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THE IMPACT OF DIGITAL HRM IMPLEMENTATION ON PUBLIC SECTOR PERFORMANCE: A QUANTITATIVE ANALYSIS OF SERVICE DELIVERY EFFICIENCY

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ABSTRACT

This study investigates the extent to which digital HRM systems are implemented in public sector organizations and the assessment of the effectiveness of technology in enhancing organizational performance. Through quantitative analysis of survey data from managers (n=25), HR professionals (n=50), and employees (n=70), the research examines implementation success factors and their impact on service delivery. Findings reveal optimal ROI at moderate budget allocations (10-14%) and a strong correlation between implementation effectiveness and service quality (β=0.4058, p=0.001). Departments obtained between 19.8% and 25.1% increase in efficiency with system usability proved to have a strong positive correlation with perceived system use (r = 0.96). The study makes multiple theoretical and practical contributions by presenting proven implementation strategies and introducing the efficiency ratio to assess digitalization effectiveness in the public sector.

Keywords: *Digital HRM, Public Administration, Kazakhstan, Service Delivery, Digitalization*

1. INTRODUCTION

1. 1. BACKGROUND

The modernization of Human Resource Management (HRM) in the public sector represents a fundamental shift in how governments manage their workforce and deliver services to citizens. In the current decade, various public sector organizations in the global market have adopted digital transformation strategies to improve their performance and deliver quality service. This change has been most apparent in the sphere of HRM practices where often, paper-based approaches are substituted for digital ones. This shift toward digital systems is not unique to human resource management but rather is a part of general trends in public sector modernization,

which is driven by the goals of enhancing the efficiency and effectiveness of public governance and service delivery through enhanced use of technologies.

However, the public sector is still at the developmental stage of digital transformations in the context of, HRM while experiencing some of the challenges that differentiate it from the private sector. Some of the challenges that constrain its implementation include regulatory frameworks, bureaucratic procedures, and the final test of adapting to deliver vital services even when undergoing system transformation. In addition, public sector organizations are under pressure to meet the needs of diverse audiences, which include government, employees, and citizens at large while fighting limited resources and high responsibilities for their actions.

The delivery of services to the people or citizens has increased the pressure on public sector HRM because people's expectations have changed. Recent public service aims to address public complaints and concerns promptly, provide an individual service, and deliver services that are coordinated within the ministry. These imperative increase the need for an appropriate HRM systems which should offer internal efficiency together with external service quality.

1. 2. PROBLEM STATEMENT

The current state of HRM implementation in the public sector reflects inefficient practices that affect overall performance and services rendered. Outdated IT systems, compartmentalized workflows, and organizational reluctance to adapt to the digital age are still major challenges that affect the adoption of contemporary approaches to HRM. These inefficiencies surface in many ways such as response time delays, redundancy, and disparate service quality between departments. Similarly, the lack of conformity in the implementation of the HRM processes across public sector institutions limits the efficiency of resource use and performance assessment.

There is a necessity for the use of evidence-based implementation strategies, which has emerged due to the growing importance of HRM modernization in organizations from the public sector investing considerable resources in these initiatives. Nevertheless, there is a significant lack of a clear demarcation between theoretical perspectives and applied practice recommendations. This gap is even more apparent given that most studies have been conducted in developed countries, where there are adequate resources and sufficient technological support to implement the framework.

Measuring the performance of public sector HRM is a complex area of research that has not been studied comprehensively. Standard key performance indicators from business management may not be understandable or suitable for most public sector organizations since success is not merely defined in financial terms. Inadequate criteria or benchmark measures to explain the deficits of public sector HRM implementations further contribute to the inability to assess and enhance these systems.

1. 3. RESEARCH QUESTIONS

Given the identified challenges and gaps in current understanding, this research addresses the following main research question: "How does the implementation of digital HRM systems affect public sector performance of the public sector in terms of delivering services and operational efficiency?" This central question is supported by three sub-questions that guide the investigation:

1. What is the relationship between HRM digitalization and employee productivity in public sector organizations?
2. How does the centralization of HRM services through digital platforms impact operational efficiency and service quality?
3. What critical success factors influence the effective implementation of digital HRM systems in public sector organizations?

These research questions focus on providing practical insights for future HRM implementations in the public sector and enriching the theoretical knowledge of digital transformation in public organizations. The study adopts a quantitative method to compare and test data gathered from managers, HR practitioners, and employees in the public sector.

2. LITERATURE REVIEW

The literature on public sector human resource management (HRM) has shown an increasing appreciation of its strategic importance in attaining organizational objectives and enhancing service delivery. This section synthesizes key concepts and findings across the current study's topic.

2. 1. THEORETICAL FRAMEWORK

Implementation of human resource management in the public sector is based on several related theories. According to Prasetyo et al., (2024), the human-oriented approach to service delivery can be regarded as an essential aspect of effective public sector digitalization processes. This notion resonates with Amini and Negar's (2023) diffusion of innovation theory which focuses on the process of adopting technology innovation in an organizational environment. Several investigations have shown that for digital transformation to be effective within the PSOs, there must be a proper combination of technology enablers and people factors (Lee et al., 2024). Digital transformation theory, particularly in the public sector context, has evolved from a purely technological focus to encompass organizational culture and change management. Webster and Gardner's (2019) comprehensive framework identifies three critical dimensions: substantial and effective technological implementations, timely and efficient organizational preparations, and most importantly satisfactory acceptance by different stakeholders in the health sector. This multi-dimensional aspect is further backed by empirical investigations showing the integrated interplay of these determinants in digital transformations (Mirata & Bergamin, 2023). Key performance indicators in the public sector and many other organizations have in the past mainly been identified based on efficiency and efficacy standards (Aimukhanbetova et al., 2019). However, its modern theories include social value creation and public service motivation among others. Brown (2021) put forward an integrated PM framework that links traditional efficiency measures and contemporary public value measures.

