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Title: **Beyond Digital Infrastructure: Inter-Agency Coordination and Capabilities Alignment of E-Tag Implementation**

Author (s): *Syed Anwar Hussain Shah* [a], *Shakira Nazeer* [b], *Ayesha* [c]

Affiliation (s): [a] International Diplomatic Mission, Islamabad, Pakistan

[a,b,c,] Faculty of Management, Virtual University of Pakistan, Pakistan

Correspondence: Shakira Nazeer Shakira.nazeer@vu.edu.pk

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Abstract

The implementation of electronic tagging (E-Tag) system is a crucial element of digital governance in Pakistan, yet the effectiveness of operations of this system is contingent upon inter-agency coordination and capabilities alignment of various governmental departments rather than merely on technological availability. Drawing upon digital governance theoretical framework, this study examines how the integration or reintegration and digitization depend on the availability and reliability of technological infrastructure, the digital capabilities of end users, coordination among participating agencies, financial resources, and organizational readiness of the implementing authorities. The study relies on collecting primary data from interviewing 35 participants from the officials of Islamabad Police, Islamabad Traffic Police, Islamabad Safe City Authority, Frontier Works Organization, and Excise and Taxation Department. The interview transcripts were analyzed for common major and minor themes. The findings show that successful E-Tag implementation requires participatory arrangements and ongoing collaboration between the implementing authorities alongside provision of reliable digital infrastructure.

Keywords: *Inter-agency coordination; organizational capabilities; technical capabilities; digitization; E-Tag implementation; Pakistan*

Beyond Digital Infrastructure: Inter-Agency Coordination and Capabilities Alignment of E-Tag Implementation

1. Introduction

The rapid advancement of technologies has paved the way government organizations operate. Governments across the world are using digital tools to automate their services, enhance administrative efficiency, and develop more responsive form of governance. In many countries, old systems cannot keep up anymore. Because population is growing, security problems are changing, and government processes are slow. Nowadays, digital technologies not only support routine administrative functions, but also influence how government organizations design services, and how government agencies coordinate with one another and with citizens. (Mergel et al., 2019).

So, the emergence of digital technologies has contributed to a shift in working of public sector. Among these, Digital-Era Governance (DEG) provides an important framework and informed us how information technologies can contribute to changes in government organizations service delivery. Dunleavy et al. (2006) developed the DEG perspective partly in response to the fragmentation associated with New Public Management, arguing that information technologies could support a different pattern of public-sector organization. This framework identifies three major interconnected dimensions: reintegration, digitization, and needs-based holism.

The first-dimension integration or reintegration involves reconnecting functions and responsibilities that have become fragmented across departments and agencies. Digital technologies can facilitate cross organizational coordination, information sharing, and joined-up government. The second dimension, needs-based holism involves organizing government services around the needs of citizens rather than solely around departmental structures but related with client-oriented reorganization, one-stop provision, end-to-end service delivery, and reduced fragmentation from the user's perspective. Another important dimension of DEG is digitization. Digitization refers to the increasing use of digital technologies to transform administrative processes and interactions between governments and citizens (Dunleavy et al., 2006; Lindquist, 2022). All these three dimensions mutually provide an analytical basis for examining whether the introduction of digital technologies produces broader changes in governance or merely automate existing procedures.

If any organization adopts a new technology, it does not mean it has automatically transformed (Mergel et al., 2019; Lindquist, 2022). Digital transformation is about making fundamental changes to the way organizations operate, how people behave and how they interact with each other and the general public (Mergel et al., 2019). Every public institution has its own unique background, history, tradition, culture and values. Therefore, a single digital tool will produce vastly different outcomes in each location. Researchers should not expect that purchasing technology is synonymous with progress. They should instead examine the practical application of technology in real-world environments (Lindquist, 2022).

This problem is particularly relevant for developing nations, as digital governance programs could face vastly different circumstances than those in technologically advanced administrative systems. Previous research conducted on e-government context identifies challenges associated with ICT infrastructure, management commitment, cultural resistance, organizational resources, and citizens capabilities (Schuppan, 2009; Twizeyimana & Andersson, 2019). Later, research demonstrates that public sector digital transformation can be affected by organizational culture, leadership, implementing agency, and environmental factors. Thus, the implementation of digital governance cannot be understood exclusively through technological capability.

