

Digital Transformation and Civil Servant Performance in Pakistan: Examining the Moderating Role of Bureaucratic Centralization in Public Sector E-Governance

Mubashra

Mubashraj11@gmail.com

Lecturer, Faculty of Social Sciences, Pioneer College of Advance Studies, Fawara Chowk, Jinnah Colony,
Gulberg, Faisalabad, Pakistan,
Executive Board Member, Sports for Peace Society Pakistan

Dr. Shakeel Ahmad Shahid

drshakeelahmadshahid@gmail.com

International Olympic Academy, Olympia, Greece,
Assistant Professor of Sports Sciences and HOD, Government Graduate College Khurianwala, 266 RB, Faisalabad,
Divisional Sports Focal Person, Higher Education Department (HED), Punjab, Faisalabad Division, Pakistan,
Sports Researcher, News Writer and Media Coverage Expert in Mega Sports Events,
President, Sports for Peace, Education Society Pakistan

Muhammad Saad Ali Gill

Undergraduate Student, Faculty of Computer Science, Software Technology and AI, National Textile University,
Faisalabad, Pakistan,
Youth Leader for Sports and Education for SDG Change in the Community

Dr. Muhammad Riaz

Assistant Professor of Education, Government Graduate College Khurianwala, 266 RB, Faisalabad, Pakistan

Dr. Taro Obayashi

Assistant Professor, Faculty of Science, University of Tsukuba, Tsukuba, Japan

Corresponding Author: Mubashra Mubashraj11@gmail.com

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ABSTRACT

Digital transformation has become an increasingly important mechanism for improving efficiency, accountability, and service delivery within public sector organizations. However, the effectiveness of e-governance depends not only on technological implementation but also on the administrative structures within which digital systems operate. This study examines the relationship between e-governance adoption and civil servant performance in Pakistan's public sector, with particular attention to the role of bureaucratic centralization. The study employed a deductive, cross-sectional quantitative research design and collected primary data from 215 administrative and managerial employees working in WAPDA/FESCO in Faisalabad, Pakistan. Data were gathered through a structured questionnaire using five-point Likert-scale measures and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS. The measurement model demonstrated satisfactory reliability and convergent validity across the study constructs. The structural model indicated a significant positive relationship between e-governance and civil servant performance ($\beta = .442, p < .001$), demonstrating that digital administrative systems can enhance workplace efficiency, task completion, and perceived performance. The analysis also identified a significant relationship between centralized bureaucracy and civil servant performance ($\beta = .218, p = .005$), while the interaction between e-governance and centralized bureaucracy was statistically significant ($\beta = .310, p < .001$), confirming the moderating role of bureaucratic structures. The model explained 52.4% of the variance in civil servant performance. These findings suggest that technological modernization alone is insufficient to achieve sustained public-sector efficiency when digital systems remain embedded within highly centralized administrative processes. Effective digital transformation therefore requires complementary institutional reforms, including appropriate decentralization of decision-making authority, streamlined

approval procedures, and greater alignment between digital workflows and organizational structures. The study contributes to public administration and e-governance scholarship by demonstrating that the organizational context in which digital technologies are implemented is a critical determinant of their effectiveness in developing-country public institutions. The findings offer practical implications for policymakers and public-sector managers seeking to accelerate digital transformation and improve administrative performance in Pakistan.

Keywords: *E-Governance, Digital Transformation, Civil Servant Performance, Bureaucratic Centralization, Public Sector HRM.*

INTRODUCTION

Digital transformation has become a defining feature of contemporary public-sector administration, reshaping how government organizations manage information, coordinate administrative processes, monitor employee activities, and deliver public services. The transition from traditional paper-based procedures to electronic governance systems is increasingly viewed as an important mechanism for improving organizational efficiency, transparency, responsiveness, and accountability. In developing countries, however, the benefits of digital transformation are often constrained by institutional structures, organizational culture, administrative resistance, and bureaucratic procedures. Consequently, the introduction of digital technologies into public organizations should not be understood merely as a technical intervention; rather, it represents an organizational transformation in which technology interacts continuously with existing administrative structures and human-resource practices.