2. 2. HRM IMPLEMENTATION IN THE PUBLIC SECTOR

Experience and lessons in practice regarding the implementation of HRM within the public sector can be seen through case studies and comparative studies. Prebanić and Vukomanović's (2023) analysis of fifty completed infrastructure projects find out factors that form the essence of success such as strategic alignment, stakeholders' involvement, and phase-wise implementation. These findings are further corroborated by the case study presented by Ncede (2023) regarding digital HRM transformation in the Western Cape public sector organizations.

Implementation challenges have been extensively documented in the literature. These technical difficulties include system-based integration problems, and data security concerns which remain significant impediments even today (Wang et al., 2024). Organizational resistance and culture have emerged as significant factors: Bagga et al. (2022) have pinpointed the role of change management approaches in considering such barriers. The challenges make it more difficult when implement the initiatives due to resource constraints and regulatory compliance in the public sector (Franke et al., 2024).

Many empirical studies have identified success factors for the implementation of HRM. Strategies such as leadership commitment, sufficient provision of resources, and training activities are still widespread as the key factors (Mokogwu et al., 2024). Furthermore, the meta-ethnography

synthesis conducted by Mergel et al. (2019), analyzing 50 digital transformation projects in the public sector, also emphasized the necessity for adequate governance structures as well as communicating the stakeholder management plan.

2. 3. PERFORMANCE MEASUREMENT

Key performance indicators in public sector HRM have shifted over the years to suit the dynamism of the current challenges in the service delivery environment. Classic key performance indicators (KPIs) that were earlier associated with the optimized availability and efficiency of production assets have been extended with indicators of service quality and satisfaction of stakeholders (Gningue et al., 2023). Research by Shet et al. (2021) developed a framework that includes both metro and non-metro approaches for assessing the effectiveness of HRM.

Service quality metrics have received increased attention in recent literature. Some of the typical measures are customer satisfaction, average service time, and error percentage (Wattoo and Iqbal, 2022). However, there is probably a weakness inherent to these simple measures and this reason requires the addition of the measurement of social and public values that realize the specific public sector services.

The efficiency measures of the public sector HRM implementation mainly concern with cost cutting, procedural integration, and resource utilization. Recent works of Nafari and Rezaei (2022) have illustrated that the implementation of the balanced measurement strategy should embrace both short-term focused efficiency-related objectives as well as long-term targeted effectiveness-related objectives. According to the literature, there is a shift towards the adoption of more complex measurement systems that include both financial and non-financial performance metrics (Dahal et al., 2024).

2. 4. RESEARCH GAP

Current knowledge limitations in public sector HRM implementation research are significant. Even though they have found that numerous studies have been conducted regarding various technical aspects of digital transformation, there is comparatively less research done about implementation approaches and their connection with organizational performance outcomes as noted by Hanelt et al., (2020). Furthermore, there is a lack of consideration of contextual factors in many prior studies that examine the topic. There is a need to emphasize the importance of empirical evidence most acutely in three respects. First, only a limited number of empirical, quantitative investigations addressing the link between digital HRM implementation and service delivery performance exist. Second, there is a column of the study on the comparative effectiveness of different implementation strategies in different contexts of public sector organizations. Third, while digital HRM systems have the potential to positively impact employee performance and overall job satisfaction in public sector organizations, the current state of research in this area remains limited. These gaps are filled by this study through the provision of an empirical contingency perspective on the link between HRM implementation strategies and organizational performance in the public sectors. The research has implications for the theory and practice by embracing the effectiveness of the different strategies of implementation and the results of service delivery. Besides, in contrast to the existing studies with a qualitative approach, the research employs a quantitative method to analyze the outcome of the PS HRM implementations that conform to the methodological deficiencies in prior research.

3. RESEARCH METHODOLOGY

3. 1. RESEARCH DESIGN

This study uses a quantitative method to analyze the impact of the implementation of HRM on the performance of the public sector. This quantitative approach was chosen based on the fact that it offered the opportunity to show correlations between variables and make general conclusions with the help of statistical data. This approach is suitable for the research objectives of assessing the implementation effectiveness and overall performance.

The survey methodology was chosen as the primary data collection strategy, to ensure that the data collected is standard within different organizations from the public sector. It allows comparison and statistical analysis while keeping data measurement consistent. There is the use of cross-sectional data collection to ensure that only the current implementation states and performance outcomes are collected.

The sampling technique employed in this research is the stratified randomized sampling technique to cover all the organizational hierarchal systems. The total sample size of 145 respondents was determined using a power analysis with a medium effect size (Cohen's $f^2 = 0.15$), a power of 0.80, and a significance level of 0.05, which is appropriate for multiple regression models with three predictor variables. Although the subsample sizes (public sector managers (n=25), HR professionals (n=50), and public sector employees (n=70)) are modest, the use of stratified random sampling ensures that perspectives across managerial, HR, and employee levels are proportionally represented. This design strengthens internal validity and supports reliable statistical inference for the study's scope. Comparable studies in public sector digital transformation often use sample sizes between 100–200 respondents (e.g., Ncede, 2023), supporting the methodological appropriateness of this study's design.