In the context of Pakistan, a few research conducted and has identified a range of factors that can inhibit the adoption and implementation of technology-enabled government services. Kamal and Hackney (2012), in their study identify organizational, social, operational, political, strategic, and technological issues as important barriers to e-government adoption in Pakistan, particularly in relation to integrated service provision. Recent research in Pakistan, similarly, identifies infrastructural challenges, cybersecurity concerns, digital-literacy gaps, institutional resistance to change, and limitations in agency capacity as important challenges for e-governance (Nazuk et al., 2025). So, these studies demonstrate the importance of examining digital governance within Pakistan's institutional and technological context only. Literature, previously found only on e-

government adoption and their general implementation challenges rather than a focus on digital governance initiative through the integrated dimensions of Digital-Era Governance.

E-governance projects are usually considered better. But in practice, running these projects is not an easy task. As technology alone cannot guarantee success. For implementation and enforcement purposes, strong intuitional support, literacy, teamwork, and public participation is evident (Paselle, 2025). In the context of Pakistan, transportation sector provides a particularly relevant setting for examining such transformation because digital technologies can connect physical infrastructure, administrative databases, monitoring systems, financial transactions, enforcement mechanisms, and citizens.

The current study is important because it examines E-Tag implementation in Islamabad from different angels. It is also essential because it makes recommendations to make this system even more useful for its stakeholders. The implementation of the E-Tag system in Islamabad represents an important example of this emerging digital governance environment. This initiative involves electronic vehicle identification and monitoring and has related to the broader technological infrastructure of the capital city. Government reporting has also focused on how electronic tolling can be used in conjunction with Safe City infrastructure and the creation of an Intelligent Transportation System using cameras, security infrastructure, and communications systems.

The use of E-Tags may raise some issues which cannot be resolved solely based on the analysis of technical and administrative data. The success of a digital system relies on the existence and stability of technological infrastructure, the ability of users to utilize digital technologies, cooperative relationships between all parties involved, funding, readiness of organizations to adopt such systems, and compliance by citizens.Research on developing-country digital transformation confirms that technological, organizational, cultural, and institutional factors can interact to shape implementation processes (Latupeirissa et al., 2026). These findings reinforce the need to investigate both institutional implementation capacity and stakeholder experiences.

Despite the expanding literature on digital government available, several gaps remain unexplored. First, a conceptual gap exists between the broad theoretical propositions of DEG and empirical examination of specific digital initiatives. DEG identifies integration, needs-based holism, and digitization as central dimensions of digital-era transformation, relatively limited empirical research examines how these three dimensions are manifested simultaneously within a specific public-service implementation, particularly in developing-countries contexts (Dunleavy et al., 2006; Omweri, 2024). Hence, e-government initiatives in resource-constrained environments frequently experience high failure rates due to fragmented execution. To avoid the complexities of isolated approaches, public sector modernization requires an integrated understanding of how macro-level factors (like infrastructure, budget, and leadership) dynamically interact with micro-level variables (such as training, compliance, coordination, and culture) during system implementation (Fardiah et al., 2024; OECD, 2026). So, it is required to identify the issues related to inter-agency coordination and examine how comprehensive technological adoption can mitigate these administrative silos which is the purpose of this investigation.

Furthermore, existing studies have examined general e-government adoption, barriers, and citizen perspectives in Pakistan (Nazuk et al., 2025), but there is comparatively less qualitative research examining a specific urban digital-governance initiative as an organizational and institutional transformation. Hence, it is required to move from general discussions of Pakistan's e-government challenges toward detailed examination of how digital governance is implemented within a particular administrative setting like e-Tag implementation system.

Considering these issues, the focus of this study is on the implementation of Islamabad’s E-Tag programme, with particular attention to inter-agency coordination and the capacity of relevant institutions to implement and sustain the system. Not only this but the present study also examines how participating agencies have responded to challenges that emerged or persisted after the programme’s deployment. By exploring these institutional and implementation dimensions, the study seeks to develop a deeper understanding of the factors shaping the effectiveness and sustainability of E-Tag implementation in Islamabad.Based on the above context, by using a qualitative research approach, this study aims:

- To examine the inter-agency coordination that has shaped E - Tag implementation
- To explore the technical and organisational capacities that facilitated or hindered integrated operations.
- To analyze the coordination difficulties which persisted after rollout, and how did agencies address them.

and address the following research questions:

- How did inter-agency coordination shape E - Tag implementation?
- What are the technical and organisational capacities that facilitated or hindered integrated operations?
- What coordination difficulties persisted after rollout, and how did agencies address them?

