

Adaptive Bureaucratic Capacity in Responding to Digital Governance Challenges A Public Administration Perspective

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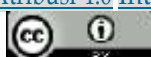
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ABSTRACT

Digital governance requires public bureaucracies to develop adaptive capacities in responding to technological change, service complexity, and increasing public expectations. This study aims to analyze bureaucratic adaptability in strengthening digital governance at Tegalrejo Subdistrict, Yogyakarta. A qualitative case-study approach was employed involving 12 informants consisting of structural officials, administrative staff, information-system operators, and digital public-service users. Data were collected through semi-structured interviews, non-participant observation, and document analysis and examined using thematic analysis. The findings indicate that adaptive capacity is supported by leadership commitment, employee digital competence, organizational learning, and interunit coordination, while limited infrastructure, fragmented systems, and resistance to change remain major constraints. The study concludes that strengthening adaptive bureaucratic capacity improves institutional responsiveness and provides a practical framework for sustainable digital public-service reform

INTRODUCTION

Digital governance has become a central agenda in public administration because digital technologies increasingly shape government decision-making, administrative processes, and public service delivery. The United Nations Department of Economic and Social Affairs reported that the proportion of the global population lagging in digital government development declined from 45.0 percent in 2022 to 22.4 percent in 2024, indicating substantial global progress while also revealing persistent disparities among countries and local governments (United Nations Department of Economic and Social Affairs, 2024). Digital transformation is therefore no longer limited to converting conventional services into electronic formats but requires institutional restructuring, data integration, resilient digital infrastructure, and citizen-oriented service design. The Organisation for Economic Co-operation and Development emphasizes that sustainable digital government depends on adaptable governance arrangements, reliable digital public infrastructure, and the capacity to manage emerging technologies responsibly (Organisation for Economic Co-operation and Development, 2024). These developments demonstrate that bureaucratic capacity to learn, respond, and reorganize has become essential for maintaining effective and reliable public administration in a rapidly changing digital environment.

At the national and local levels, governments face increasing pressure to provide services that are faster, more accessible, transparent, integrated, and responsive to citizens' needs. The World Bank identifies core government systems, digital public services, citizen engagement, and institutional enablers as major dimensions of public-sector digital maturity, but notes that significant gaps remain across economies and governmental levels (World Bank, 2022). These gaps commonly involve fragmented information systems, inadequate technological infrastructure, limited digital competencies, weak coordination, and insufficient institutional support for innovation. Febiri et al. (2024) found that public digitalization improves administrative performance when it is supported by human-capital development and alignment between technology, institutional values, and organizational practices. Consequently, digital governance challenges must be understood as organizational and administrative problems rather than merely as technical limitations.

The concept of adaptive bureaucratic capacity refers to the ability of public organizations to recognize environmental changes, mobilize resources, develop new competencies, revise established routines, and institutionalize more appropriate responses. Tangi et al. (2021) demonstrated that digital government transformation is influenced by managerial activities, organizational support, a sense of urgency, and a collaborative environment, while organizational barriers can obstruct substantive change. Moser-Plautz and Schmidhuber (2023) similarly showed that external crises may accelerate digital transformation, although the degree of adaptation varies according to organizational characteristics, responsibilities, employee attitudes, and innovation culture. Research by Susanti et al. (2023) further indicates that adaptive capacity can strengthen bureaucratic reform and digital public services, but its effectiveness

depends on regulatory reinforcement and institutional collaboration. These findings establish adaptive capacity as a multidimensional capability involving leadership, human resources, organizational learning, coordination, technology, and supportive institutional arrangements.

Previous studies have provided important explanations of digital transformation, but several research gaps remain. Scupola and Mergel (2022) focused on co-production and public-value creation in Denmark, demonstrating how stakeholders can participate in digital strategy formulation and implementation, but their study did not specifically examine the internal adaptive capacity of lower-level bureaucratic organizations. Kuhlmann and Heuberger (2023) identified both intended and unintended effects of local digital reforms on public employees and citizens, yet further investigation is required to explain how local bureaucracies develop practical responses to those consequences. Haug et al. (2024) reviewed a broad body of literature on digitally induced change and identified diverse drivers, processes, and outcomes, but the variation among studies shows that the mechanisms connecting digital challenges with bureaucratic adaptation remain insufficiently contextualized. Therefore, there is a need for case-based research that examines how leadership, employee competence, organizational learning, coordination, and institutional constraints interact in shaping adaptive bureaucratic capacity within a local government setting.