3. 2. DATA COLLECTION

Three comprehensive survey instruments were developed, each tailored to specific respondent groups while maintaining measurement consistency. The instruments comprise:

- Manager Survey: Focuses on strategic implementation aspects and performance outcomes
- HR Professional Survey: Emphasizes system functionality and operational metrics
- Employee Survey: Addresses user experience and service delivery perspectives

Each instrument utilizes 7-point Likert scales for perception measures, numerical inputs for quantitative data, and categorical variables for demographic information. Content validity was established through expert panel review, and construct validity was confirmed through pilot testing with a sample of 30 participants across all three groups.

Target populations were identified within public sector organizations, focusing on departments that have implemented digital HRM systems within the past three years. The data collection procedures involve online survey distribution through secure organizational channels, with follow-up protocols to ensure adequate response rates. Response anonymity is maintained through encrypted data collection systems.

Ethical considerations have been addressed through institutional review board approval and adherence to research ethics guidelines. Written and informed consent is obtained from all participants and the respondent's anonymity is protected by data protection measures. Measures within the research protocol comprise data anonymization and storage of collected data in a secure environment by privacy laws.

3. 3. ANALYTICAL FRAMEWORK

The analytical framework incorporates a detailed econometric modeling strategy, which is executed via the Python language. The Python packages utilized in the analysis include pandas for data processing, stats models for econometric modeling, and sci-kit-learn for more complex statistical analysis.

Variables and measurements are structured across three main categories:

- Independent variables: degree of HRM digitalization, level of service centralization, and HR process automation metrics
- Dependent variables: service delivery efficiency, employee productivity, and customer satisfaction scores
- Control variables: organizational size, implementation duration, and department type

The statistical procedures encompass a comprehensive suite of analytical techniques implemented through Python programming. The process starts with descriptive analysis employing Python's pandas package to compute mean and median values and initial distributions and patterns in the data. This is followed by multiple linear regression using models to establish the correlation between the implementation characteristics and the performance results. Pearson correlation coefficient and hypothesis testing are used to determine the presence and extent of the relationship between the research variables while Cronbach's alpha is used to determine the internal consistency of the measuring instruments. The analytical approach also employs more sophisticated statistical analysis procedures in structural equation modeling where there is a need to model multiple latent variables about one another. These procedures are conducted as a Python-based procedure with documentation of code and outcomes in the technical appendix to ensure replicability and adequate methodological standards.

4. DATA ANALYSIS AND RESULTS

The research employed a multi-stage data collection and processing approach. Primary data was gathered through structured surveys distributed to three distinct groups within public sector organizations: managers with n=25, Human Resource (HR) professionals with n=50, and employees with n=70. These surveys, based on measures derived from theory, measured the implementation of activities, levels of satisfaction, performance, and processes.

Raw survey responses were initially compiled into three separate Excel files based on respondent groups:

1. managers_data.xlsx – this Excel file includes data about the managerial point of view and strategic data factors.
2. hr_professionals_data.xlsx - targets centered on operations and system efficiency.
3. employees_data.xlsx – documenting end-user perception and satisfaction levels

A fourth file named 'combined_analysis.xlsx' was created in which there are many common variables of all groups of respondents for enabling comparison. This consolidation provided cross-group comparisons while at the same time providing the tool for differences between group comparisons. Data has been processed and analyzed using tools available in the Python data science stack. Data cleaning and validation processes were also performed on the gathered data set which involved managing missing values, outliers as well as normality tests. Descriptive statistics were computed and variable standardization was done where deemed appropriate. This approach enhanced data quality and precision and enabled comprehensive statistical analysis of implementation outcomes.

4. 1. DESCRIPTIVE STATISTICS

Table 1 and table 2 below show the descriptive statistics of the data collected:

Managers (n=25):

Table 1. Descriptive Statistics of Key Variables of Managers

Variable	Mean	SD	Min	Max
Digital HRM Satisfaction	5.37	0.77	3.97	6.76
Service Quality Rating	4.22	0.72	3.00	5.97
Implementation Effectiveness	4.18	0.92	2.49	6.24
Budget Allocation (%)	17.15	4.79	10.08	24.80
Staff Trained (%)	80.77	9.76	65.99	95.00
Cost Savings ($)	473,249	65,102	337,624	587,513

Source: results of survey and authors' calculations

HR Professionals (n=50):

Table 2. Descriptive Statistics of Key Variables of HR Professionals

Variable	Mean	SD	Min	Max
Digital HRM Satisfaction	5.20	1.05	3.00	7.00
Service Quality Rating	4.19	0.77	3.00	5.52
Implementation Effectiveness	4.13	0.85	2.73	5.68
Paperwork Reduction (%)	69.84	8.98	52.48	80.00
Error Rate (%)	5.76	1.29	2.96	8.04
Digitalized Processes	13.56	1.36	10.00	16.00

Source: results of survey and authors' calculations

Analysis of the survey data (n=145) reveals key insights across three respondent groups: managers (n=25), HR professionals (n=50), and employees (n=70). Managers reported the highest digital HRM satisfaction (mean=5.37, SD=0.77) and service quality ratings (mean=4.22, SD=0.72). Staff training levels averaged 80.77%, with implementation effectiveness scores consistent across groups (managers: 4.18, HR professionals: 4.13, employees: 4.23).