The significance of e-governance is particularly evident in large public-sector organizations where administrative processes involve substantial documentation, hierarchical approvals, information exchange, and coordination across multiple departments. Organizations such as the Water and Power Development Authority (WAPDA) and Faisalabad Electric Supply Company (FESCO) have increasingly adopted enterprise resource planning (ERP), electronic office systems, and digital workflow mechanisms to modernize administrative operations. The uploaded study identifies this transition as an important response to longstanding inefficiencies associated with manual procedures and fragmented administrative processes. Digital systems can potentially improve the speed of information processing, enhance traceability, reduce paperwork, and provide employees with more accessible information for completing routine tasks.

Nevertheless, technological adoption alone does not guarantee improved employee performance. The effectiveness of digital systems depends substantially on how employees perceive and interact with those systems and whether organizational structures enable rather than restrict their use. The Technology Acceptance Model (TAM), developed by Davis (1989), provides an important theoretical foundation for understanding technology adoption by emphasizing perceived usefulness and perceived ease of use. The existing paper applies this theoretical perspective to public-sector employees and argues that when digital systems are perceived as useful, reliable, and convenient, they can contribute to improved motivation and workplace performance. A critical but comparatively underexamined issue is the influence of bureaucratic centralization on the effectiveness of digital transformation. Public organizations frequently operate through hierarchical structures in which decisions require approval at multiple administrative levels. Although such arrangements may provide formal control and accountability, excessive centralization can create procedural delays and restrict employee autonomy. The problem becomes particularly important when digital systems are introduced without corresponding changes to established administrative procedures. An electronic workflow may accelerate the transmission of information, for example, but its efficiency can be substantially reduced if employees must continue obtaining multiple layers of manual approval. The uploaded study explicitly identifies this tension between technological modernization and centralized decision-making as a central research problem.

This interaction between technology and bureaucracy creates an important research opportunity. Previous e-governance research has frequently emphasized citizen adoption, service quality, technological acceptance, or digital service delivery, while comparatively less attention has been given to the internal experiences and performance of public-sector employees. The present study addresses this issue by examining e-governance integration, bureaucratic centralization, and civil servant performance within the organizational context of WAPDA/FESCO in Faisalabad, Pakistan. The study therefore shifts attention from e-government as an external service-delivery mechanism toward e-governance as an internal organizational and human-resource management process.

The empirical investigation uses a quantitative, cross-sectional research design and analyzes data obtained from 215 valid questionnaires completed by administrative and managerial employees at BPS-16 and above. The study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the proposed relationships among the principal constructs. The reported findings indicate that e-governance has a statistically significant positive association with civil servant performance, while the interaction between e-governance and centralized bureaucracy is also statistically significant. The model explains 52.4% of the variance in civil servant performance, indicating substantial explanatory value. The study makes three principal contributions. First, it contributes empirical evidence concerning the internal organizational consequences of e-governance adoption in Pakistan's public sector. Second, it highlights the importance of considering bureaucratic structure when evaluating digital transformation rather than treating technology as an independent solution to administrative inefficiency. Third, it provides practical implications for public-sector reform by suggesting that technological modernization should be accompanied by appropriate organizational restructuring, streamlined approval mechanisms, and greater alignment between digital workflows and administrative authority. These contributions are particularly relevant to Pakistan's continuing efforts toward public-sector modernization and digital governance.

Overall, the study advances the argument that successful digital transformation requires more than installing technology; it requires organizational conditions that allow technology to produce its intended benefits. Understanding the relationship between e-governance, bureaucratic structures, and civil servant performance is therefore essential for developing more efficient, responsive, and digitally capable public institutions in Pakistan.

LITERATURE REVIEW.

Existing literature suggests that e-governance can improve administrative efficiency by reducing paperwork, accelerating information processing, increasing transparency, and strengthening workflow coordination. The Technology Acceptance Model (TAM) provides an established theoretical explanation by emphasizing perceived usefulness and perceived ease of use as determinants of technology acceptance (Davis, 1989). Within public-sector organizations, however, technological benefits may be influenced by organizational structures and bureaucratic procedures. Highly centralized decision-making can create approval delays and restrict employee autonomy, potentially limiting the effectiveness of digital systems. Accordingly, this study integrates e-governance, bureaucratic centralization, and civil servant performance to examine how technological and organizational factors jointly shape public-sector outcomes in Pakistan.