Another limitation in the literature concerns the tendency to assess digital transformation through technological adoption, system availability, or service outputs without adequately examining the administrative processes through which adaptation occurs. Adie et al. (2024) found that digital leadership research in public organizations remains fragmented and requires stronger integration between leadership practices, organizational capabilities, and digital transformation outcomes. Moreover, studies of government employees show that acceptance of emerging technologies depends on perceived usefulness, ethical considerations, prior experience, and expectations regarding the future role of technology (Ahn & Chen, 2022). These findings suggest that bureaucratic adaptation cannot be achieved only through infrastructure procurement or application development because it also requires behavioral change, institutional learning, managerial support, and the reconfiguration of administrative routines. A context-specific examination is therefore necessary to understand how public officials interpret digital pressures and translate them into organizational responses in day-to-day public service delivery.

Against this background, this study aims to analyze adaptive bureaucratic capacity in responding to digital governance challenges at Tegalrejo Subdistrict, Yogyakarta. The analysis focuses on leadership commitment, employee digital competence, organizational learning, interunit coordination, technological readiness, and institutional barriers affecting the adaptation process. Theoretically, the study contributes to public-administration scholarship by connecting digital government transformation with adaptive organizational capacity at the local bureaucratic level. Practically, the findings are expected to provide evidence for designing employee-development programs, strengthening

coordination mechanisms, improving digital infrastructure, and establishing more flexible administrative procedures. The study may consequently support the development of responsive, inclusive, and sustainable digital public services that remain aligned with public values and local community needs.

LITERATURE REVIEW

Adaptive Bureaucratic Capacity

Adaptive bureaucratic capacity refers to the ability of public organizations to recognize environmental changes, mobilize resources, revise administrative routines, and develop appropriate institutional responses. In digital governance, this capacity requires more than adopting new technologies because bureaucracies must also align organizational structures, policies, human resources, and service procedures. Gong et al. (2020) emphasize that digital transformation in government depends on flexibility in technological, policy, and organizational arrangements. Lips and Eppel (2022) further explain that bureaucratic adaptation develops through organizational learning, experimentation, decentralized problem-solving, and continuous adjustment to changing public needs. Adaptive bureaucratic capacity can therefore be understood as a dynamic institutional capability that enables government organizations to remain responsive while maintaining accountability and service continuity.

Digital Governance and Institutional Transformation

Digital governance transforms administrative procedures, institutional relationships, data management, and public service delivery. Gong et al. (2020) explain that successful government digital transformation requires alignment between information systems, organizational functions, public policies, and service objectives. Without institutional integration, digital initiatives may create fragmented platforms, duplicated data, incompatible procedures, and inefficient services. Ciancarini et al. (2023) identify open data, digital technology, employee competence, and flexible service-development processes as important foundations of public-sector transformation. Thus, digital governance should be viewed as an institutional change process that integrates technological development with organizational and administrative reform.

Digital Leadership and Organizational Agility

Leadership is essential in developing adaptive bureaucratic capacity because digital transformation often changes established authority, responsibilities, and work practices. Pittaway and Montazemi (2020) found that local-government leaders require the ability to communicate transformation goals, coordinate organizational actors, manage institutional constraints, and connect technological initiatives with public-service objectives. AlNuaimi et al. (2022) demonstrate that digital leadership supports organizational agility, allowing institutions to reallocate resources, experiment with new procedures, and respond more rapidly to technological and service demands. However, agility in public administration must remain consistent with transparency, legal accountability, and procedural fairness. Digital leadership and organizational

agility therefore constitute important foundations for responsive and responsible bureaucratic adaptation.

Digital Competence and Organizational Learning

Employee digital competence and organizational learning determine whether technological resources can be transformed into improved administrative performance. Digital competence includes the ability to operate information systems, manage data, communicate through digital platforms, and understand information security. Ciancarini et al. (2023) argue that limited digital skills may increase employee dependence on technical specialists, encourage continued use of manual procedures, and create resistance to organizational change. Mikalef et al. (2023) also found that technological capabilities improve public-organizational performance when supported by employee expertise, managerial coordination, and effective integration into administrative processes. Continuous training, knowledge sharing, practical assistance, and institutional learning are therefore necessary to strengthen adaptive bureaucratic capacity.