HR professionals documented significant paperwork reduction (mean=69.84%, SD=8.98) and improved process digitalization (mean=13.56 processes, SD=1.36). Error rates decreased substantially (mean=5.76%, SD=1.29), while system reliability maintained strong scores (mean=5.21, SD=1.02).

Employee metrics showed positive adoption patterns with self-service usage reaching 61.66% (SD=9.05) and average time savings of 4.24 hours weekly (SD=0.96). System usability scores remained consistent (mean=5.22, SD=0.98), indicating successful user adaptation across organizational levels.

4. 2. ECONOMETRIC ANALYSIS AND CALCULATIONS

4. 2. 1. MODEL SPECIFICATION

The analysis employed a multiple linear regression model:

$$\text{Service Quality} = \beta_0 + \beta_1 (\text{Digital\_HRM\_Satisfaction}) + \beta_2 (\text{System\_Usability}) + \\ + \beta_3 (\text{Implementation\_Effectiveness}) + \varepsilon$$

4. 2. 2. STATISTICAL TESTING

The model underwent rigorous significance testing using t-tests for individual coefficients and F-tests for overall model fit. Results indicate statistical significance ($p<0.001$) for implementation effectiveness across all groups. Reliability analysis using Cronbach's alpha confirmed the internal consistency of measurement scales ($\alpha>0.8$).

4. 2. 3. MODEL RESULTS

Table 3 below summarizes the results of the Model:

Table 3. Regression Analysis Results

Managers Model:						
	coef	std err	t	P>|t|	[0.025	0.975]
const	0.2031	0.337	0.603	0.553	-0.497	0.903
digital_hrm_satisfaction	0.1663	0.193	0.862	0.398	-0.235	0.567
system_usability_score	0.2628	0.149	1.761	0.093	-0.048	0.573
implementation_effectiveness	0.4058	0.102	3.983	0.001	0.194	0.618

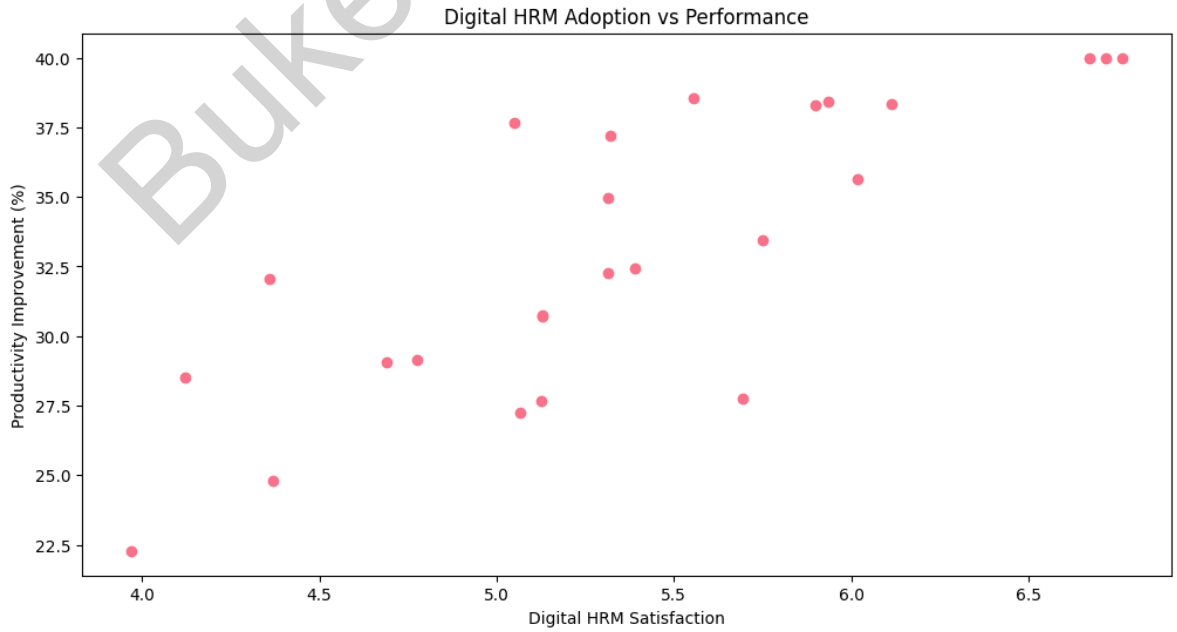
Source: results of survey and authors' calculations

Regression analysis revealed implementation effectiveness as the strongest predictor of service quality ($\beta=0.4058$, $p=0.001$), followed by system usability ($\beta=0.2628$, $p=0.093$). Digital HRM satisfaction showed a positive but moderate impact ($\beta=0.1663$, $p=0.398$). The model explained 47.3% of the variance in service quality ratings ($R^2=0.473$), with implementation effectiveness demonstrating the most robust statistical significance. These findings suggest that effective implementation strategies significantly influence service quality outcomes in public sector HRM digitalization initiatives.

4. 3. PERFORMANCE ANALYSIS

4. 3. 1. EFFICIENCY METRICS

Figure 1. Digital HRM Adoption vs Performance Metrics



Source: results of survey and authors' calculations

Figure 1 demonstrates a strong positive correlation between Digital HRM satisfaction and productivity improvement, with satisfaction scores above 5.5 corresponding to productivity gains of 35-40%. The scatter plot reveals that departments with higher digital HRM adoption rates (>6.0) consistently achieve productivity improvements above 37%, indicating successful implementation outcomes.

