BEYOND BUREAUCRACY: E-GOVERNANCE AND INTEGRATED DATABASES IN DIGITAL PAKISTAN

Nida Khattak

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Centre for Aerospace and Security Studies

ABSTRACT

States around the globe, including Pakistan, have shifted from traditional bureaucracies towards New Public Management (NPM), which advocates for digital transformations, particularly in the domain of e-governance required as an efficient public administration. This research paper examines Pakistan's digital transformation by evaluating the maturity of e-governance and integrated databases within its Neo-Weberian public administration that synthesises NPM-style digital reforms with Weberian bureaucracy. In doing so, it also explores the challenges and opportunities that exist for Pakistan's digital transformation. For this purpose, the study takes a case study approach and focuses on the National Information Technology Board (NITB) as a case study by selecting four of its digital initiatives to further specify the scope. Using a qualitative approach, the study investigates the performance of these initiatives and their alignment with global e-governance standards, using Layne & Lee's four-stage maturity model while relying on both primary and secondary data. The thematic analysis of this data reveals five major themes, including efficiency and processing time in government services, cost reduction and operational challenges, citizen satisfaction and platform engagement, integration of government databases and institutional fragmentation, cybersecurity and data protection, providing valuable insights into Pakistan's progress, challenges, and prospects in its pursuit of digital transformation.

Keywords: Pakistan e-governance, Data Integration, NITB Pakistan, Digital Pakistan

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1. INTRODUCTION

In the field of public administration, the concept of New Public Management (NPM) originated at the end of the 20th century evolving from the Weberian bureaucracy.[1] Inspired from the market-driven globalised world, it aimed to replace the traditional bureaucratic model with one that is decentralised, citizen-centric, performance based, and ensures efficiency, accountability, and transparency through market-oriented reforms.[2] Although in today's world, NPM is no longer the 'gold standard' but it has provided the groundwork for today's concept of e-governance because of its inherent principles that aiming at achieving efficiency, transparency, and accountability in the public sector.

While NPM provides a blueprint for how e-governance can actually enhance the efficiency, accountability, and transparency within public administration, there are certain models that helps identifying the maturity level of e-governance within a state to determine its effectiveness. One such model developed by Layne and Lee[3] is the most recognised within the study of public administration as it helps to understand the progression of e-governance from basic level, such as the provision of online services, to a higher level, such as complete data integration both vertically and horizontally across the public sector.

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[1] Farah Abdullahi, "Introduction to New Public Management (NPM)," *Global Scientific Journal* 12, no. 5 (2023), https://www.globalscientificjournal.com/researchpaper/Introduction_to_New_Public_Management_NPM_.pdf.

[2] Ibid

[3] Karen Layne and Jungwoo Lee, "Developing Fully Functional E-government: A Four Stage Model," *Government Information Quarterly* 18, no. 2 (June 1, 2001): 122–36, https://doi.org/10.1016/s0740-624x(01)00066-1.

Since Pakistan is also aiming for a digital transformation to attain a governance model that is efficient and citizen-centric through its ongoing efforts to integrate an e-governance infrastructure into its public administration, the theories/models discussed above can help to understand the current state of such integration.

This paper seeks to achieve this by critically evaluating Pakistan's practical efforts in advancing e-governance through a case study of a key public sector organisation National Information Technology Board (NITB), which is at the forefront of implementing such initiatives. The analysis focuses on the organisation's digital maturity by assessing its online presence, service digitalisation, vertical integration, and horizontal integration through effective inter- and intra-agency data sharing. Furthermore, the study examines Pakistan's policy measures for data security and cybersecurity governance, addressing the dual challenge of utilising digital data for administrative efficiency while mitigating its vulnerability to cyber threats. Hence, this paper aims to explore the key research questions posed in this paper which are: **a)** What is Pakistan's current stage of digital maturity in relation to e-governance and data integration? **b)** What challenges and opportunities exist for its digital transformation within e-governance and data integration?

2. RESEARCH METHODOLOGY

The study investigates the research questions using a qualitative approach to understand the digital maturity in Pakistan. A case study method is employed and the focal institution is the National Information Technology Board (NITB). This approach allows for a detailed investigation of how government digital initiatives are performing and whether they align with global e-governance standards. Both primary and secondary data are used in order to undertake this investigation. The primary data consist of two semi

structured interviews with public policy and e-governance experts (APPENDIX I and II). One limitation of conducting interviews was restricted access to NITB officials as multiple requests for interviews were either ignored or denied. Nevertheless, open-ended questions for the respondents explore the status and adoption of e-governance practices, challenges in integrating databases, and the extent to which these initiatives taken by NITB aligns with Layne & Lee's four-stage maturity model. Th secondary data includes government reports, policy documents, NITB's official publications, and academic literature on national e-governance and global best practices.