Coordination and Institutional Barriers

Digital governance requires effective coordination because public services often involve multiple administrative units, information systems, levels of government, and external stakeholders. Pittaway and Montazemi (2020) emphasize that bureaucratic leaders must connect organizational actors and information resources around shared transformation objectives. However, coordination may be constrained by organizational silos, incompatible databases, unclear data ownership, limited infrastructure, and resistance among employees. AlNuaimi et al. (2022) suggest that supportive leadership and organizational agility can reduce uncertainty and facilitate the acceptance of digital change. Consequently, interunit coordination, infrastructure readiness, communication, and employee participation are critical for overcoming institutional barriers to digital transformation.

Public Value and Accountability

The primary purpose of digital governance is to create public value through services that are accessible, efficient, inclusive, responsive, and trustworthy. Desai (2024) explains that digital public infrastructure can strengthen service integration and reduce duplication, although its implementation must remain oriented toward citizens' needs and institutional responsibilities. Digital services must also consider people with limited access, knowledge, or ability to use technological systems. Andrews et al. (2022) argue that government use of artificial intelligence and automated systems requires transparency, human oversight, ethical safeguards, and clear institutional accountability. Adaptive bureaucratic capacity is therefore effective only when technological innovation improves public services while protecting fairness, privacy, inclusion, and public trust.

Conceptual Synthesis

Based on the literature, adaptive bureaucratic capacity in responding to digital governance challenges consists of seven interconnected dimensions: leadership commitment, employee digital competence, organizational learning, interunit coordination, technological readiness, institutional barriers, and public-service responsiveness. These dimensions correspond with the focus of this study on the ability of Tegalrejo Subdistrict, Yogyakarta, to respond to technological change, service complexity, fragmented systems, and organizational resistance. Leadership provides strategic direction, competence and learning support implementation, technology enables digital processes, and coordination strengthens institutional integration. Public-value orientation ensures that adaptation remains responsive to community needs and consistent with administrative accountability. This conceptual framework provides the basis for analyzing how local bureaucracies develop and apply adaptive capacity in digital public-service delivery.

METHODOLOGY

Research Approach and Design

This study employed a qualitative approach with a single-case study design to examine adaptive bureaucratic capacity in responding to digital governance challenges at Tegalrejo Subdistrict, Yogyakarta. The qualitative approach was selected because the study sought to understand institutional experiences, organizational processes, employee interpretations, and adaptation practices within their actual administrative context. The case study design enabled an in-depth investigation of how leadership commitment, employee digital competence, organizational learning, technological readiness, and interunit coordination shaped the implementation of digital public services. The unit of analysis was the subdistrict bureaucracy as an organization, while structural officials, administrative employees, information-system operators, and service users served as sources of information. Qualitative case studies are appropriate for examining complex institutional phenomena that cannot be separated from their organizational and social contexts (Busetto et al., 2020).

Research Participants and Sampling

The potential participants comprised officials, employees, information-system operators, and citizens directly involved in or affected by digital public-service delivery at Tegalrejo Subdistrict. Participants were selected using non-probability purposive sampling because the study required individuals with relevant knowledge, experience, and direct involvement in bureaucratic adaptation and digital governance. The study involved 12 informants, consisting of three structural officials, four administrative employees, two information-system operators, and three citizens who had used digital public services. The inclusion criteria for structural officials were holding decision-making or resource-allocation responsibilities and having direct involvement in the supervision of digital public services. Administrative employees and information-system operators were required to have at least one year of experience in implementing or supporting digital service procedures, while

citizen participants were required to have used at least one digital public service provided by Tegalrejo Subdistrict during the research period. Structural officials were selected because of their authority in decision-making and resource allocation, administrative employees and system operators because of their direct involvement in daily digital procedures, and citizens because they could provide an external perspective on service accessibility, responsiveness, and practical implementation. The adequacy of the sample was assessed through information saturation during data collection (Hennink & Kaiser, 2022).

