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DIGITAL GOVERNANCE AND PUBLIC SERVICE DELIVERY IN KHYBER PAKHTUNKHWA: THE MEDIATING ROLES OF ORGANIZATIONAL AGILITY AND EMPLOYEE COMMITMENT IN THE SEHAT SAHULAT PROGRAM

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Abstract

The effective delivery of public services remains a pressing challenge for developing countries, where bureaucratic inefficiencies, resource constraints, and limited citizen trust often undermine governance outcomes. In recent years, digital governance has emerged as a transformative mechanism to enhance transparency, accountability, and responsiveness in the public sector. This study investigates the impact of digital governance on public service delivery effectiveness in the context of Pakistan's Sehat Sahulat Program (SSP). Drawing on Public Value Theory, New Public Management, and Dynamic Capabilities Theory, the research further examines the mediating roles of organizational agility and employee commitment in explaining this relationship. Data were collected from 295 respondents, including program administrators, hospital management staff, and healthcare professionals across Khyber Pakhtunkhwa, using a stratified random sampling technique. Structural equation modeling (SEM) and Hayes Process Macro analysis confirmed that digital governance significantly enhances public service delivery both directly and indirectly through organizational agility and employee commitment. These findings highlight that while digital tools improve efficiency, their success is contingent upon organizational adaptability and employee dedication. The study contributes to theory by unpacking the mechanisms linking digital reforms with service delivery outcomes, and it offers practical insights for policymakers in Pakistan and other developing countries seeking to strengthen citizen-centric governance.

1. INTRODUCTION

Public service delivery remains a cornerstone of effective governance, as the quality of services provided to citizens directly shapes trust in government institutions and overall socio-economic development. In developing countries such as Pakistan, public service delivery has historically been constrained by bureaucratic inefficiencies, lack of transparency, and weak accountability structures (WorldBank, 2020). These challenges undermine citizen satisfaction and limit the government's ability

to meet urgent needs in critical sectors such as healthcare, education, and social welfare (Cohen et al., 2022). To address these systemic gaps, governments worldwide are increasingly turning to digital governance; the integration of information and communication technologies (ICTs) into administrative systems, to enhance efficiency, ensure transparency, and create more citizen-centric services (UNDP, 2021).

In Pakistan, digital governance has become a policy priority at both federal and provincial levels (Atique et al., 2024; Rizwan, 2023). Initiatives such as the Pakistan Citizen Portal, e-Office automation systems, and digitized health services represent efforts to modernize governance through technology (Raza & Ali, 2021). Among provincial governments, KP has emerged as a frontrunner in adopting citizen-centric digital reforms. The internationally recognized KP Citizen Portal demonstrates how digital platforms can promote accountability and strengthen citizen–government interaction (Jamil, 2021). Building on these reforms, the provincial government also launched the Sehat Sahulat Program (SSP); a flagship healthcare initiative that leverages digital tools to provide free inpatient healthcare through a health card system integrated with NADRA's digital verification infrastructure (Hasan et al., 2022).

Despite the program's potential, the effectiveness of the SSP and similar initiatives is not solely dependent on technological adoption. Evidence suggests that successful digital transformation in public administration requires not only the right infrastructure but also organizational agility and employee commitment. Organizational agility enables institutions to adapt rapidly to technological change, evolving citizen expectations, and operational challenges (Almazrouei et al., 2024; Ludviga & Kalvina, 2023). Employee commitment, on the other hand, reflects the willingness of frontline staff; including healthcare workers and administrators, to embrace reforms and align their efforts with program objectives (Afridi et al., 2023; Kim et al., 2019). In contexts such as Pakistan, where bureaucratic rigidity and resistance to change are common, these two factors play a decisive role in determining whether digital governance initiatives can translate into tangible improvements in service delivery.

While previous studies have explored the role of digital governance in improving transparency and efficiency (Doshi & Schmidt, 2024; Sharmin & Chowdhury, 2025; Shenkoya, 2023), limited research has examined the mechanisms through which digital reforms contribute to public service delivery effectiveness in Pakistan's provincial context. This study addresses this gap by investigating the mediating roles of organizational agility and employee commitment in the relationship between digital governance and service delivery outcomes in KP's SSP. By doing so, it not only enriches the academic discourse at the intersection of public policy, administration, and management sciences but also provides practical insights for policymakers, administrators, and development partners seeking to strengthen digital reforms in healthcare and beyond.