For data analysis, the research uses a thematic analysis approach[4] that is applied to identify key patterns in interviewee's responses. The analysis focuses on five main areas: efficiency and processing time of government services, cost reduction and operational challenges, citizen satisfaction and platform engagement, integration of government databases and institutional fragmentation, and security in e-governance and data integration within NITB. These areas are chosen based on literature review that identifies these pointers as an effective way to explore the maturity level of e-governance for digital transformation. Findings from the interviews are then compared with secondary data sources to ensure validity and reliability. Purposive sampling was used to select interview participants, ensuring that insights were gathered from those directly involved in or affected by digital governance efforts in Pakistan. Ethical considerations were also acknowledged and include obtaining informed consent for publication of the interviewee's responses.

[4] Muhammad Naeem et al., "A Step-by-Step Process of Thematic Analysis to Develop a Conceptual Model in Qualitative Research," *International Journal of Qualitative Methods* 22 (October 1, 2023), https://doi.org/10.1177/16094069231205789.

3. LITERATURE REVIEW

In his seminal work, *A Public Management for All Seasons?* (1991), Hood recorded the emergence of New Public Management (NPM), which originated from public administration focusing on performance management, decentralisation, and market-oriented changes[5]. Though Hood did not focus on e-governance, his ideas on productivity and responsibility shaped the discussions on digital governance over next two decades.

Although, the value and relevance of NPM in todays were denied by some writers like Dunleavy and his colleagues in their work on Digital Era Governance (2006)[6]. They criticises New Public Management and offers an alternative—Digital-Era Governance—which is characterised by a focus on integration, transparency, and the provision of services to users through digital means. Nevertheless, recently authors have investigated the evolving nature of NPM in studies such as *Reform, Hybridization, and Revival: The Status of New Public Management in Australia and New Zealand* (2024) exploring whether NPM is retained, modified, or revived but confirming that it definitely has not been replaced.[7]

Hence, literature on NPM and its association with e-governance takes central stage in this study. Research papers such as, *The New Public Management, E-government and the Notion of 'Public Value'* (2008) explore further how trends in e-governance are heavily inspired by the NPM and how the e-governance policies are not

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[5] Christopher Hood, "A Public Management For All Seasons?," *Public Administration* 69, no. 1 (March 1, 1991): 3–19, https://doi.org/10.1111/j.1467-9299.1991.tb00779.x.

[6] Dunleavy, Patrick, Helen Margetts, Simon Bastow, and Jane Tinkler. *Digital Era Governance:*, 2006. https://doi.org/10.1093/acprof:oso/9780199296194.001.0001.

[7] Shaun Goldfinch and John Halligan, "Reform, Hybridization, and Revival: The Status of New Public Management in Australia and New Zealand," *Public Management Review* 26, no. 9 (March 19, 2024): 2542–60, https://doi.org/10.1080/14719037.2024.2329770.

only focus on for government public services deliveries but also only influence the political agendas.[8]

The literature on e-governance in Pakistan not only highlights the possibilities of increasing efficiency in management, service provision, and public participation, but it also analyses the critical factors that impede the implementation of such practices. The study *Future of e-Government in Pakistan: A Case Study Approach* (2014) follows the path of e-governance development, paying particular attention to how ICT is utilised to further government activities.[9] It emphasises the impact of technology on enhancing the levels of accountability, efficiency, and service delivery within the public sector.

Similarly, serving as an exploration of policy gaps, the study *Trust in E-Government Services in Pakistan: A Conceptual Study* (2021) attempts to understand the level of trust and acceptability of users towards digital services and attributes low digital literacy, negative perceptions of cybersecurity, and unreliable services as the major hurdles in implementing e-governance.[10] A theoretical perspective on these challenges is offered through the document *Using Actor-Network Theory to Analyze E-Government Implementation in Developing Countries* (2007) which examines the complex socio-technical dynamics of e-governance adoption.[11] The gaps posed by institutional policy

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[8] Carla M. Bonina and Antonio Cordella, "The New Public Management, E-government and the Notion of 'public Value': Lessons From Mexico," *GlobDev*, January 1, 2008, http://globdev.org/files/24-Paper-Bonina-The%20New%20Public%20Mgt-Revised.pdf.

[9] Muhammad Irfanullah Arfeen, "Future of e-Government in Pakistan: A Case Study Approach," *Twentieth Americas Conference on Information Systems*, 2014, https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1054&context=amcis2014.

[10] Sohail Ahmed and Ayaz Ahmad, "Trust in E-Government Services in Pakistan: A Conceptual Study," *International Journal of Engineering and Information Systems (IJEAIS)* 5, no. 3 (2018), https://www.researchgate.net/publication/350495749_Trust_in_E-Governemnt_services_in_Pakistan_A_conceptual_study.