Data Collection Techniques and Instruments

Data collection was conducted from January to March 2026 through semi-structured interviews, non-participant observation, and document analysis. The interview instrument consisted of open-ended questions developed from the study's conceptual dimensions, including leadership commitment, digital competence, organizational learning, technological readiness, interunit coordination, institutional barriers, and public-service responsiveness. The interview guide was reviewed by two public-administration researchers to assess the clarity, relevance, and alignment of the questions with the research objectives before being used in the field. Observations focused on digital service procedures, employee interactions, technology use, service accessibility, and the coexistence of digital and manual administrative processes. Documents examined included service standards, organizational profiles, operational procedures, digital-service guidelines, internal reports, and other institutional records relevant to digital governance. These data sources enabled the researchers to compare interview statements with observed administrative practices and documentary evidence.

Data Credibility and Research Trustworthiness

Because this study used a qualitative approach, statistical validity and reliability testing were not applied. Instead, research quality was established through credibility, dependability, confirmability, and transferability. Credibility was strengthened through source triangulation by comparing information from structural officials, administrative employees, information-system operators, and citizens, as well as through method triangulation involving interviews, observations, and document analysis. Member checking was conducted by returning summaries of important interview interpretations to selected informants to ensure that the findings appropriately represented their experiences and statements. Dependability and confirmability were supported through an audit trail documenting participant selection, interview procedures, coding decisions, theme development, and changes made during the analytical process. Reflexive notes were also maintained to identify the researchers' assumptions and reduce the risk that personal expectations would dominate data interpretation, consistent with the quality principles of reflexive thematic analysis proposed by Braun and Clarke (2021).

Research Procedures

The research was conducted through several sequential stages. The initial stage involved identifying the research problem, reviewing relevant literature, constructing the conceptual dimensions, obtaining institutional permission, and preparing interview, observation, and documentation protocols. The researchers then identified prospective informants based on the predetermined inclusion criteria, explained the study's objectives and procedures, and obtained voluntary informed consent before data collection. Interviews were conducted individually in locations that ensured participant comfort and confidentiality, recorded with permission, and supplemented with field notes concerning relevant contextual information. Data collection and preliminary analysis were conducted concurrently so that emerging information could guide subsequent interviews and determine whether further clarification was required. The final stages involved verbatim transcription, data organization, coding, theme construction, triangulation, interpretation, and preparation of the findings. Participants' identities were protected through informant codes and the removal of personally identifiable information.

Data Analysis

The data were analyzed using reflexive thematic analysis, which enabled the identification and interpretation of recurring patterns related to adaptive bureaucratic capacity and digital governance. Analysis began with repeated reading of interview transcripts, observation notes, and institutional documents to develop familiarity with the complete dataset. The researchers then generated initial codes, compared related codes, organized them into candidate themes, reviewed the relationship between the themes and the original data, and defined the meaning and boundaries of each final theme. The analysis combined deductive coding based on the conceptual dimensions established in the literature with inductive coding to accommodate unexpected issues emerging from participants' experiences. The final themes were interpreted in relation to the research objectives and public-administration theory. NVivo 14 software was used to organize transcripts, store coded passages, compare participant groups, develop analytical memos, and maintain a transparent record of the analytical process; however, all interpretive decisions remained the responsibility of the researchers (Kiger & Varpio, 2020).

RESEARCH RESULT

Overview of Research Findings

The findings were obtained from semi-structured interviews with 12 informants, non-participant observations, and institutional document analysis at Tegalrejo Subdistrict, Yogyakarta. The informants consisted of three structural officials coded as SO1-SO3, four administrative employees coded as AE1-AE4, two information-system operators coded as IO1-IO2, and three digital public-service users coded as SU1-SU3. Thematic analysis identified seven interrelated themes: leadership commitment, employee digital competence, organizational learning, interunit coordination, technological readiness, institutional barriers, and public-service responsiveness. Overall, bureaucratic adaptation was supported by internal organizational capacity but remained constrained by

fragmented systems, infrastructure limitations, resistance to change, and overlapping manual and digital procedures. A summary of the main findings and their primary evidence sources is presented in Table 1.