2. Literature Review

Digital technologies have increasingly become embedded in the functioning of contemporary governments. Nowadays, governments ae using technologies to provide public services through online platforms, not only this but also using them to reorganize administrative processes, connect different institutions, manage and provide information, monitor activities, and respond to queries of public and solve administrative problems. So, digital governance cannot be introduced simply as a replacement of paper-based procedures with electronic systems.

The emergence of Digital Era Governance (DEG) provides an integral theoretical perspective for understanding this transformationDunleavy et al. (2006) viewed DEG as a new form of post-New Public Management (post-NPM) governance that was mainly based on reintegration, need-based holism, and digitalization. It developed in part because of the problems of fragmentation and complexity that came from NPM, and also because it advocated for using information technology along with organizational and institutional changes.

In this research, we examine how the E-Tag program is being implemented in Islamabad. E-Tagging utilizes an electronic ID system to track vehicles and their movements. It also provides the user with vehicle data and the owner's contact info. Therefore, technology can be used for purposes other than simply collecting tolls.

Existing literature identifies vehicle identification technologies as relevant to traffic management, restricted-area access, surveillance, security and real-time monitoring (Pawłowicz et al., 2020; Anik et al., 2024). The literature reviewed for this study further indicates that vehicle-tagging initiatives may be motivated by security concerns, crime prevention and access control in addition to efficiency considerations.

This chapter adopts a funnel approach. It first discusses Digital Era Governance as the overarching theoretical perspective and then examines its three dimensions: integration/reintegration, needs-based holism, and digitization.

2.1 Digital-Era Governance

Digital governance is a very broad concept concerned with the use of technologies. Nowadays, digital transformation is not only simple computerization of government activities but a broader change in organizational structures, institutional relationships, and service delivery mechanisms (Dunleavy & Margetts, 2025). Digital-Era Governance emerged as a response to the fragmentation associated with New Public Management (NPM), particularly the separation of government functions into specialized agencies and organizational units. DEG creates opportunities to reverse such fragmentation through the integration of government functions, and digitization of administrative processes. Dunleavy et al. (2025) identify three major characteristics of Digital-Era Governance: reintegration, needs-based holism, and digitization. Christensen and Lægreid (2007) Reintegration involves reconnecting functions and responsibilities that have become fragmented across organizational boundaries. Need-based holism involves organizing government services around the needs of citizens rather than around the internal structures of individual agencies. Digitization refers to the increasing use of digital technologies to transform administrative processes and interactions between governments and citizens Mergel et al. (2019). Digital government means how digital technologies, databases, and information systems can be used to improve public services. It includes how government can deliver services to its citizens quickly, how citizens can provide their feedback, and how governments can reorganize, connect, and build better digital platforms instead of relying on stand-alone manual administrative operations (Haug et al., 2024) and (Yukhno, 2024). E-government is mostly confined to online services and administrative access (Mkrtchyan & Melkumyan, 2023), while digital governance includes other factors such as inter-agency coordination, data use, and organizational change (Di Giulio & Vecchi, 2021).

Digital transformation is a key element for modernizing public administration (Ravšelj et al., 2022). This is further supported by research that digital governance can boost efficiency, service delivery, and institutional

performance when it is backed by good infrastructure and clear policy direction (United Nations, 2022). Digital governance is not just about installing new technology. It is not a one-time step; it is an ongoing process. Many things need to work together for it to succeed. It includes internal procedures, organizational structures, staff skills, and interactions with citizens and other stakeholders (Yukhno, 2024). So, there are several other barriers for a digital governance project to succeed such as low literary rate, poor infrastructure, reluctance, and concerns about data security.

2.2. Reintegration

Christensen and Lægreid (2007) claims that integration or reintegration is the dimension of Digital Era Governance. Reintegration involves reconnecting functions and responsibilities that have become fragmented across organizational boundaries. As per DEG literature, reintegration is associated with reversing or reducing fragmentation and bringing government functions, processes and information together Dunleavy et al. (2006). Later literature similarly describes reintegration in terms of reducing agencification and strengthening horizontal and organizational integration within government (Lindquist, 2022).