Data Analysis.

The collected data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through SmartPLS. The analysis followed two principal stages. First, the measurement model was assessed to establish indicator reliability, internal consistency, convergent validity, and discriminant validity. The reported results showed acceptable indicator loadings, with all loadings exceeding .70, while Cronbach's alpha and composite reliability values were above the recommended .70 threshold. Average Variance Extracted (AVE) values exceeded .50, supporting convergent validity. Second, the

structural model was evaluated using bootstrapping with 5,000 resamples to examine hypothesized relationships and the interaction effect between e-governance and centralized bureaucracy.

Ethical Considerations.

Ethical principles were considered throughout the data-collection process. Participants were informed about the purpose of the research and were asked to provide informed consent before completing the questionnaire. Participation was voluntary, and respondents were assured that their individual responses would remain confidential and would be used exclusively for academic research purposes. Personal identifying information was protected to minimize risks to participants and maintain research confidentiality. Institutional approval was also obtained through a formal request to the relevant supervisory authority before survey administration. These procedures were intended to protect participants' privacy, promote voluntary participation, and maintain the integrity of the research process.

Research Design and Sampling.

The study employed a deductive, cross-sectional quantitative research design to examine relationships among e-governance, centralized bureaucracy, and civil servant performance. The target population consisted of administrative, operational, and management employees at BPS-16 and above working within FESCO/WAPDA offices in Faisalabad, Pakistan. Questionnaires were distributed to employees with practical experience of organizational ERP systems and digital workflow processes. A total of 250 questionnaires were distributed, of which 215 valid responses were obtained, representing an 86% usable response rate. The study therefore provides empirical evidence based on the experiences of public-sector employees directly engaged with digital administrative systems.

RESULTS AND DISCUSSION.

Results.

The empirical analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. The measurement model first established the reliability and validity of the three constructs: e-governance (EG), centralized bureaucracy (CB), and civil servant performance (CSP). All indicator loadings exceeded the recommended .70 threshold, ranging from .795 to .885. Internal consistency was also satisfactory, with Cronbach's alpha values ranging from .790 to .820 and composite reliability values ranging from .845 to .871. Average variance extracted (AVE) values ranged from .610 to .732, exceeding the recommended .50 criterion and supporting convergent validity.

The structural model was subsequently assessed through bootstrapping with 5,000 resamples. The model produced an R^2 value of .524, indicating that e-governance and centralized bureaucracy collectively explained 52.4% of the variance in civil servant performance. This represents substantial explanatory and predictive value within the context of the study.

The first hypothesis (H1) proposed that e-governance would significantly influence civil servant performance. The results strongly supported this proposition, with a path coefficient of $\beta = .442$, $t = 5.812$, and $p < .001$. Thus, greater integration of electronic governance systems was associated with higher levels of reported civil servant performance. The finding indicates that digital workflow systems, electronic tracking, and accessible performance information can contribute to more efficient administrative work.