[11] Carolyne Stanforth, "Using Actor-Network Theory to Analyze E-Government Implementation in Developing Countries," *Information Technologies and International Development* 3, no. 3 (March 1, 2007): 35–60, https://doi.org/10.1162/itid.2007.3.3.35.

resistance, infrastructural barriers, and regulatory restrictions are also discussed against this framework.

The research gap of the current study lies in its exclusive focus on the National Information Technology Board (NITB) a case study to assess its role in Pakistan's e-governance framework. It applies Layne and Lee's (2001) e-governance maturity model to evaluate NITB's progress across key stages, including catalogue, transaction, vertical integration, and horizontal integration. By focusing on NITB's initiatives, policy implementation, and successful horizontal data integration across ministries, and vertical integration through digital service delivery, this research provides a focused and structured analysis of e-governance maturity within Pakistan's public administration, given that the NITB is a leading platform for developing a digital Pakistan.

4. THEORETICAL FRAMEWORK

This study is guided by two key theoretical perspectives: New Public Management (NPM) and Layne & Lee's Four-Stage Maturity Model. NPM emphasises efficiency, cost reduction, decentralisation, and performance-based governance, challenging traditional bureaucratic structures by promoting customer-centric digital services. The evolution of public administration from Max Weber's centralised bureaucratic model[12] to decentralised New Public Management (NPM)[13] reflects a fundamental shift in the nature of governance, particularly in how governments approach efficiency, transparency, and accountability. Weberian bureaucracy emerged at the scene in the beginning of 20th century and is

[12] Sandro Serpa and Carlos Miguel Ferreira, "The Concept of Bureaucracy by Max Weber," *International Journal of Social Science Studies* 7, no. 2 (January 17, 2019): 12, https://doi.org/10.11114/ijsss.v7i2.3979.

[13] Farah Abdullahi, "Introduction to New Public Management (NPM)," *Global Scientific Journal* 12, no. 5 (2023), https://www.globalscientificjournal.com/researchpaper/Introduction_to_New_Public_Management_NPM_.pdf.

rooted in hierarchical structures, rigid rules, and formal procedures, designed to ensure stability, impartiality, and rule-based governance.[14] However, by the end of 20th century, as societies became more complex and technologically advanced, this model struggled to meet the demands of modern governance, particularly in areas like e-governance and data integration. The bureaucratic approach often resulted in slow decision-making, inefficiencies, and a lack of responsiveness to public needs.[15]

With the emergence of NPM, public administration began to adopt market-driven principles, performance-based evaluation, and prioritise decentralisation and customer-centric service delivery.[16] Unlike bureaucratic rigidity, NPM focuses on digital innovation, service accessibility, utilising e-governance tools to enhance efficiency, and inter-agency coordination.[17] A key aspect of this transition is the integration of databases on these e-governance platforms, which enable real-time information sharing and reduces redundancy and administrative bottlenecks.[18] By minimising bureaucratic inefficiencies and promoting digital governance, NPM offers a more vibrant and responsive public administration model, which is better suited to the demands of a data-driven governance ecosystem.[19]

Pakistan's governance framework aligns with the Neo-Weberian Model, which integrates traditional bureaucratic structures with New Public Management (NPM)-style digital innovations to improve efficiency, oversight, and service delivery. Through this lens, the study examines how Pakistan's public sector is transitioning from rigid,

[14] Sandro Serpa and Carlos Miguel Ferreira, "The Concept of Bureaucracy by Max Weber.
[15] Farah Abdullahi, "Introduction to New Public Management (NPM)
[16] Ibid.
[17] Ibid.
[18] Ibid.
[19] Ibid.

bureaucratic systems towards a more responsive, technology-driven governance model. NITB exemplifies this hybrid approach by promoting e-governance tools and data integration while operating within a bureaucratic framework. The Neo-Weberian Model provides a middle ground, ensuring that state authority and oversight remain intact while allowing for a gradual digital transformation that aligns with efficiency-driven, citizen-focused governance principles.

Feature	Bureaucracy (Weberian Model)	New Public Management (NPM)
Structure	Hierarchical, rule-based	Decentralised, market-driven
Decision-Making	Procedural, slow, rule-focused	Results-oriented, flexible
Service Delivery	Bureaucratic, standardised	Customer-centric, efficiency-focused
Accountability	Through formal rules and procedures	Performance-based and managerial accountability

Table 1: Bureaucracy vs. NPM: The Core Differences

Source: Data collected by the researcher

Within this context, Layne and Lee's Four-Stage Model provides a valuable framework for assessing Pakistan's e-governance maturity in line with New Public Management (NPM) principles of efficiency, transparency, and citizen engagement.[20] The first stage, Catalogue Stage assesses basic websites and online portals, within

[20] Karen Layne and Jungwoo Lee, "Developing Fully Functional E-government: A Four Stage Model"