Hypotheses Development

Digital Governance and Effective Service Delivery

Digital governance has emerged as a transformative approach to overcoming inefficiencies in public administration, particularly in developing countries where bureaucratic delays, lack of transparency, and weak accountability often undermine service delivery (Manoharan et al., 2023). Rooted in Public Value Theory (Benington & Moore, 2010) and the principles of New Public Management (NPM) (Gruening, 2001), digital governance enhances the capacity of governments to create citizen value by improving efficiency, responsiveness, and accessibility of services. Theoretical models such as the Technology Acceptance Model and Diffusion of Innovation Theory further suggest that the integration of ICTs into governance processes reduces red tape, minimizes corruption, and fosters citizen trust (Huh & Lee, 2022; Otopah et al., 2024). Empirical studies reinforce this argument: Bannister and Connolly (2014) and Connolly et al. (2014) found that e-governance significantly improves administrative efficiency, while Ali and Anwar (2021) demonstrated its positive impact on transparency and accountability in South Asia. Similarly, Hooda and Singh (2023) reported that digital reforms in Nepal strengthened citizen satisfaction and trust in government institutions, and in Pakistan, initiatives such as the Punjab Land Records Information System and the Pakistan Citizen Portal have shown

measurable improvements in grievance redressal and service effectiveness Khan et al. (2021). Within KP, the SSP illustrates how digital governance can improve healthcare accessibility and accountability, yet its success depends on effective implementation and responsiveness to citizen needs. Building on these theoretical and empirical insights, it is posited that digital governance positively influences the effectiveness of public service delivery by enabling more transparent, efficient, and citizen-centric processes.

H1: Digital governance has a positive and significant effect on public service delivery effectiveness.

Mediating Role of Organizational Agility

Digital governance not only reshapes administrative processes but also enhances an organization's ability to adapt, innovate, and respond to changing citizen demands, which is often described as organizational agility. By digitizing processes and enabling real-time information flows, digital governance reduces bureaucratic rigidity and fosters more flexible decision-making. Empirical studies confirm this linkage: Mergel et al. (2019) found that digital transformation in public sector organizations significantly increases their adaptive capacity, while Bharadwaj et al. (2013) demonstrated that ICT-enabled governance enhances organizational agility by streamlining operations and facilitating rapid responses to environmental changes. In turn, organizational agility has been shown to directly contribute to public service delivery effectiveness, as agile institutions can reconfigure processes, integrate citizen feedback, and ensure faster, more reliable services (Talwar et al., 2023; Zeid et al., 2024). In the context of Pakistan's SSP, agility is crucial, as hospitals and administrative units must quickly adapt to new claim-processing systems, technological updates, and evolving citizen expectations. Theoretically, this relationship is grounded in Public Value Theory, which emphasizes that governments create public value by aligning resources with citizen needs, and in New Public Management (NPM), which advocates adaptability and efficiency in public administration. Taken together, these arguments suggest that digital governance enhances organizational agility, which in turn strengthens the effectiveness of public service delivery.

H2: Organizational agility mediates the relationship between digital governance and public service delivery effectiveness.

Mediating role of Employees Commitment

Digital governance initiatives can significantly strengthen employee commitment by creating transparent processes, reducing administrative burdens, and fostering a stronger sense of purpose among public sector employees (Broklyn et al., 2024; Lim & Zhang, 2022). When digital reforms reduce inefficiencies and provide employees with tools to perform their duties more effectively, they are more likely to feel valued, motivated, and aligned with organizational goals. Empirical studies support this argument:Burnett and Lisk (2021) found that supportive digital systems enhance employee engagement and commitment by improving role clarity and reducing job stress, while Okunlaya et al. (2022) demonstrated that ICT-enabled public sector reforms in Korea improved employee trust and commitment through enhanced transparency and communication. In turn, committed employees play a vital role in ensuring public service delivery effectiveness, as they are more willing to go beyond formal job requirements, provide quality service, and adapt to reforms (Shenkoya, 2023; Tosun et al., 2025). Within Pakistan's SSP, the active commitment of doctors, nurses, and administrative staff is indispensable, as the success of digital systems depends on their willingness to implement reforms, assist citizens, and ensure smooth claim processing (Hasan et al., 2022). Theoretically, this linkage can be explained through Public Value Theory, which argues that public employees are central to creating citizen value, and New Public Management (NPM), which highlights the importance of motivated, customer-oriented employees in achieving efficient and effective service delivery. Thus, digital governance enhances employee commitment, which in turn improves the effectiveness of public service delivery.