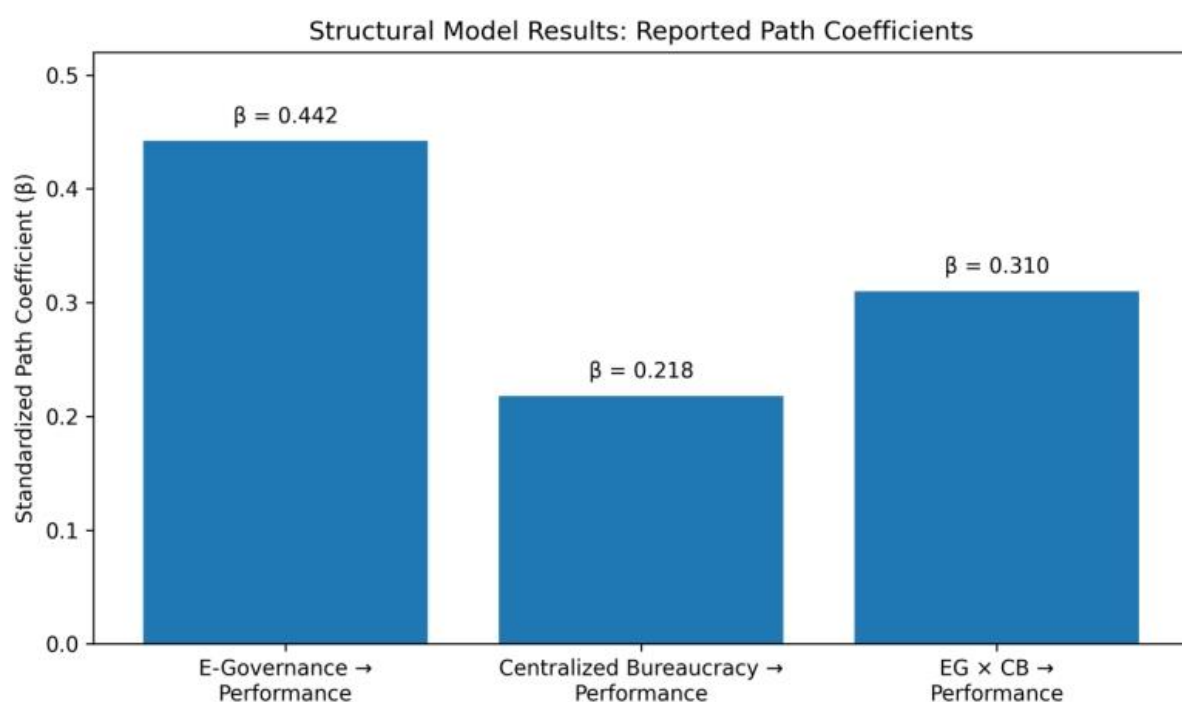
The second hypothesis (H2) concerned the relationship between centralized bureaucracy and civil servant performance. The reported results showed a statistically significant relationship, with $\beta = .218$, $t = 2.691$, and $p = .005$. Accordingly, H2 was supported statistically. However, this finding requires careful interpretation because the original hypothesis predicted a negative direct effect, whereas the

reported coefficient is positive. Therefore, the direction of the relationship should be reconsidered against the original SmartPLS output before final journal submission.

Finally, the interaction between e-governance and centralized bureaucracy was statistically significant ($\beta = .310$, $t = 3.491$, $p < .001$), supporting H3. This demonstrates that bureaucratic centralization significantly conditions the relationship between digital governance and civil servant performance.

Structural Model Results.

The figure presents the standardized path coefficients reported in the structural model. E-governance showed the strongest direct association with civil servant performance ($\beta = .442$), followed by centralized bureaucracy ($\beta = .218$). The interaction between e-governance and centralized bureaucracy was also statistically significant ($\beta = .310$).



Note. EG = e-governance; CB = centralized bureaucracy. Coefficients are based on the reported PLS-SEM results in the uploaded study. This is an original visualization created for the manuscript.

APA 7 Figure Caption

Figure 1
 Structural model results showing standardized path coefficients for e-governance, centralized bureaucracy, and their interaction with civil servant performance.

DISCUSSION.

The findings provide important evidence concerning the organizational consequences of digital transformation in Pakistan's public sector. The strongest direct relationship identified in the model was between e-governance and civil servant performance ($\beta = .442$). This finding suggests that the integration of electronic administrative systems can improve the efficiency of public employees by facilitating faster information processing, increasing visibility of workflows, and reducing some of the limitations associated with paper-based administration. The result is consistent with the Technology

Acceptance Model (TAM), which proposes that perceived usefulness and ease of use influence individuals' acceptance and utilization of information technologies (Davis, 1989). The study's findings therefore reinforce the proposition that digital systems are more likely to generate positive organizational outcomes when employees perceive them as useful and operationally supportive.

The result is particularly relevant to WAPDA/FESCO, where administrative activities have increasingly incorporated ERP and electronic workflow systems. The evidence reported in the study indicates improvements in data visibility and workflow-processing speed following digitalization. From a public-sector HRM perspective, these improvements are important because employee performance is influenced not only by individual motivation and competence but also by the tools and organizational systems available to employees. Digital systems can provide employees with more immediate access to information, facilitate monitoring of task progress, and reduce delays associated with physical file movement.