Pakistan's digital initiatives, and whether inculcates static information or provided citizens with interactive services.[21] Moving to the second stage, the Transaction Stage, IT if the government e-platforms offer online services such as tax payments and application processing, and whether these services are consistent and efficient.[22] The Vertical Integration Stage aims to evaluate the intra-governmental (central and local) and intra-agency (government and citizen) coordination by digitising internal workflows between governments on one hand and on the other hand, government-citizen interaction.[23] The most advanced phase, Horizontal Integration, focuses on cross-agency data sharing for seamless governance, a key component of NPM's data-driven decision-making.[24] By applying Layne and Lee's model, Pakistan's current stage of e-governance can be critically evaluated, highlighting gaps in digital transformation and the need for stronger data integration to realise NPM's vision of an efficient, transparent, and citizen-centric public administration.

[21] Ibid.
[22] Ibid.
[23] Ibid.
[24] Ibid.

Layne & Lee's Stage	NPM Principle Applied
1. Cataloguing (Basic Online Presence)	Enhances **transparency** by providing public information (e.g., websites, digital records).
2. Transaction (Service Digitalisation)	Promotes **efficiency** through online services, reducing bureaucratic delays and costs.
3. Vertical Integration (Inter-Agency Coordination)	Supports **performance-based management** by integrating government levels, reducing redundancy.
4. Horizontal Integration (Unified Government Platforms)	Embodies **customer-oriented governance**, ensuring a one-stop government service experience.

Table 2: Application of NPM Principles in Government Stages

Source: Data collected by the Researcher

5. INSTRUMENTAL FRAMEWORK OF E-GOVERNANCE IN PAKISTAN

Pakistan currently has the following polices and structures in place, which are instrumental in driving its digital revolution.

5.1 Policies

The Digital Pakistan Policy 2018[25] laid the foundation for Pakistan's digital transformation by aiming to create a digital ecosystem that enables the digitisation of socio-economic sectors, promoting e-governance, and enhances digital literacy among citizens. Building upon this foundation, the Digital Nation Pakistan Bill 2025[26] further aims to advance the country's digital agenda aims to establish a unified digital identity for citizens, centralising social, economic, and governance data to streamline service delivery and enhance citizen engagement in alignment with global trends. Collectively, these policies underscore Pakistan's commitment to transforming the public administration landscape for improved governance and global competitiveness.

5.2 Structure

Federal government bodies play a crucial role in shaping and regulating Pakistan's digital landscape. The Ministry of Information Technology and Telecommunication (MoITT)[27] serves as the central authority, responsible for formulating IT policies and overseeing nationwide digital initiatives. Under MoIIT is the National Information Technology Board (NITB) which is responsible for implementing e-governance solutions and providing IT services to federal institutions. Whereas, the other bodies such as Pakistan Telecommunication Authority (PTA), Pakistan Software Export Board (PSEB), Universal Service Fund (USF), regulates the telecom and digital communication sector, ensuring compliance with national and international standards, facilitate the growth of the

[25] "Digital Pakistan Policy" (MOIB.PK, 2018), https://moib.gov.pk/Downloads/Policy/DIGITAL_PAKISTAN_POLICY%2822-05-2018%29.pdf.

[26] "The Digital Nation Pakistan Bill" (Senate of Pakistan, 2025), https://www.senate.gov.pk/uploads/documents/1738057563_368.pdf.

IT industry by promoting software and service exports, and focuses on expanding digital infrastructure to underserved areas respectively.

On national level, the National Database and Registration Authority (NADRA) and The Digital Pakistan Initiative play key role in their respective domains such as managing digital identity systems and providing authentication solutions for e-governance services, and fostering digital transformation across both public and private sectors. This ensures the effective integration of technology into governance, the economy, and society.

At the provincial level, each province has its own IT board like The Punjab Information Technology Board (PITB), Khyber Pakhtunkhwa Information Technology Board (KPITB), the Sindh Information Science & Technology Department, and the Balochistan Information Technology Department which works to advance digitalisation and IT infrastructure within their respective province.

Each of these entities plays a crucial role in Pakistan's broader digital transformation strategy, aligning with federal and regional governance efforts. However, the scope of this research is limited to NITB, which operates at the federal level and is engaged in initiatives that surpass others in terms of both scale and impact.