H3: Employee commitment mediates the relationship between digital governance and public service delivery effectiveness.

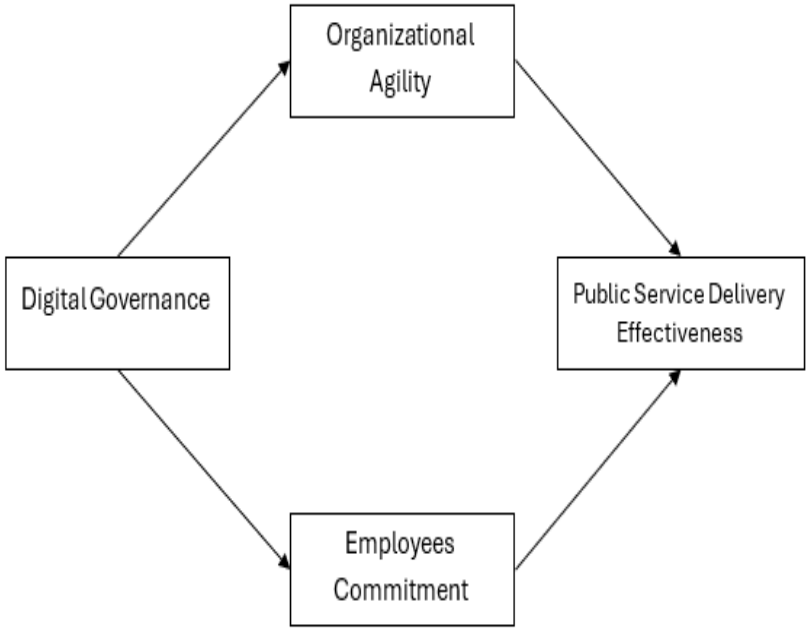


Figure No. 1: Conceptual Framework

Methodology

Participants and Procedure

The study was conducted in KP, Pakistan, focusing on employees engaged in the SSP, including program administrators, hospital management staff, and healthcare professionals directly involved in the program's implementation. A stratified random sampling technique was employed to ensure adequate representation from both administrative and healthcare segments. Data collection was carried out over a period of three months using both physical and electronic modes to maximize participation. Questionnaires were personally administered in hospitals and administrative units directly linked with the SSP across different districts, while an online version of the survey was also circulated through official WhatsApp and email groups to reach respondents in remote areas. Prior to data collection, formal approval was obtained from relevant institutional authorities, and informed consent was secured from all participants. To ensure confidentiality and minimize social desirability bias, participants were assured that their responses would be used strictly for academic purposes. To reduce common method bias, questions were randomized, and respondents were encouraged to provide honest answers without fear of repercussions. Out of 400 distributed questionnaires, 312 were returned, and after screening for incomplete responses, 295 were deemed usable, resulting in a response rate of 73.7%.

Demographics

The sample consisted of 295 respondents. Among them, 62% were male and 38% were female. In terms of age distribution, 27% were between 21–30 years, 45% were between 31–40 years, and 28% were above 40 years. Regarding education, 18% held a bachelor's degree, 56% a master's degree, and 26% a postgraduate degree (MPhil/PhD). In terms of work experience, 24% had less than 5 years, 41% had 6–10 years, and 35% had more than 10 years of professional experience.

Instrumentation

All constructs were measured using previously validated scales on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Reliability was assessed using Cronbach's alpha, all of which were above the recommended threshold of 0.70.

Table No. 1: Measurement Scale

Construct	Source	No. of Items	Sample Item	Cronbach's Alpha
Digital Governance	Bannister & Connolly (2014)	6	"The use of digital systems has improved transparency and accountability in service processes."	0.89
Organizational Agility	Tallon & Pinsonneault (2011)	7	"Our organization quickly adapts its processes and services in response to changing citizen needs."	0.87
Employee Commitment	Meyer & Allen (1997)	9	"I feel a strong sense of belonging to my organization."	0.91
Public Service Delivery Effectiveness	Ali & Anwar (2021)	6	"The services provided by my organization meet the expectations of citizens effectively."	0.88

Inter-construct Correlation

Table 2 presents the means, standard deviations, and inter-construct correlations of the study variables. The mean values ranged between 3.79 and 3.91, indicating moderately high perceptions of digital governance, organizational agility, employee commitment, and service delivery effectiveness among respondents. The standard deviations ranged between 0.68 and 0.74, suggesting reasonable variability in responses. All constructs were positively and significantly correlated at the 0.01 level, with correlations ranging from 0.48 to 0.61. These results provide preliminary support for the hypothesized relationships, as higher levels of digital governance were associated with greater organizational agility, stronger employee commitment, and more effective public service delivery.