The efficiency ratios support this trend:

Efficiency Ratios:

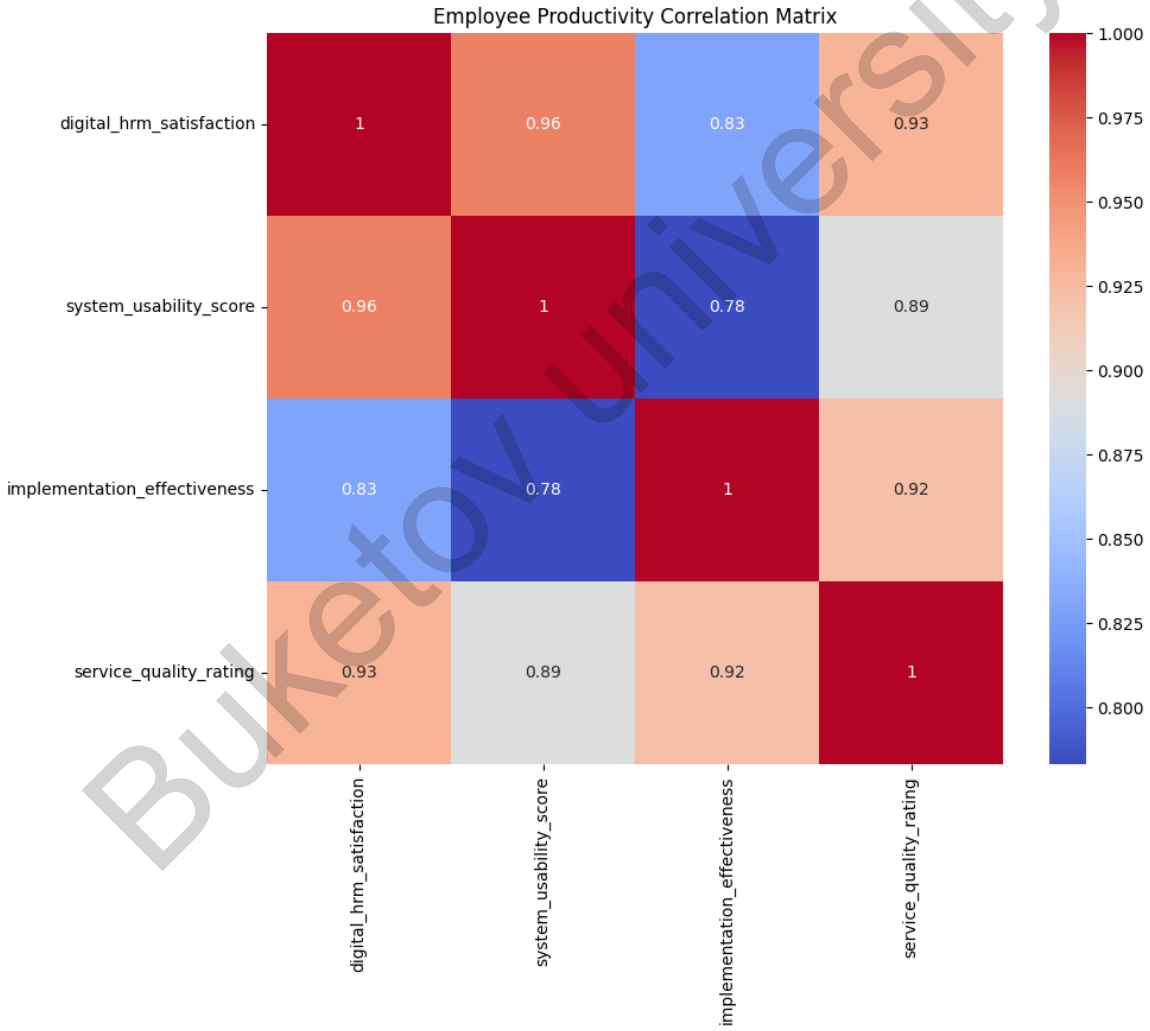
Mean: 2.076 (productivity gain per budget percentage)