Table 1. Summary of Key Findings and Informant Sources

Theme	Main finding	Primary evidence sources
Leadership commitment	Leaders supported digital services through direction, supervision, and problem-solving, although formal long-term planning remained limited	SO1-SO3, AE1-AE4, and internal documents
Employee digital competence	Employees could operate routine service applications, but competence differed in troubleshooting, data management, and system integration	AE1-AE4, IO1-IO2, and observations
Organizational learning	Adaptation occurred mainly through peer learning, informal assistance, and practical experience	AE1-AE4 and IO1-IO2
Interunit coordination	Coordination supported service continuity, but information exchange was still partly informal and dependent on particular personnel	SO1-SO3, AE1-AE4, and IO1-IO2
Technological readiness	Basic digital facilities were available, but network instability, device limitations, and fragmented platforms reduced effectiveness	IO1-IO2, observations, and service records
Institutional barriers	Resistance to procedural change, overlapping manual and digital work, and limited technical support constrained adaptation	AE1-AE4, IO1-IO2, and observations
Public-service responsiveness	Digital services improved processing speed and access for digitally capable users, but direct assistance remained necessary for some citizens	SU1-SU3, AE1-AE4, and observations

As shown in Table 1, the findings represent perspectives from all four informant groups. Structural officials primarily contributed information concerning leadership and coordination, administrative employees explained daily digital practices and institutional barriers, information-system operators described technological and system-related issues, and service users provided evidence concerning accessibility and responsiveness. The triangulation of these perspectives indicates that adaptive bureaucratic capacity was influenced by organizational, technological, and service-related factors.

Leadership Commitment in Digital Service Adaptation

Leadership commitment emerged as an important enabling factor in the implementation of digital governance. Structural officials described managerial support through operational direction, internal coordination, and intervention when technical or administrative problems disrupted service delivery. Administrative employees also indicated that clear explanations and direct assistance increased their willingness to use new digital procedures. *"When the application cannot be accessed, we immediately coordinate with the operator and adjust the service procedure so that citizens do not have to wait too long."* (SO1, 15 January 2026). *"Employees are more confident in using the system when the instructions are explained directly rather than delivered only through short messages."* (AE2, 22 January 2026).

Employee Digital Competence

Most administrative employees were able to perform routine digital activities, including data entry, document verification, record retrieval, and digital communication. However, their competence differed in troubleshooting, data synchronization, and procedures involving several applications. *"For routine data entry, I can complete the process independently, but when synchronization fails or the account cannot be accessed, I still need help from the system operator."* (AE3, 5 February 2026). *"The main difficulty is not using one application, but connecting information from several platforms that have different procedures."* (IO1, 19 February 2026).

Organizational Learning and Knowledge Sharing

Organizational learning occurred mainly through peer assistance, observation, repeated practice, and informal communication. Employees frequently consulted system operators or more experienced colleagues when encountering unfamiliar procedures. *"Usually, when a new feature appears, we learn by trying it together and sharing screenshots in the internal messaging group."* (AE1, 27 February 2026) *"Many solutions are still shared verbally, so when the person who understands the problem is absent, the resolution can take longer."* (IO2, 01 March 2026)

Interunit Coordination

Interunit coordination supported service continuity when requests required verification, approval, data correction, or consultation with another administrative unit. Communication was generally conducted through meetings, internal messaging groups, telephone calls, and direct consultation. *"When the problem involves another unit, we usually communicate directly first because waiting for formal correspondence can delay the service."* (SO3, 16 March 2026) *"The coordination is relatively fast when we know the responsible person, but it becomes difficult when the authority for correcting the data is unclear."* (AE4, 30 March 2026)

Technological Readiness and System Fragmentation

Observational evidence and information from IO1–IO2 show that Tegalrejo Subdistrict had basic technological facilities, including computers, internet

access, document scanners, printers, official applications, and electronic communication channels. These facilities supported document processing, database access, communication with applicants, and routine administrative services. SU1–SU3 also indicated that digital procedures reduced repeated visits when information and documents could be submitted or confirmed electronically. Basic technological readiness therefore contributed to service efficiency.

Nevertheless, IO1–IO2 identified network instability, limited device availability, and fragmented applications as major constraints. Network problems occasionally delayed data entry, document uploading, and verification. Some devices were shared intensively among employees, particularly during periods of high service demand. In addition, incomplete system integration required repeated data entry, manual document transfer, and verification across different platforms. These findings indicate that technological readiness existed at an operational level but had not yet produced fully integrated digital governance.

Resistance to Change and Dual Administrative Procedures

The findings from AE1–AE4 and IO1–IO2 show that resistance to change did not generally appear as direct rejection of digital technology. Instead, it was reflected in preferences for familiar manual procedures, hesitation to use new application features, fear of making data-entry errors, and dependence on more technologically competent colleagues. Employees with limited experience frequently checked digital outputs repeatedly or retained printed copies as additional safeguards. These practices reflected concerns regarding accuracy and accountability rather than complete opposition to digitalization.