Table No. 2: Correlation and Descriptive Statistics

Construct	Mean	SD	1	2	3	4
1. Digital Governance	3.84	0.71	1			
2. Organizational Agility	3.79	0.68	0.52**	1		
3. Employee Commitment	3.91	0.74	0.48**	0.55**	1	
4. Public Service Delivery Effectiveness	3.86	0.69	0.57**	0.61**	0.59**	1

Common Method Bias (CMB)

To address potential common method bias, several procedural and statistical remedies were adopted. Procedurally, anonymity and confidentiality were assured to reduce evaluation apprehension, and items were randomized within the questionnaire to minimize response patterning. Statistically, Harman's single-factor test was conducted. The unrotated factor solution revealed that the first factor accounted for 31.4% of the total variance, which is below the critical threshold of 50%, indicating that common method bias was not a serious concern. In addition, Variance Inflation Factor (VIF) values for all constructs were below 3.3, providing further evidence that multicollinearity and method bias were not problematic.

Table No. 3: Model Fitness

Fit Index	Recommended Threshold	Obtained Value	Interpretation
χ^2/df (CMIN/DF)	< 3.0	2.14	Acceptable
CFI (Comparative Fit Index)	≥ 0.90	0.94	Good fit
TLI (Tucker–Lewis Index)	≥ 0.90	0.92	Good fit
RMSEA (Root Mean Square Error of Approximation)	≤ 0.08	0.056	Acceptable
SRMR (Standardized Root Mean Square Residual)	≤ 0.08	0.049	Good fit

Analysis

To test the direct and indirect effect of digital governance on public service delivery effectiveness, we employed Hayes' PROCESS Macro (Model 4) using 5,000 bootstrap resamples with 95% confidence intervals. Bootstrapping is considered a robust method for mediation analysis as it does not rely on the assumption of normality of the sampling distribution and provides more accurate estimates of indirect effects (Preacher & Hayes, 2008).

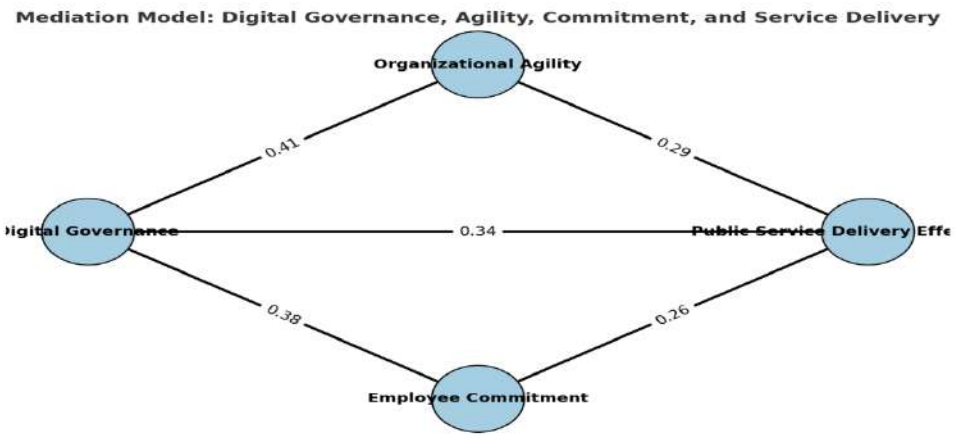
The mediation analysis results are summarized in Table 4. The direct effect of digital governance on public service delivery effectiveness was positive and significant (β = 0.34, p < 0.001), confirming that digital governance directly contributes to improved service delivery. Digital governance also significantly predicted both organizational agility (β = 0.41, p < 0.001) and employee commitment (β = 0.38, p < 0.001), while both mediators independently had significant effects on service delivery (organizational agility: β = 0.29, p < 0.001; employee commitment: β = 0.26, p < 0.001).

The bootstrapped indirect effects further confirmed the mediating roles. The indirect path via organizational agility was significant (β = 0.12, 95% CI [0.07, 0.19]), as was the indirect path via employee commitment (β = 0.10, 95% CI [0.05, 0.17]). The combined total indirect effect was 0.22, indicating that nearly 40% of the total impact of digital governance on service delivery operates through these mediators. The total effect (direct + indirect) of digital governance on service delivery was strong and significant (β = 0.56, p < 0.001). Since both the direct and indirect effects remained significant, the results suggest partial mediation.