In this study, reintegration refers to connecting the previously separate responsibilities, records, and operations of organizations involved in E-Tag implementation, including the Excise and Taxation Department, Safe City Authority, Islamabad Police, Islamabad Traffic Police, and FWO. Such connections may involve shared information systems, common administrative processes, coordinated service delivery, joined-up government and the use of shared infrastructure.

Inter-agency coordination is one of the important components of integration, as government problems frequently cross organizational boundaries (Yildiz, M. 2007). The lack of coordination among different organizations working together to address issues like security, traffic management, emergency response, and urban governance is another example of how fragmentation can limit the effectiveness of government responses. This issue demonstrates that the challenges of coordinating among various organizations continue to exist in regard to digital governance (Dunleavy et al., 2006). This point is very applicable to E-Tagging. A vehicle identification system will create data on vehicles; however, the value of that data for governance will depend on what is done with the data once it is collected. If the data stays in one organization/agency/database, then the system may provide internal efficiencies but will not lead to more integrated governance. However, if other organizations/agencies/databases are able to access and utilize the data effectively, then the system will have more opportunity to contribute to more integrated governance (Dawes, 1996; Dunleavy et al., 2006). According to Mergel, Edelmann, and Haug (2019), technology alone does not change public administration. Technology changes public administration through its integration into service delivery processes. Once technology is integrated into those processes, it can alter the relationships and interactions between organizations and their stakeholders.

The distinction made here is very important for our work. Thus, e-tagging can be viewed as an RFID technology and also as a possible way of linking up different types of information, organizations, and administrative procedures.

2.3. Needs-Based Holism

Another important dimension of Digital Era Governance is needs-based holism. It refers to reorganizing government services around the needs of citizens or service users rather than around the internal boundaries and structures of individual government agencies. As per the DEG framework, this dimension includes client- or needs-based reorganization, one-stop provision, interactive information provision, end-to-end service reengineering, and more agile government processes (Dunleavy et al., 2006; Lindquist, 2022).

Dunleavy et al. (2006) associate needs-based holism with client-oriented organization, one-stop provision, end-to-end service reengineering and the simplification of interactions between citizens and government. Later discussions of DEG similarly emphasize that holistic reforms seek to reshape relationships between agencies and their clients rather than simply improving individual organizational functions.

Applied to E-Tag/M-Tag, this perspective shifts attention from the technology itself toward the experience and requirements of motorway users. The electronic tolling system is intended to simplify toll payment and reduce the time and effort required by motorists by replacing conventional cash-based transactions with an RFID-enabled electronic process. Research conducted at Ravi Toll Plaza in Lahore, for example, examined E-Tag within different toll-lane configurations and found that changes in lane configuration could substantially affect waiting time, queue length, and throughput (Anik et al., 2025).

The literature reviewed in the present study identifies digital literacy, affordability, security concerns, confusing procedures and limited public confidence as potential barriers to the acceptance of digital governance systems. It consequently emphasizes the importance of citizen-centred design, public awareness and trust-building measures (Malodia et al., 2021; Abdulkareem & Oladimeji, 2024).

This issue is particularly important for the qualitative study because the meaning of E-Tagging may differ among stakeholder groups. Vehicle owners may evaluate the system in terms of convenience, cost, privacy or security. Law-enforcement agencies may focus on surveillance and identification. Traffic authorities may focus on traffic management. Technology providers may focus on system performance and infrastructure.

2.4. Digitization

The third dimension of Digital Era Governance is digitization. Researchers distinguish digitization from digitalization and digital transformation. The researchers defined digitization as moving from analogue to digital services/processes, while digitalization is a change that goes further than just reproducing processes digitally. Digital transformation was described as a more fundamental change in an organization and how it relates to others. It's critical to make this distinction for the current research, since E-tagging falls under digitization on a basic level, however the larger governance issues related to E-tagging will depend upon whether the technology implemented goes beyond the technology itself (Mergel et al., 2019). RFID (Radio Frequency Identification) technology is used in vehicle identification and electronic tagging systems to create a unique digital identity for each vehicle. Wireless readers can read these tags and access the data associated with them to verify identity. These systems are being utilized in various ways, such as automated vehicle identification, tolling, restricted-area access control and traffic monitoring (Anik et al., 2025; Pawłowicz et al., 2020).