The findings concerning centralized bureaucracy are more complex. Although the coefficient for centralized bureaucracy was statistically significant and positive ($\beta = .218$), the theoretical development of the study anticipated a negative relationship. This discrepancy is important and should not be overlooked. A positive coefficient could indicate that certain forms of centralized administrative control provide structure, accountability, or procedural clarity that may support employee performance. However, it could also reflect the way the construct was operationalized, because the two centralized-bureaucracy indicators emphasize approval requirements and hierarchical impediments to modernization. Consequently, the direction and substantive interpretation should be checked against the original dataset and SmartPLS output before publication.

The significant interaction effect provides the study's most important theoretical contribution. The relationship between e-governance and civil servant performance does not occur independently of organizational structure. The significant $EG \times CB$ interaction ($\beta = .310, p < .001$) demonstrates that bureaucratic centralization changes the relationship between digital governance and employee outcomes. This finding supports the broader argument that technological transformation cannot be separated from institutional transformation. Installing an electronic workflow system while retaining lengthy approval chains and parallel manual procedures may limit the efficiency gains expected from digitalization.

The practical significance of this finding is especially apparent in the problem of duplicated electronic and paper-based processes. The uploaded study identifies the continued use of dual filing and multiple manual approvals as structural barriers to realizing the full benefits of e-governance. A digital system can transmit information rapidly, but if an employee must still obtain signatures from several hierarchical levels, the overall administrative process may remain slow. Digital transformation therefore requires complementary reforms in decision authority, standard operating procedures, and accountability mechanisms.

Overall, the findings demonstrate that technology and organizational structure must evolve together. E-governance has a substantial positive association with civil servant performance, while bureaucratic centralization significantly shapes the effectiveness of digital systems. The study consequently moves beyond a technology-centred explanation of public-sector modernization and highlights the importance of institutional readiness, administrative restructuring, and employee-centred implementation. For Pakistan's public-sector organizations, the evidence suggests that meaningful digital transformation should involve not only investment in ERP and e-office technologies but also simplification of administrative procedures, reduction of unnecessary approval layers, and greater delegation of routine decisions. This integrated approach is more likely to convert technological investment into sustained improvements in employee performance and public-sector efficiency.

RECOMMENDATIONS, LIMITATIONS, AND FUTURE RESEARCH.

Recommendations.

Based on the findings of this study, several recommendations can be proposed for strengthening e-governance and improving civil servant performance in Pakistan's public-sector organizations. First, WAPDA/FESCO and comparable government institutions should move beyond technology acquisition and focus on organizational transformation alongside digital transformation. Electronic office and ERP systems should be fully integrated into routine administrative procedures rather than operating alongside lengthy manual processes. The study particularly highlights the problem of duplicated paper and electronic workflows, which can reduce the efficiency gains expected from digitalization.

Second, public organizations should streamline and appropriately decentralize routine administrative approvals. Designated officials should be provided with clearly defined authority to process standard cases through digital platforms without unnecessary escalation through multiple hierarchical levels. This would reduce processing delays while maintaining appropriate accountability and administrative control. Third, organizations should strengthen employee training and digital competency development. Continuous training should focus not only on technical system use but also on adapting employees to redesigned digital workflows. Employees should understand how digital systems contribute to organizational performance and how their effective use can improve administrative productivity.

Fourth, public-sector organizations should establish digital performance and monitoring mechanisms based on reliable information generated by e-governance systems. The study recommends connecting performance incentives and internal recognition mechanisms with verifiable digital performance information rather than relying exclusively on conventional administrative assessments.

Finally, policymakers should develop integrated digital-transformation strategies that combine technological investment with administrative reform. Successful modernization requires alignment between technology, organizational structure, decision-making authority, employee capabilities, and institutional procedures.

Limitations.

Several limitations should be considered when interpreting the findings. First, the study was conducted among administrative staff within FESCO/WAPDA in the Faisalabad Division. Therefore, the findings may not be directly generalizable to all public-sector organizations in Pakistan, particularly federal ministries, provincial departments, or organizations operating under substantially different administrative conditions.

Second, the study employed a cross-sectional quantitative design, meaning that the data represent employee perceptions at a particular point in time. Consequently, the study cannot establish how perceptions of e-governance and employee performance may change as digital systems become more mature.

Third, the research relied on questionnaire-based responses. Self-reported data may be influenced by respondents' perceptions or response tendencies. Objective organizational performance indicators could provide additional evidence in future research.

