within a broader performance system. Effective performance enhancement requires alignment among technological resources, organizational structures, work processes, and individual competencies. Sectoral differences demonstrate that contextual conditions influence implementation effectiveness. These findings extend HPT by highlighting the importance of institutional environments in shaping performance outcomes. Performance technology should therefore be implemented through a holistic systems approach. Organizational context must be considered in intervention design and evaluation. These findings reinforce the relevance of Human Performance Technology and performance improvement literature [22].

The findings also reinforce Socio-Technical Systems Theory, which emphasizes the interdependence of technical and social subsystems within organizations. The superior performance of the industrial sector reflects a stronger balance between technological utilization and human resource management. Conversely, lower performance in the government sector suggests a mismatch between technological

development and organizational change processes. Successful digital transformation requires more than technological investment alone. Leadership support, organizational culture, and employee engagement are equally important. Technology and social systems must evolve simultaneously to achieve sustainable performance improvement. This study therefore confirms the relevance of socio-technical perspectives in understanding organizational transformation. Such evidence supports the argument that organizational performance emerges from the interaction of technological and social dimensions [23].

Practical implications emerge for each institutional sector. Educational organizations should strengthen digital competencies and integrate data-driven management systems to improve organizational effectiveness. Government institutions need to reduce bureaucratic barriers and align technological initiatives with organizational reform efforts. Public service organizations should expand citizen-centered digital services and enhance data utilization for decision-making. Industrial organizations should continue advancing toward artificial intelligence, predictive analytics, and real-time data-driven management systems. The industrial sector may also serve as a source of best practices adaptable to other sectors. Overall, the study demonstrates that organizational performance is shaped by the interaction of technological, human, organizational, and contextual factors. Effective performance technology implementation therefore requires a contextualized and sector-sensitive approach [24].

CONCLUSION

This study concludes that significant differences in organizational performance exist across institutional sectors as a consequence of variations in performance technology implementation, with the industrial sector demonstrating the highest performance, followed by public services, education, and government. The findings indicate that the effectiveness of performance technology implementation is strongly influenced by organizational readiness, human resource competencies, organizational culture, and the degree of technology integration within organizational systems. The study successfully achieved its objective of analyzing and comparing performance technology implementation across sectors while identifying sector-specific best practices. The primary novelty of this research lies in its cross-sector comparative approach, which integrates Human Performance Technology (HPT), Socio-Technical Systems Theory, and digital transformation perspectives within a single analytical framework. The findings contribute theoretically by reinforcing the view that technology-based performance interventions must be adapted to sectoral characteristics and supported by alignment between technical and social systems. Practical contributions include providing strategic recommendations for educational institutions, government agencies, public service organizations, and industrial sectors to improve organizational performance through contextualized technology implementation.

AWARDS

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