AE1–AE4 further reported that simultaneous manual and digital procedures increased employee workload. Certain documents were entered into digital applications but continued to be printed, signed, copied, or recorded separately. This dual process was maintained because of regulatory requirements, incomplete integration, technical uncertainty, and the need to accommodate physical documents submitted by citizens. Although the arrangement protected administrative evidence and service continuity, it reduced the efficiency expected from digital transformation.

Public-Service Responsiveness and User Experience

The perspectives of SU1–SU3 indicate that digital services improved access to information, document confirmation, and communication regarding service requirements. Digital communication reduced repeated visits and allowed users to correct incomplete documents before attending the service office. AE1–AE4 similarly reported that digital records made it easier to retrieve information and monitor ongoing applications. These changes improved service continuity and processing efficiency when systems operated normally.

However, SU1–SU3 also revealed that the benefits of digital services were not experienced equally. Some users required assistance in preparing electronic files, accessing online forms, interpreting instructions, and using digital

communication channels. Observations showed that AE1–AE4 frequently assisted users by scanning documents, resizing files, completing electronic forms, and explaining procedures. The service model therefore remained hybrid rather than fully online. This finding demonstrates that adaptive bureaucratic capacity included the ability to maintain direct assistance for users with limited digital competence.

Integrated Findings on Adaptive Bureaucratic Capacity

The integrated perspectives of SO1–SO3, AE1–AE4, IO1–IO2, and SU1–SU3 demonstrate that adaptive bureaucratic capacity was supported by leadership commitment, functional employee competence, informal organizational learning, and interunit coordination. Structural officials provided direction, employees adjusted administrative practices, system operators resolved technical problems, and users supplied evidence concerning the actual accessibility of digital services. Together, these capabilities enabled the bureaucracy to maintain services despite technical disruption, procedural change, and differences in digital competence.

At the same time, the data from all informant groups showed that adaptive capacity remained constrained by limited infrastructure, fragmented systems, unequal employee competence, dependence on particular operators, informal knowledge management, and resistance to procedural change. These constraints resulted in repeated data entry, overlapping manual and digital records, delayed technical resolution, and uneven user experiences. The findings indicate that Tegalrejo Subdistrict had achieved operational adaptation, but sustainable digital transformation would require informal practices to be converted into standardized and institutionally supported mechanisms.

DISCUSSION

Leadership Commitment and Bureaucratic Adaptation

The findings show that leadership commitment was a primary factor supporting digital service implementation at Tegalrejo Subdistrict. Structural officials provided direction, supervision, coordination, and intervention when technical or procedural problems occurred. This supports Gasco-Hernandez et al. (2022), who found that leadership, strategy, organizational arrangements, and collaboration are important foundations of digital transformation in local government. Sanina (2024) similarly explains that public managers play a central role in translating digital agendas into organizational action. However, leadership in this study remained more operational than strategic because long-term planning for competence development, technological risks, and digital continuity had not been fully formalized. This condition indicates the need to transform managerial support into a digital service roadmap, measurable competency targets, and periodic evaluations.

Employee Digital Competence and Organizational Learning

Most employees were able to operate routine digital service applications, but their capabilities varied in troubleshooting, data management, information security, and system integration. Information-system operators possessed more

advanced technical skills, which created dependence on a limited number of personnel. Sandoval-Almazan et al. (2024) found a similar pattern, showing that public managers may support digitalization while still lacking competence in planning, implementation, and data governance. At the same time, employees at Tegalrejo Subdistrict adapted through peer learning, informal assistance, and practical experience. Afzal and Panagiotopoulos (2024) explain that frontline employees use various adaptation strategies when digital systems alter their daily work. Therefore, role-based training, cross-training, backup operators, and documented troubleshooting procedures are needed to convert informal learning into sustainable organizational knowledge.

Interunit Coordination, Technological Readiness, and System Fragmentation

Interunit coordination helped maintain service continuity through meetings, internal messaging groups, telephone communication, and direct consultation. Nevertheless, coordination was still partly informal and depended on particular personnel, especially when data correction or technical intervention involved other units. Gasco-Hernandez et al. (2022) emphasize that digital transformation in local government requires collaboration across organizational and governmental boundaries. The findings also show that computers, internet access, scanning equipment, and government applications were available, but network instability, limited devices, and fragmented platforms reduced their effectiveness. Crusoe et al. (2024) describe this condition as digital transformation decoupling, in which formal digital adoption is not fully connected to operational processes. The results therefore indicate that technological improvement must be accompanied by clearer authority, standardized problem-escalation procedures, integrated systems, and defined technical-support responsibilities.