Finally, the study focuses on a relatively specific organizational and geographical context. The influence of bureaucratic centralization may differ across institutions depending on organizational culture, leadership, regulatory requirements, and levels of digital maturity.

Future Research.

Future research should extend the present investigation beyond FESCO/WAPDA and examine e-governance and bureaucratic structures across federal, provincial, and local government institutions in Pakistan. Comparative studies across different public organizations would help determine whether the observed relationships remain consistent across institutional environments. The original study similarly recommends extending research to other federal and provincial public-administration settings.

Future researchers should also employ longitudinal designs to examine whether the effects of digital transformation on employee performance change over time. Such research could compare organizational performance before and after the implementation of major e-governance reforms.

A mixed-methods approach would also be valuable. Quantitative surveys could be combined with semi-structured interviews involving senior bureaucrats, managers, and employees to explore the organizational and cultural barriers that cannot be fully captured through numerical measures. The uploaded study specifically recommends qualitative interviews with senior bureaucrats as a direction for future investigation.

Finally, future studies could examine additional variables such as organizational culture, leadership support, employee digital competence, resistance to change, perceived usefulness, and organizational readiness. Incorporating these variables could provide a more comprehensive explanation of why digital transformation succeeds in some public institutions but produces limited improvements in others.

CONCLUSION.

This study examined the relationship between e-governance, bureaucratic centralization, and civil servant performance within the public-sector context of WAPDA/FESCO in Faisalabad, Pakistan. The study was motivated by the growing importance of digital transformation in public administration and the recognition that technological modernization cannot be evaluated independently of the organizational structures in which digital systems are implemented. Using a quantitative, cross-sectional research design and data from 215 valid respondents, the study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to investigate the proposed relationships.

The findings provide strong evidence that e-governance is positively associated with civil servant performance. The reported structural model demonstrates a significant relationship between e-governance and performance ($\beta = .442$, $t = 5.812$, $p < .001$), indicating that effective digital administrative systems can contribute substantially to improved workplace efficiency and administrative performance. The findings are consistent with the central proposition of the Technology Acceptance Model that technologies capable of improving employees' work processes can generate positive behavioral and organizational outcomes (Davis, 1989). In the context of WAPDA/FESCO, digital systems appear particularly valuable for improving information visibility, workflow coordination, and the speed of administrative processing.

The study also demonstrates that bureaucratic structures remain an important component of digital transformation. The reported relationship between centralized bureaucracy and civil servant performance was statistically significant ($\beta = .218$, $t = 2.691$, $p = .005$), while the interaction between e-governance and centralized bureaucracy was also significant ($\beta = .310$, $t = 3.491$, $p < .001$). These findings indicate that the organizational environment surrounding digital technologies matters considerably. Digital systems cannot automatically eliminate inefficiencies when employees remain subject to lengthy approval procedures, hierarchical decision-making, and parallel manual processes.

The study therefore contributes to the public-administration and e-governance literature by emphasizing that digital transformation should be accompanied by institutional and administrative transformation.

Investment in ERP systems, electronic workflows, and digital information platforms can improve public-sector performance, but their effectiveness is likely to be constrained when organizational procedures remain unnecessarily centralized or dependent on duplicated paper-based processes. The study consequently supports a more integrated approach to public-sector modernization in which technology, organizational structure, employee capability, and administrative authority are developed simultaneously. The paper specifically identifies decentralization of appropriate approval powers and elimination of duplicated paper trails as important reform priorities.

From a policy perspective, the findings suggest that Pakistani public-sector organizations should view e-governance not simply as a technological project but as a long-term organizational reform programme. Digital transformation should be supported by employee training, streamlined workflows, appropriate delegation of authority, transparent performance monitoring, and institutional mechanisms that encourage effective use of digital systems.

In conclusion, the study demonstrates that the success of e-governance depends on the interaction between technology and institutional structure. Creating genuinely efficient digital public institutions requires more than replacing paper with electronic platforms; it requires redesigning administrative processes so that technology can operate at its full potential. For WAPDA/FESCO and similar public-sector organizations, aligning digital innovation with organizational reform offers a significant opportunity to improve civil servant performance, administrative efficiency, and the broader quality of public-sector governance in Pakistan.

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