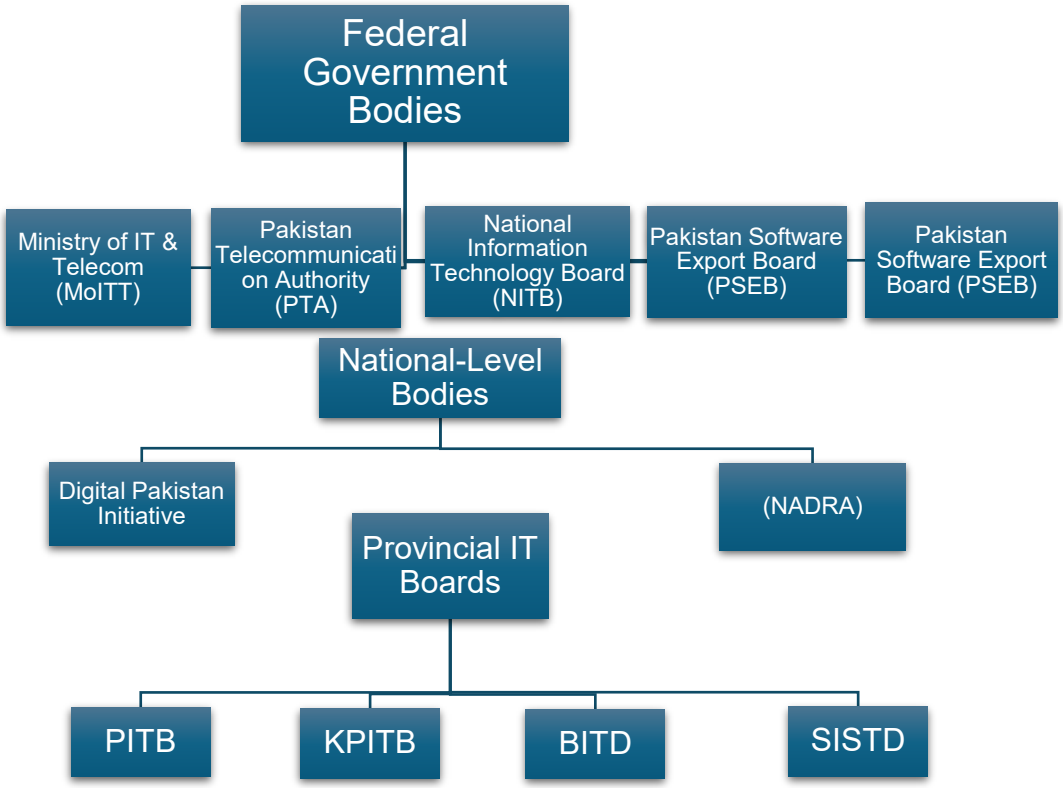

Figure 1: Structure of E-Governance Authorities in Pakistan

Source: Data collected by the Researcher

6. ANALYSIS: CASE STUDY OF NITB

Before delving into the analysis of the case study, the research will briefly introduce the background of the institution being analysed.

6.1 Background

The NITB was established in 2014 through the merger of the Pakistan Computer Bureau (PCB) and the Electronic Government Directorate (EGD), and it is a government agency task with leading digital transformation and advancing e-governance initiatives in

Pakistan.[28] Until now, NITB has initiated 31 Web portals and 15 mobile application working for both vertical and horizontal integration.[29] However, this study only analyses four web-portals and applications due to the study's limitation imposed by the word count. The intra-government platform, e-office, and e-file functions in the domain of horizontal integration while citizen-facing platforms functions in the domain of vertical integration.

Intra-Government Platforms	Citizen-Facing Platforms
E-Office	Pakistan Citizen Portal
E-File	Pakistan Jobs Portal

Table 3: Selected NITB Platforms for Analytical Evaluation

Source: Data collected by the Researcher

6.2 Thematic Analysis

The implementation of e-governance in Pakistan, particularly through the NITB, presents a complex landscape of both challenges and benefits. The interview transcripts provide qualitative insights into the efficiency, cost-effectiveness, citizen satisfaction, database integration, and security of these platforms. This thematic analysis explores key themes emerging from the interviews, drawing connections between empirical observations and theoretical frameworks of e-governance. Furthermore, insights from academic literature on global and Pakistan-specific e-governance trends are incorporated

[28] "NITB-About," https://www.nitb.gov.pk/about.html#:~:text=Previously%20operating%20as%20an%20attached,Electronic%20Government%20Directorate%20(EGD).

[29] Ibid.

to contextualise these findings. This thematic analysis will lay the foundation for assessing Pakistan's digital maturity level using Layne's and Lee's model.

6.2.1. Theme 1: Efficiency and Processing Time in Government Services

A. Lack of Quantifiable Data

A central issue identified through interviews is the absence of real-time data to measure the impact of digital platforms on processing time. While anecdotal evidence suggests improved service delivery, the lack of systematic performance measurement remains a limitation. This aligns with global challenges in digital transformation, where effectiveness is often difficult to quantify due to the absence of rigorous impact assessment frameworks.[30]

B. Partial Adoption and Resistance

In the report, "e-office adoption report" submitted by the IT ministry, by the mid of 2024, out of 40 ministries and divisions, barely five made a 'half-hearted' use of the platform.[31] However, there has been increase in the adoption, as of January 2025, 23 ministries have incorporated e-office into their working, demonstrating a gradual adoption.[32] Despite the introduction of platforms such as e-Office and the National Job Portal, many government departments continue to rely on traditional methods.[33] This mixed adoption limits the overall efficiency gains of e-governance. Organizational inertia

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[30] Donald F. Norris and Christopher G. Reddick, "Local E-Government in the United States: Transformation or Incremental Change?"