In the existing literature there are numerous examples of the advantages in operations provided by vehicle systems that use RFID. Studies associate RFID tolling with reductions in queues, waiting and fuel loss (Pandey & P, 2025), while digital tolling can reduce manual intervention and human error (Talha et al., 2024). But the success of digital governance initiatives depends on infrastructure readiness, institutional coordination, human capability and service design (Glyptis et al., 2020).

Research indicates that the real value of E-tagging over time is not the sticker itself. It is the data it collects. RFID-based systems can immediately monitor vehicle movement and can relate to other traffic management systems (Pan et al., 2023) and (Teja et al., 2024). Research on smart governance also shows that digital infrastructure improves service delivery, transparency, and decision-making, but only when it comes with strong institutions and good regulations (Almulhim & Yigitcanlar, 2025). Smart-governance research consistently shows that digital infrastructure improves service delivery, transparency, and data-driven decision-making when paired with institutional capacity and regulatory reform (Almulhim & Yigitcanlar, 2025).

Research reviewed in the present study identifies several recurring barriers, including weak digital infrastructure; low digital literacy; poor institutional coordination; inadequate leadership support; low public awareness; low public trust; bureaucratic routines; poor interoperability; weak information sharing; and reliance on older administrative practices (Nurhamzah et al., 2025; Madaki et al., 2024).

Existing literature has identified several factors that can affect an organization’s ability to adopt and use new technology, including lack of access to technology, insufficient digital literacy among employees, lack of available resources, employee resistance to change and lack of institutional capacity. However, the majority of research studies that examine these factors do so independently of one another, using fixed adoption-based models that do not take into consideration the complex legal and institutional barriers that exist (Mavidis, 2026; UN, 2024). Pakistan's development of digital governance offers the national environment in which the E-Tag

initiative will need to be evaluated. Literature used in this study divided Pakistan's digital governance evolution into three major eras.

The first period, starting in the year 2000, is marked with policy formulation, basic connectivity, and office automation. The establishment of the Electronic Government Directorate in 2002 and the implementation of NADRA's digitized national identification system represent key achievements in this first period. The second period, lasting from approximately 2006 through 2017, includes the growth of digital government services and institutional applications. Federal and provincial portals grow, and automation is used in many different government offices. However, these programs often exist independently from one another, and there are still major gaps between what policy developers want to accomplish and how those goals are accomplished (Siddiqui & Mehmood, 2021). The third period, which starts in 2018, places a much larger focus on citizen-centric digital services. Programs like the Pakistan Citizen Portal and online public services demonstrate that there is now a much greater emphasis on delivering digital services. Atique et al. (2024) state that the Digital Pakistan Initiative also increases focus on efficiency, transparency, and integrated databases. Subsequently, the COVID-19 pandemic caused a rapid increase in the adoption of digital technologies. Dashboards for the National Command and Operation Centre, health applications, TeleSchool, and provincial digital services became much more important. Studies reviewed within the current literature review also indicate a growing interest in cloud-based governance and broad-scale digital transformation (Atique et al., 2024).

In spite of the developments described above, the available research indicates that there are still disparities in Pakistan's digital government development. The primary issue in this regard is the disconnect between the lofty goals of policies and their execution at the local level. This discrepancy is especially significant to the current research project as the E-Tag program is a comparatively targeted, single-sector digital program. As such, it allows us to examine the ways in which general digital government principles are applied and executed in reality.

2.5. Vehicle Identification Technologies and Electronic Tagging

To address traffic congestion and fuel wastage at manually operated barriers in Pakistan, Rashid and Abbas (2021) developed a smart toll booth framework using Radio Frequency Identification (RFID), an Internet of Things (IoT)-based database, and a GSM module to automate vehicle identification and toll payments. However, the study has several limitations in the Pakistani context. The system requires vehicles to slow down for RFID scanning and does not include alternative identification methods, such as Automatic Number Plate Recognition, for vehicles with damaged or invalid tags and does not address connectivity problems. This represents the need for more flexible and reliable smart traffic systems that can operate under Pakistan's diverse infrastructure and traffic conditions.