Institutional Barriers and Resistance to Change

Resistance to digital change appeared through hesitation, preference for familiar procedures, fear of data-entry errors, and continued reliance on manual records. However, this resistance did not represent complete rejection of digitalization because it was also influenced by unstable systems, uneven competence, accountability concerns, and unclear workflows. Afzal and Panagiotopoulos (2024) show that employees' perceptions of control and discretion influence their responses to digital transformation. Similarly, Crusoe et al. (2024) explain that weak alignment between transformation requirements and operational practices can reduce digital performance. In this study, parallel manual and digital procedures increased workload but also functioned as safeguards against system failure and data loss. Therefore, resistance should be addressed through employee participation, practical training, reliable technical support, and gradual process redesign rather than through purely directive enforcement.

Public-Service Responsiveness and Digital Inclusion

Digital services improved information access, document verification, communication, and processing speed for users with sufficient digital

competence. However, some citizens still required assistance in completing online forms, preparing electronic documents, and understanding application procedures. Mesa (2023) found that education and digital capability influence access to electronic government and trust in public services. Kim et al. (2024) likewise show that standardized digital platforms may create unequal experiences when face-to-face interaction is reduced. These findings explain why hybrid services remained necessary at Tegalrejo Subdistrict. Digital responsiveness should therefore be evaluated not only through efficiency but also through accessibility, inclusion, assistance needs, and user experience.

Theoretical and Practical Implications

The study indicates that adaptive bureaucratic capacity consists of interconnected individual, organizational, technological, and service dimensions. At the individual level, adaptation depends on employee competence and learning; at the organizational level, it depends on leadership, coordination, and knowledge management; while at the technological and service levels, it depends on infrastructure, system integration, accountability, and citizen accessibility. The study contributes to public-administration theory by distinguishing operational adaptation from institutionalized adaptive capacity. Tegalrejo Subdistrict had developed operational adaptation through informal learning, workarounds, coordination, and hybrid services, but these practices had not yet been fully institutionalized. Practically, the findings support the development of formal digital strategies, role-based training, integrated systems, shared knowledge repositories, and inclusive service standards.

CONCLUSIONS AND RECOMMENDATIONS

This study concludes that adaptive bureaucratic capacity at Tegalrejo Subdistrict, Yogyakarta, is supported by leadership commitment, employee digital competence, organizational learning, interunit coordination, and basic technological readiness. These capacities enabled the bureaucracy to maintain digital public services and respond to operational disruptions, although their effectiveness remained constrained by fragmented information systems, infrastructure limitations, uneven employee competence, dependence on particular personnel, resistance to procedural change, and overlapping manual and digital processes. The findings indicate that adaptive capacity has developed primarily at the operational level through informal learning, direct coordination, practical problem-solving, and hybrid service delivery, but has not yet been fully institutionalized within long-term organizational strategies and integrated administrative systems.

It is recommended that Tegalrejo Subdistrict develop a formal digital-service roadmap, implement role-based competency development, establish backup system operators, and document recurring technical solutions in a shared knowledge repository. Coordination should be strengthened through clear authority arrangements, standardized problem-escalation procedures, and regular evaluation of digital-service performance. Improvements in infrastructure and system interoperability should be accompanied by administrative process redesign to reduce unnecessary duplication without

weakening accountability. Hybrid service channels should also be maintained to ensure that citizens with limited digital access or competence continue to receive accessible and equitable public services.

ADVANCED RESEARCH

Future research should employ comparative and mixed-method designs involving subdistricts or local-government institutions with different levels of digital maturity. A larger and more diverse group of service users should be included, particularly older adults, persons with disabilities, and citizens with limited digital access. Quantitative indicators such as processing time, service errors, system downtime, employee workload, user satisfaction, and service costs should also be examined. Longitudinal research is needed to determine whether informal adaptation practices become institutionalized over time and how changes in leadership, personnel, technology, and regulation influence bureaucratic adaptive capacity.

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