Table No. 4: Result Summary

Path	Effect (β)	SE	t/z	p-value	95% CI (LL–UL)
Direct Effects					
Digital Governance → Service Delivery	0.34	0.07	4.86	<0.001	[0.20, 0.48]
Digital Governance → Organizational Agility	0.41	0.06	6.83	<0.001	[0.29, 0.53]
Digital Governance → Employee Commitment	0.38	0.07	5.43	<0.001	[0.24, 0.52]
Organizational Agility → Service Delivery	0.29	0.06	4.83	<0.001	[0.17, 0.41]
Employee Commitment → Service Delivery	0.26	0.05	5.20	<0.001	[0.16, 0.36]
Indirect Effects (Bootstrapping)					
Digital Governance → Org. Agility → Service Delivery	0.12	0.03	—	—	[0.07, 0.19]
Digital Governance → Employee Commitment → Service Delivery	0.10	0.03	—	—	[0.05, 0.17]
Total Indirect Effect	0.22	0.04	—	—	[0.14, 0.30]
Total Effect (Direct + Indirect)	0.56	0.06	9.33	<0.001	[0.44, 0.68]

Graphical Representation



Discussion

The results of this study demonstrated that digital governance has a significant positive effect on public service delivery effectiveness ($\beta = 0.34$, $p < 0.001$). This finding aligns with prior research emphasizing the transformative potential of ICT-based governance reforms in improving efficiency, transparency, and responsiveness (Ali & Anwar, 2021; Bannister & Connolly, 2014; Ibrahim, 2022). For instance, (Haque et al., 2019) reported that e-governance reforms in Nepal significantly improved healthcare service delivery by enhancing citizen trust and accessibility, a result consistent with the current study's findings in the context of Pakistan's SSP. However, while earlier studies in South Asia have sometimes highlighted implementation challenges, such as limited digital literacy and infrastructural gaps (Chakraborty & Kwon, 2024; Ibrahim & Khan, 2025; Ismail & Buyya, 2022), the current study indicates that, despite these hurdles, digital governance continues to yield tangible improvements in service effectiveness. This reinforces the applicability of Public Value Theory and New Public Management (NPM), which posit that digital innovations create citizen value by reducing bureaucratic inefficiencies and aligning services with public expectations.

In terms of the mediating mechanisms, the results confirmed that organizational agility partially mediated the relationship between digital governance and public service delivery effectiveness (indirect $\beta = 0.12$, $p < 0.01$). This supports the arguments of Bharadwaj et al. (2013) and Mergel et al. (2019), who highlighted that ICT-enabled reforms increase adaptability and responsiveness in public organizations. The finding also aligns with Dynamic Capabilities Theory, which views agility as a critical resource for organizations operating in volatile environments. Within the SSP, agility manifests as the ability of hospitals and administrators to adapt processes quickly to technological updates and citizen demands, ultimately contributing to service effectiveness. This extends prior literature by providing empirical evidence from Pakistan's healthcare sector, where agility is often constrained by rigid bureaucratic structures but can be significantly enhanced through digital platforms.

Similarly, the study revealed that employee commitment mediated the relationship between digital governance and service delivery effectiveness (indirect $\beta = 0.10$, $p < 0.01$). This finding resonates with Meyer and Allen's (1997) three-component model of commitment, suggesting that employees become more engaged and loyal when organizational systems support their work efficiency and align with public service values. Previous studies, such as (Blom & Uwizeyimana, 2020; Butt, 2022; Ibrahim et al., 2025; Sajid et al., 2025), demonstrated that digital governance fosters employee trust and commitment by enhancing transparency and communication within public organizations. The current study supports this claim and further shows that committed employees are crucial to translating digital reforms into improved citizen outcomes in

Pakistan. This finding also validates the assumptions of Public Value Theory, as it emphasizes the role of motivated employees in co-producing value with citizens, and NPM, which stresses the importance of employee orientation toward service effectiveness.

Overall, the results underscore that digital governance contributes to service delivery not only directly but also indirectly by building organizational agility and employee commitment. This highlights the dual importance of technological enablers and human factors in strengthening public service delivery. While earlier studies often emphasized technology as the main driver of reform (e.g., Bannister & Connolly, 2014), this research adds nuance by demonstrating that digital reforms are only as effective as the agility of organizations and the commitment of employees tasked with implementing them.