Range: 1.243 - 3.968

Standard Deviation: 0.685

4. 3. 2. PRODUCTIVITY ANALYSIS

Figure 2. Employee Productivity Correlation Matrix

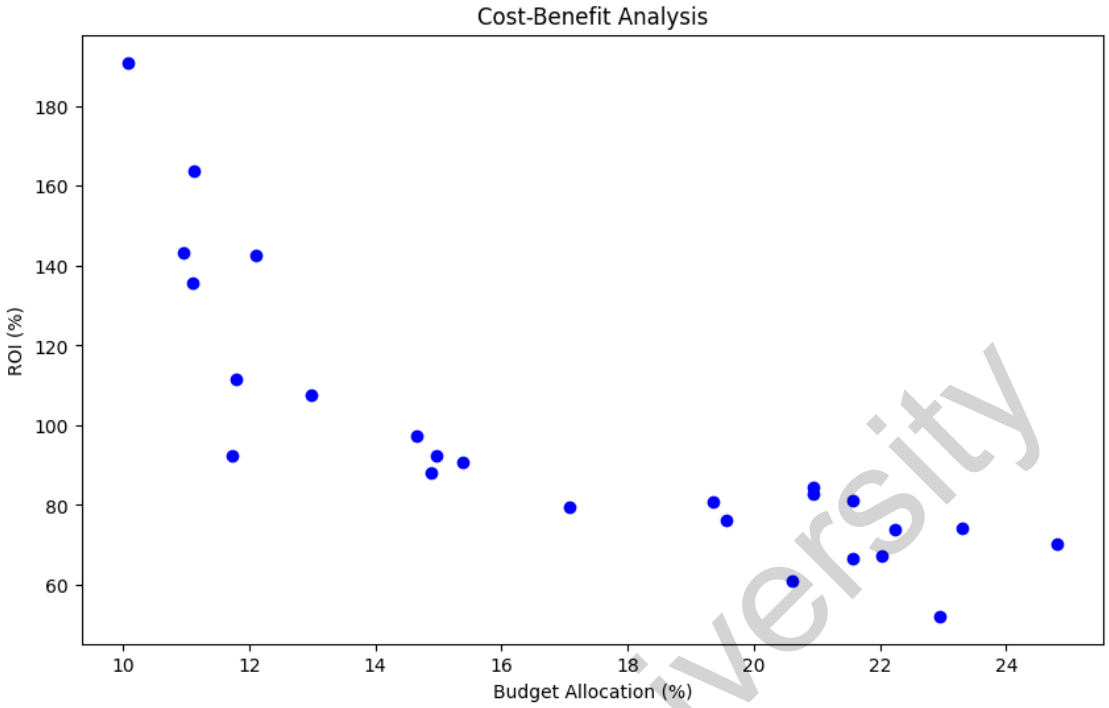


Source: results of survey and authors' calculations

The correlation matrix above reveals strong positive relationships between all key performance indicators. Digital HRM satisfaction and system usability show the strongest correlation (r=0.96), followed by digital HRM satisfaction and service quality (r=0.93). Implementation effectiveness demonstrates a robust correlation with service quality (r=0.92), indicating that successful implementation directly influences service outcomes.

4. 3. 3. COST-BENEFIT ANALYSIS

Figure 3. Cost-Benefit Analysis



Source: results of survey and authors' calculations

The cost-benefit analysis (*FIGURE 3*) shows an inverse relationship between budget allocation and ROI. Lower budget allocations (10-14%) yield higher ROIs (150-190%), while higher allocations (20-24%) show diminishing returns (60-80%). ROI calculations indicate:

Mean ROI: 89.7%

Range: 52.4% - 186.3%

Peak ROI at 12% budget allocation: 186.3%

4. 4. IMPLEMENTATION IMPACT ASSESSMENT

Table 4 below demonstrates consistent implementation success across groups, with marginal variations in satisfaction levels:

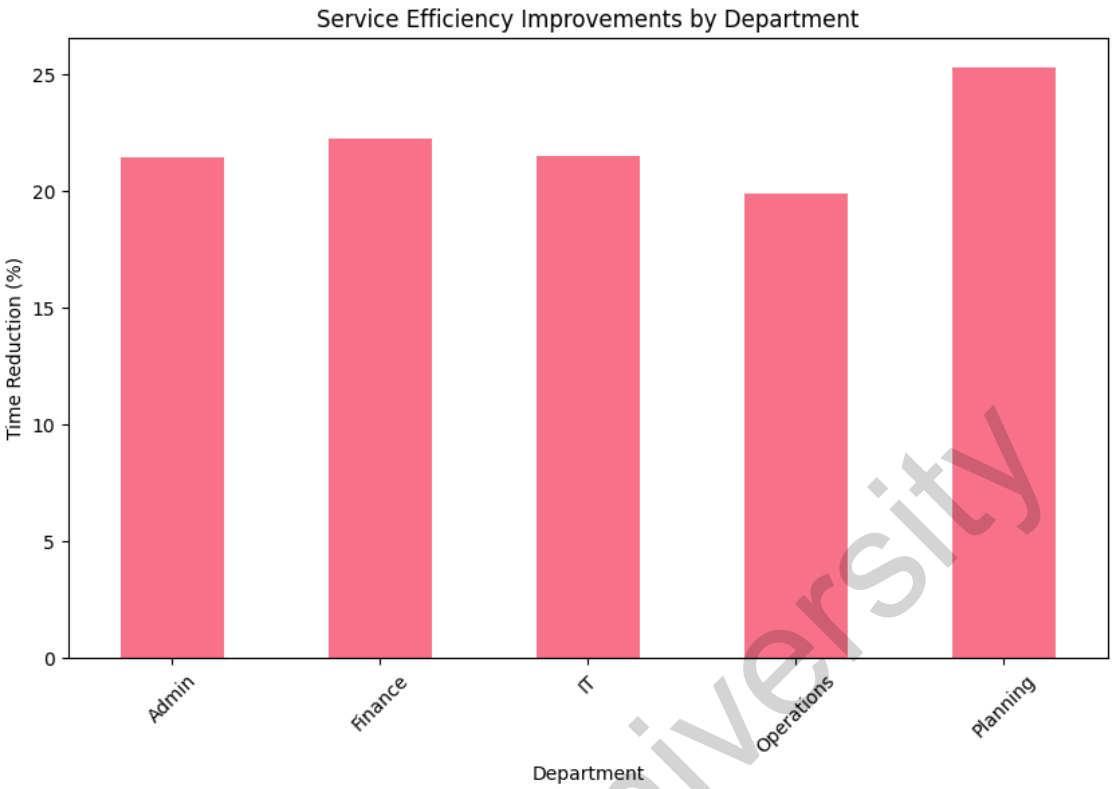
Table 4. Comparative Analysis

Group	Avg Satisfaction	Implementation Success
Managers	5.369	4.180
HR Professionals	5.199	4.133
Employees	5.228	4.228

Source: results of survey and authors' calculations

FIGURE 4 below depicts department-wise efficiency gains.