[31] Kalbe Ali, "Ministries Lukewarm About E-office," *DAWN.COM*, June 9, 2024, https://www.dawn.com/news/1838736.

[32] PT Profit, "PM Sets March 20 Deadline for Full E-office Adoption Across Ministries," Profit by Pakistan Today, March 13, 2025, https://profit.pakistantoday.com.pk/2025/03/13/pm-sets-march-20-deadline-for-full-e-office-adoption-across-ministries/.

[33] Interviewee response

and bureaucratic reluctance to change contribute to this resistance, consistent with the "technology acceptance model," which suggests that perceived usefulness and ease of use influence adoption rates.[34] Moreover, Layne and Lee's four-stage model highlights the challenges of transitioning from cataloguing to horizontal integration, illustrating why partial adoption remains a major hurdle. [35]

C. Financial and Human Capital Constraints

The second interviewee highlighted financial and human capital challenges as key barriers to the full implementing of e-governance projects. Attracting and retaining skilled personnel remains a challenge, which affects project execution and service quality. These limitations underscore the broader issue of capacity building in government-led digital initiatives. [36]

6.2.2 Theme 2: Cost Reduction and Operational Challenges

A. Hybrid System and Redundant Expenses

Currently, over 40 federal government organisations and departments are using e-Office, but measuring its direct impact on time and cost savings remains a challenge. Many departments continue to operate within a hybrid system, using both manual hard-copy files and digital platforms in parallel.[37] While e-Office and e-File theoretically reduce costs associated with paper-based processes, the hybrid nature of many departments—maintaining both digital and manual systems—limits financial benefits. This paradox

[34] Vincent Homburg, *Understanding E-Government: Information Systems in Public Administration.*
[35] Karen Layne and Jungwoo Lee, "Developing Fully Functional E-government: A Four Stage Model,"
[36] Dunleavy, Patrick, Helen Margetts, Simon Bastow, and Jane Tinkler. *Digital Era Governance*
[37] Interviewee response

highlights a critical issue in e-governance: the transition phase often incurs additional expenses before long-term savings materialise.[38]

B. Policy Shifts and Future Prospects

A significant policy directive mandating exclusive digital file handling by March 2025 is a step toward cost reduction. A major shift is expected following a directive issued by the Prime Minister in May 2024. As per this directive, from 20 March 2025, no hard-copy files will be received or forwarded within any federal government organisation or department.[39] However, the interviewees highlight concerns over e-Office's compatibility with traditional bureaucratic workflows. The reluctance to abandon paper-based processes underscores the challenge of aligning new technologies with established institutional cultures. [40]

C. Lack of Performance Frameworks

The primary sources for this study pointed out that government cost structures do not always align with traditional cost-benefit models. Unlike other countries where public expenditure requires demonstrable returns, Pakistan lacks a structured performance evaluation mechanism. PC-3, which serves as a performance review mechanism, is essential for tracking progress. Ideally, if a project has a PC-3, it should include impact data and showcase achievements through reports or presentations. However, in many cases, this level of transparency is missing. The absence of a robust PC-3 performance

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[38] C.S.R Prabhu, *E-governance : Concepts and Case Studies.*

[39] Mushtaq Ghumman, "PM Directs E-office Implementation in All Ministries by 20th," *Brecorder*, March 13, 2025, https://www.brecorder.com/news/40352720/pm-directs-e-office-implementation-in-all-ministries-by-20th.

[40] Carolyne Stanforth, "Using Actor-Network Theory to Analyze E-Government Implementation in Developing Countries".

review system means that there is minimal accountability regarding whether e-governance investments yield expected results.[41]

6.2.3 Theme 3: Citizen Satisfaction and Platform Engagement

A. Pakistan Citizen Portal: A Mixed Success

The Pakistan Citizen Portal has witnessed substantial engagement, with 4.8 million registered users and 4.4 million complaints submitted.[42] Interviews suggest that the portal's success is mainly due to public trust, as it reduces corrupt practices in public administration, which are more prevalent with manual complaint processes. However, the interview also suggest that precise satisfaction metrics are not publicly available. The presence of a feedback mechanism offers a potential method for evaluating user experience, yet official data transparency remains a challenge. [43]

B. National Job Portal: A One-Directional Platform

Unlike the Citizen Portal, the National Job Portal functions as a one-way interaction tool without feedback mechanisms. This hinders its capacity to assess user satisfaction effectively. Best practices in e-governance suggest that digital services should incorporate bidirectional communication to enhance user engagement and improve service refinement.[44]

6.2.4 Theme 4: Integration of Government Databases and Institutional Fragmentation

A. Incomplete Data Integration

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[41] Christopher Hood, "A Public Management For All Seasons,"
[42] "Prime Minsiter's Performance Delivery Unit," Pakistan Citizen Portal, n.d., https://citizenportal.gov.pk/.
[43] Sohail Ahmed and Ayaz Ahmad, "Trust in E-Government Services in Pakistan: A Conceptual Study,"
[44] Darrell M. West, *Digital Government*.