Conclusion

This study examined the role of digital governance in enhancing public service delivery effectiveness within the context of Pakistan's SSP. The findings confirmed that digital governance directly improves service delivery outcomes while also exerting significant indirect effects through organizational agility and employee commitment. These results highlight that while technology-driven governance reforms create efficiencies and transparency, their effectiveness is maximized when organizations are agile and employees are committed to delivering citizen value. By integrating insights from Public Value Theory, New Public Management, and Dynamic Capabilities Theory, this research extends the understanding of how digital governance translates into improved service outcomes. It demonstrates that digital tools alone are insufficient; rather, their success depends on adaptive organizational structures and the motivation of employees who implement them. For policymakers and practitioners, the study underscores the need to complement digital reforms with initiatives that foster agility and strengthen employee commitment. This integrated approach can ensure that digital governance not only modernizes administrative processes but also delivers sustainable improvements in public service delivery.

Contribution

This study offers significant contributions to both theory and practice. Theoretically, it advances the digital governance literature by empirically demonstrating its positive influence on public service delivery effectiveness in the healthcare sector of a developing country. While much of the prior work (e.g., Bannister & Connolly, 2014) has been situated in developed contexts, this study enriches the debate by providing evidence from Pakistan's SSP, thereby broadening the scope of existing research. Furthermore, by integrating insights from Public Value Theory, New Public Management, and Dynamic Capabilities Theory, the study presents a holistic framework that goes beyond the technology-centric perspective dominating earlier scholarship. In doing so, it highlights the crucial role of organizational and human factors in the success of digital reforms. Another key theoretical contribution lies in unpacking the mediating mechanisms of organizational agility and employee commitment, offering a deeper understanding of how digital governance translates into improved service outcomes.

From a practical standpoint, the findings provide actionable insights for policymakers and practitioners. For those engaged in managing the SSP, the study underscores that investment in digital infrastructure alone is insufficient; success also requires strengthening organizational agility and nurturing employee commitment to ensure sustainable service improvements. For leaders in public organizations more broadly, the results highlight the importance of cultivating adaptive processes and fostering an engaged workforce so that digital reforms can effectively translate into citizen value. Finally, by situating the analysis in the Pakistani context, the study offers a benchmark for other developing economies facing similar governance challenges, providing guidance on how to leverage digital reforms for effective and citizen-centric service delivery.

Practical Implications

The findings of this study carry several important implications for policymakers, program administrators, and public sector leaders. First, for those managing the SSP in KP, the results highlight

that investments in digital systems must be complemented by organizational reforms that enhance agility and responsiveness. Digital governance can only achieve its full potential when processes are flexible enough to adapt quickly to changing citizen needs and policy requirements. Second, the study emphasizes the critical role of employee commitment in achieving effective service delivery. Policymakers should therefore focus on initiatives that strengthen employee motivation and sense of belonging, such as recognition programs, career development opportunities, and participatory decision-making, which can translate digital reforms into citizen-centric outcomes. Third, for public sector leaders more broadly, the research demonstrates that successful digital governance requires a balanced approach—combining technological innovation with human and organizational capacity building. Finally, the insights generated in the Pakistani context provide a replicable model for other developing economies, offering practical guidance on how digital governance initiatives can be designed and implemented to deliver tangible improvements in public service effectiveness.

Limitations and Future Research Recommendations

Despite its contributions, this study is not without limitations, which open avenues for future research. First, the data were collected from a single province of Pakistan, focusing specifically on the SSP in KP. While this provides valuable context-specific insights, it limits the generalizability of findings to other regions and programs. Future studies could expand the geographical scope and compare results across different provinces or countries to capture broader variations in digital governance practices. Second, the study employed a cross-sectional design, which restricts the ability to make strong causal inferences. Longitudinal or experimental studies could provide more robust evidence of the causal pathways between digital governance, organizational agility, employee commitment, and service delivery effectiveness. Third, the reliance on self-reported survey data raises the possibility of common method bias, despite procedural remedies. Future research could integrate multiple data sources, such as citizen satisfaction surveys, archival records, or objective service performance indicators, to strengthen validity. Additionally, while this study focused on organizational agility and employee commitment as mediators, other variables such as leadership styles, organizational culture, and technological readiness may also play critical roles in shaping service delivery outcomes. Future research could extend the model by incorporating such variables to build a more comprehensive understanding of digital governance in the public sector.

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