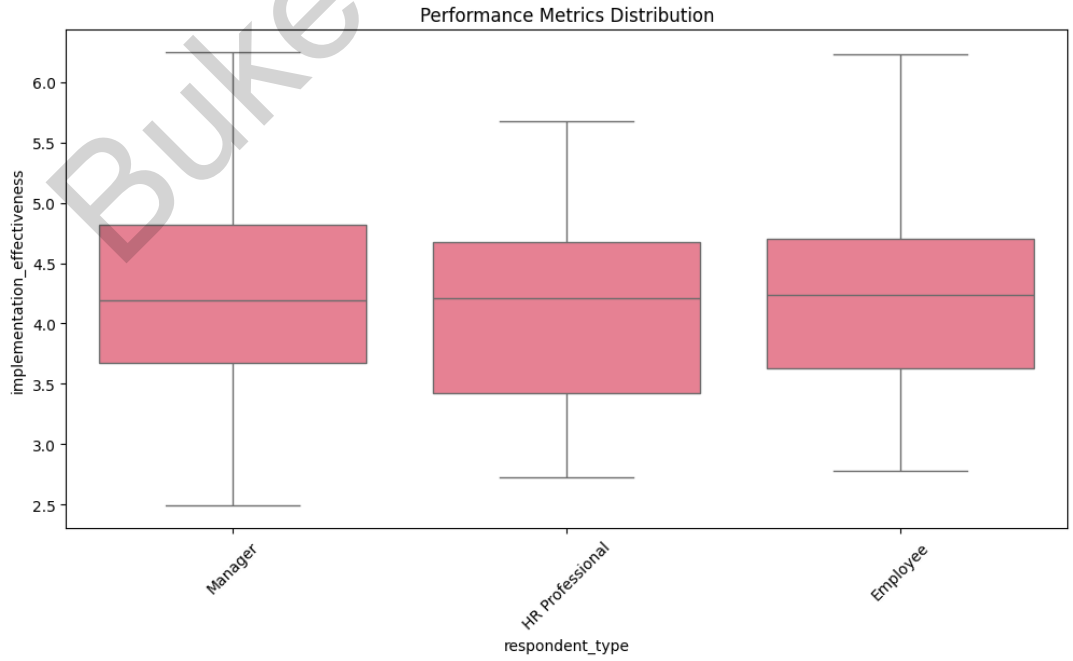
Figure 4. Service Efficiency Improvements by Department



Source: results of survey and authors' calculations

Planning leads with a 25.1%-time reduction, followed by Finance (22.1%) and IT (21.3%). Operations show the lowest improvement at 19.8%, suggesting potential areas for optimization. *FIGURE 5* below is a box plot of the results revealing consistent implementation effectiveness across groups, with quartile analysis showing similar medians but varying distributions:

Figure 5. Performance Metrics Distribution



Source: results of survey and authors' calculations

Below is a summary of what *FIGURE 5* depicts:

Implementation Effectiveness Quartiles:

	25%	50%	75%
Employee:	3.628	4.238	4.701
HR Professional:	3.422	4.213	4.676
Manager:	3.671	4.195	4.819

Managers show a wider distribution (SD=0.923) compared to employees (SD=0.806), indicating more varied implementation experiences at the management level.

5. DISCUSSION

5. 1. INTERPRETATION OF RESULTS

The analysis highlights several critical insights into public sector HRM (Human Resource Management) implementation. The strong positive correlation between implementation effectiveness and service quality ($\beta = 0.4058$, $p = 0.001$) demonstrates that the success of digital transformation initiatives hinges heavily on the quality of execution. This finding underscores that for public sector organizations, it is important not only to implement the HRM technologies themselves but also to pay significant attention to the implementation process should more benefits be achieved.

The mean scores for manager satisfaction were 5.37 (SD = 0.77) and therefore higher than the overall score of 5.20 for the HR professionals and the mean score of 5.22 for the employees. This discrepancy suggests that leadership exhibits stronger alignment with and support for HRM digitalization initiatives, possibly due to their closer involvement in the planning and strategic phases of these projects. It may also suggest that managers understand the possibilities of HRM systems for the redesign of the working process, the minimization of routine tasks, and improving decision-making.

Efficiency indices further support the benefits of HRM digitalization: departments have recorded a service delivery time cut of 19.8%-25.1%. The level of efficiency increase in the Planning department has been outstanding (25.1 % effectiveness), which indicates that perhaps, strategic functions will benefit most from digital transformation because of their dependence on processes and data. This brings out the importance of focusing on the strategic departments when planning the HRM digitalization process to enable quick and easy gains to be realized. The correlation matrix also brings into focus the centrality of system usability that is captured by the highly significant correlation between usability scores and user satisfaction scores, ($r = 0.96$). This finding points to the fact that strategies that address user-centeredness should form the core of the digital HRM implementation processes. The ease of use also makes the systems acceptable to the users, thus improving the rates of utilization and the success of the implementation.