Despite efforts to integrate government databases under NITB, many organisations continue to operate independently. This fragmentation creates inefficiencies, such as data duplication and communication delays. The voluntary nature of participation in integration efforts further weakens the coherence of digital governance.[45]

B. Standardisation Challenges in IT Frameworks

The interviews highlighted a significant challenge in IT integration: the lack of standardised frameworks across government departments. Currently, different agencies develop software using diverse programming languages, creating interoperability difficult. In contrast, countries with established digital governance systems enforce strict IT standards to ensure compatibility.[46] The lack of standardisation limits the ability of Pakistan's government departments to effectively integrate digital platforms. For instance, the Digital Economy Enhancement Project is attempting to integrate systems, but a major challenge remains the lack of standardised IT frameworks across government departments.

C. Legal and Political Influences on Platform Evolution

The interviews highlighted a reduced governmental focus on the Pakistan Citizen Portal following the 2022 political transition. Unlike legislatively mandated initiatives, platforms established through executive directives often face continuity issues amid changes in administration. This reflects the broader challenge of ensuring the sustainability of digital governance initiatives. [47]

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[45] Christopher Hood, "A Public Management For All Season?,"
[46] Karen Layne and Jungwoo Lee, "Developing Fully Functional E-government: A Four Stage Model,"
[47] Muhammad Irfanullah Arfeen, "Future of e-Government in Pakistan: A Case Study Approach,"

6.2.5 Theme 5: Cybersecurity and Data Protection

A. Existing Security Measures

The National Telecommunication Corporation (NTC) hosts NITB's digital infrastructure, with cybersecurity oversight provided by the National Computer Emergency Response Team (National CERT). While these measures offer a structured security framework, the lack of comprehensive data integration across departments[48] reduces potential vulnerabilities but also hampers interdepartmental efficiency. [49]

B. Gaps in Cybersecurity Frameworks

The respondents raised concerns about NITB's cybersecurity preparedness, questioning whether clear protocols exist for data recovery in the event of cyber threats. Effective cybersecurity requires redundancy strategies, including offline backups and data protection policies. The absence of such mechanisms poses a significant risk to the integrity of government digital services. [50]

C. Policy and Regulatory Frameworks

The National Telecommunication & Information Security Policy (NTISP) provides strategic guidelines for cybersecurity. However, the respondents suggest that practical implementation challenges persist, particularly regarding data governance across multiple agencies. A strong legislative framework, coupled with regular audits and risk assessments, is necessary to enhance security resilience. [51]

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[48] Interviewee response

[49] Christian Ø. Madsen, Jesper Bull Berger, and Mick Phythian, "The Development in Leading e-Government Articles 2001-2010: Definitions, Perspectives, Scope, Research Philosophies, Methods and Recommendations: An Update of Heeks and Bailur," in *Lecture Notes in Computer Science*, 2014, 17–34, https://doi.org/10.1007/978-3-662-44426-9_2.

[50] Muhammad Irfanullah Arfeen, "Future of e-Government in Pakistan: A Case Study Approach,"

[51] Carolyne Stanforth, "Using Actor-Network Theory to Analyze E-Government Implementation in Developing Countries,"

7. ASSESSING DIGITAL PAKISTAN'S DATA INTEGRATION AND E-GOVERNANCE MATURITY USING LAYNE AND LEE'S MODEL

Based on Layne and Lee's four-stage e-government maturity model—Catalogue, Transaction, Vertical Integration, and Horizontal Integration—Pakistan's e-governance when evaluated against this model yields the following results:

Stage 1: Catalogue (Information Dissemination) - Surpassed

Pakistan's digital initiatives have successfully progressed beyond the basic dissemination of static information. Platforms such as the National Job Portal, Pakistan Citizen Portal, and government websites provide comprehensive resources and facilitate limited interactions, meeting the foundational requirements of e-governance.

Stage 2: Transaction (Service Digitalisation) - Achieved with Limitations

The introduction of services such as e-Office and e-File, Pakistan Jobs Portal, and Pakistan Citizen Portal demonstrates a shift toward online services. However, the persistence of hybrid system (manual and digital), absence of real-time performance metrics and limited adoption of these applications and web-portals undermines efficiency gains across ministries and within the government-citizen interactions. These issues indicate that digital transaction processes remain fragmented rather than fully institutionalised.