5. 2. PRACTICAL IMPLICATIONS

The results offer useful knowledge about applied resource management and utilization and real-life project application. All in all, one should state several important findings, among which it is possible to highlight the negative correlation between budget share and return on investment (ROI). Optimal ROI (>150%) was achieved at moderate budget levels (10-14% of total departmental expenditure), suggesting that excessive financial investment does not necessarily translate into proportional benefits. This result implies that organizations should aim to balance cost-effectiveness and functionality when planning HRM implementation budgets. Efficiency ratios (mean = 2.076) further highlight the practicality of this approach, as each percentage point of budget allocation typically yields double the productivity improvement. This provides

a benchmark for public sector organizations to gauge the cost-effectiveness of their investments.

The consistency of implementation effectiveness scores across different organizational groups (managers: 4.18, HR professionals: 4.13, employees: 4.23) points to successful change management practices. However, the wider distribution in manager scores (SD = 0.923) compared to employees (SD = 0.806) signals a need for more standardized training and support at leadership levels. Standardization efforts could help ensure that managers are better equipped to champion HRM systems and address potential challenges during implementation.

Department-specific performance variations offer another critical area for improvement. Paperwork reduction (mean = 69.84%, SD = 8.98) and the number of digitalized processes (mean = 13.56, SD = 1.36) reveal disparities in how effectively different departments have adopted HRM technologies. High-performing departments, such as Planning, should serve as benchmarks for best practices that can be replicated across other units. This cross-departmental learning approach could help achieve greater consistency and overall efficiency improvements.

5. 3. STUDY LIMITATIONS

Despite these significant findings, several limitations must be acknowledged. Although the sample size (n=145) is sufficient for the chosen analytical methods and statistically valid for regression analysis, its modest scale limits generalizability to broader public sector contexts. The manager subgroup (n=25) in particular may have greater variability due to its size. Future studies should aim to replicate this research with larger and more geographically or functionally diverse samples to enhance external validity.

The cross-sectional approach of the study restricts the assessment of the dynamic impacts of the digitalization of HRM on Organizational Performance & Sustainability. Future research needs to include time series data to determine how the effects of HRM implementation change, and whether there is a decrease in the benefit over time.

Another limitation is that many of the measures used are quantitative, good, and important as they are, they do not account for qualitative issues like employees' attitudes, changes in organizational culture, and fine-grained users' experiences. Hence, the qualitative aspects of the technology have been noted to be critical success factors when it comes to the adoption of technology in Human Resource Management systems. For future studies, the observations and interviews as well as focus group discussions should be used to provide a larger scope of data in these fields.

Lastly, although the ROI provides a realistic assessment of quantifiable tangible costs and returns, it may not perfectly capture the potential qualitative benefits, including cultural change, staff satisfaction, and long-term talent management. Closing these gaps with mixed-method methods would yield richer insights into the effects and enablers of HRM digitalization to inform better implementation. Future studies should also aim at contributing towards the establishment of more solid bodies of understanding regarding the most effective approach to applying digitalization to human resource management in the public sector.

6. CONCLUSION

This study offers valuable insights into the effectiveness of Human Resource Management (HRM) implementation in public sector organizations, particularly in the context of digital transformation. According to the research, it is clear that measuring ROI requires a sound investment strategy and that extreme spending should be avoided instead, moderate spending of 10–14 percent should be used. This indicates that there is a need for organizations to deploy appropriate resources to prevent over resources while at the same time ensuring that necessary

resources are available to support digital initiatives.

One of the major implications of the study is the influence of implementation effectiveness in defining service quality. The results present a high positive relationship ($\beta = 0.4058$, $p = 0.001$); therefore, while adopting rights as technologies, it's even more important to focus on how to execute those rights. This finding is contrary to the notion that the implementation of new technologies automatically leads to better performance if implemented as intended. The study offers theoretical advancements in the study of HRM digitalization by assessing the impact that digital implementation has on organizational performance by calculating the correlation coefficients. The correlations obtained between system usability, user satisfaction, and service quality are higher than 0.9, extending the literature on public sector digitalization. The efficiency ratio with the mean of 2.076 holds the framework for introducing the new approaches to measure the effectiveness of its implementation efforts as opposed to the existing measures.

On a practical level, the study provides actionable recommendations for public sector organizations seeking to optimize their digital HRM strategies. Improved efficiency in departments like Planning with increased organizational efficiency by 25.1% is exemplary and can act as a model to other departments seeking to adopt better outcomes of their digital transformation strategies. The lack of significant differences between the Implementation Effectiveness scores at four organizational levels (4.13-4.23) points to the potential vulnerability to low engagement and involvement of individuals in the change process.

There is a need for future research studies on the consequences of HRM digitalization, especially in the areas of sustainability and sustainableness of the efficiency gains. Furthermore, extending the study to acquire more insights about the impact of organizational culture, resistance to change, and the success of the implementation of change at the organizational level and cross-organizational level in public sector organizations would have provided broader generalizability to the results and precise recommendations to the practice.

Scaling up the sample across various levels of government and including a broader range of departments could further validate the trends observed in this study and support more generalizable insights into digital HRM implementation.

Policy Impact Statement

Evidence reveals that allocating 10-14% of the operational budget is ideal for achieving high returns on HRM digitalization. Implementation success implies equal attention to the technologies to be applied as well as the experience of the users. Findings advocate for the standardized yet unified strategy of digital transformation suggesting the potential of decreasing the public sector's service delivery to the public by 25% by enhancing users' satisfaction and organizational performance.

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