Stage 3: Vertical Integration (Inter-Agency Digital Coordination) - Partial Progress

Efforts toward departmental integration exist, particularly through NITB-led initiatives, yet resistance from various ministries and regulatory bodies hinders seamless coordination. The lack of standardised IT frameworks across different levels of

government exacerbates interoperability challenges, preventing smooth data exchanges across agencies. Moreover, financial and human capital constraints slow down implementation, leaving e-governance development uneven across government departments. Furthermore, the government-citizen centric vertical integration is also limited because most of the citizen centric applications are only one-directional. In case of a two directional platform, other issues merge in, for instance, political transitions that disrupt continuity, as seen in the diminished governmental focus on the Pakistan Citizen Portal after 2022.

Stage 4: Horizontal Integration (Unified Government Platforms) - Not Yet Achieved

For full horizontal integration, government databases and digital services must be interconnected under a cohesive, interoperable infrastructure. The interviews and literature review findings suggest that Pakistan has yet to achieve this stage due to institutional fragmentation, data silos, and the absence of legally binding mandates for integration. Additionally, cybersecurity concerns reveal gaps in preparedness and governance, further delaying comprehensive digital unification.

8. KEY FINDINGS

1. Digital Pakistan is at an intermediate stage of maturity, showing promise but struggling with systemic inefficiencies.
2. The absence of legally binding mandates for integration hampers seamless inter-agency digital coordination.
3. Institutional fragmentation and data silos delay full e-governance maturity, preventing horizontal integration.

4. Hybrid systems (manual and digital) persist, limiting efficiency gains and increasing redundant expenses.
5. Cybersecurity frameworks require strengthening, particularly regarding data redundancy, legal enforcement, and risk assessments.
6. Performance evaluation mechanisms are lacking, making it difficult to measure cost savings, efficiency improvements, and citizen satisfaction objectively.

9. KEY RECOMMENDATIONS

1. Mandate exclusive digital adoption by enforcing policy-driven digital governance to accelerate e-governance adoption. Legal backing for the execution like ones currently being enforced through government's directive of the complete integration of e-offices by March 2025 deadline will aid in whole-hearted integration of digital transformation.
2. Invest in IT standardisation and interoperability to overcome fragmentation and ensure seamless system integration across government departments.
3. Develop structured performance evaluation frameworks to measure the impact of e-governance initiatives through cost-benefit analysis and citizen feedback mechanisms.

10. CONCLUSION

Concluding the analysis, Pakistan has made commendable strides in digital governance and the findings of the study also aligns with the 2024 United Nations E-Government Development Index (EGDI), where Pakistan has improved its ranking, climbing 14 places to 136th out of 193 countries, with an EGDI value of 0.5095. In the background of the infamous Layne and Lee's e-governance maturity model used around

the globe to determine the stage of maturity, Pakistan stands in a reasonable position. The current digital landscape appears to be in a transitional phase between Vertical Integration and Horizontal Integration, though significant barriers prevent full maturity. Pakistan has successfully implemented the first phase that is cataloguing, which implies government's online presence and also successful in phase two where the online services are digitalised with some limitation that mostly arise from the implementation issues. Phase three of vertical integration is still in progress and the major obstacle here remains the absence of two-directional information flow mechanism. The transition to full horizontal integration demands addressing institutional resistance, regulatory gaps, and infrastructure limitations, essential for achieving a fully integrated, transparent, and efficient e-governance ecosystem.

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APPENDICES

Appendix 1: Interviews Details

Interviews	Names	Expertise	Date of Interview	Medium of Interview
1.	Noor Muhammad Khan	CEO e-Jirga Pakistan	29-02-2025	Zoom Video
2.	T.A. Bhutta	Cyber Security Expert	03-03-2025	Phone Call

Appendix 2: Open Ended Questionnaire

QUESTIONNAIRE

In absence of **hard data**, expert's **qualitative observations** are highly appreciated for all of the five questions below.

Question 1:

Since National Information Technology Board incorporates various websites, portals, and apps like e-Office and National Jobs Portal. Has there been any decrease in the processing time of the government service requests? Is there any real time data or observations?

Question 2:

In terms of cost reduction, how much have the adoption of these e-governance platforms like E-Office and E-File reduced operational expenses?

Question 3:

Do you have any data on citizen satisfaction levels before and after these platforms were introduced like the National job Portal or Pakistan Citizen Portal and how much is the increase in citizen usage of these digital platforms in the year 2024?

Question 4:

What specific outcomes or key performance indicators (KPIs) have been tracked to measure the success of data integration across departments through NITB's platforms? For instance, have you observed reductions in data duplication, errors, or delays in inter-departmental communication?

Question 5:

What measures are in place to protect against data breaches, unauthorised access, and cyber threats to secure the sensitive data stored across NITB's integrated government databases?