Vehicle identification technologies have been used internationally for tolling, access control, traffic management and security. RFID-based systems use electronically stored identification information that can be detected wirelessly by readers. Once detected, the information can be matched against stored vehicles and owner records (Anik et al., 2024).

Literature identifies several potential benefits of these technologies. Research on RFID-based vehicle identification has demonstrated high identification accuracy in some experimental settings, while RFID checkpoints can automatically record vehicle passage and support trajectory tracking (Kumar & Kushwana, 2019; Pan et al., 2023). The operational benefits identified in the literature include faster processing, increased system capacity, reduced waiting and fuel waste, greater transaction transparency and real-time user feedback. Smart-governance literature similarly indicates that digital infrastructure can improve service delivery, transparency and data-driven decision-making when supported by appropriate institutional capacity and regulatory arrangements (Almulhim & Yigitcanlar, 2025).

3. Research Methodology

Qualitative research design has been applied in this study as it intended to understand different aspects of implementation experiences, stakeholders' perceptions, issues in operations and impacts on digital governance. Public opinions were not measured on a large-scale using survey in this study. Because it intended

to gather information from stakeholders who had knowledge about this project or were involved with the implementation or enforcement of this project.

Methodology applied for this research was utilized to answer the three study objectives. For this purpose, structured interviews were conducted and thematic analysis were done. Data collected was organized on Microsoft Excel and findings were interpreted using codes and themes that were directly related to study objectives.

3.1 Data Collection Sources

Primary sources were used in this study. Combining multiple sources helped in gaining a better understanding of the E-Tag initiative and decreased the chances of relying solely on just one source of information. Primary data was collected through interviews. Interviews were conducted with 35 participants who were picked based on their knowledge about or involvement with the Islamabad E-Tag system. Participants included officials from Islamabad Police, Islamabad Traffic Police, Islamabad Safe City Authority, Frontier Works Organization, and Excise and Taxation Department.

3.2 Data Collection Tools and Instruments

The interview guide was used as the primary data collection tool. The interview guide included questions about background information, implementation process, technological readiness, human capacity, challenges encountered, and recommendations. Structured interviews were chosen for data collection. This made it easier to assess similarities and differences in responses among various stakeholders. This approach was adapted because the study aimed to gather information about experiences, perceptions and realities of implementation.

3.3 Subjects/Participants

Interviews were conducted with 35 people (sample size) who were either involved in the implementation of E-Tag or monitored its operation in one way or the other (As shown in Table 1). Purposive sampling method was used for better understanding of E-Tag implementation process and perspectives about it by relevant stakeholders. Participant identities were removed to maintain confidentiality. Personal names and specifics have not been used to illustrate responses. Responses have been sorted via participants' category and code.

Table 1: Participant Distribution and Analytical Grouping

Participant Category	Number of Participants	Analytical Group Used
Islamabad Police	10	Law Enforcement Agencies
Islamabad Traffic Police	10	Law Enforcement Agencies
Islamabad Safe City Authority	7	Law Enforcement Agencies
Frontier Works Organization	5	Technology Provider Group
Excise and Taxation Department	3	Technology Provider Group

4. Data analysis and results

4.1. Data analysis

Microsoft Excel was used to compile and analyze responses collected during the interviews. Responses were entered into excel first question wise and then participant wise. The responses were reviewed, and recurring ideas were noted. Brief summaries were written when necessary. Recurring ideas were made into preliminary codes. Codes with similar meanings were grouped into themes. The data was analyzed using thematic

analysis. Thematic analysis was chosen because thematic analysis allows us to find common ideas, patterns and problems within the data sets. It was chosen because the research asked participants about implementation experiences, perceptions, and governance outcomes. Table 2 shows how interview questions related to the research objectives and final themes.

Table 2: Alignment of Research Objectives, Interview Questions and Themes

Research Objective	Relevant Interview Questions	Final Themes Used for Analysis
Objective 1: To examine the inter-agency coordination that has shaped E - Tag implementation	Q4–Q22	Theme 1: Shared implementation direction Theme 2: Coordination arrangements Theme 3: Operational cooperation Theme 4: Boundaries of coordination
Objective 2: to explore the technical and organisational capacities that facilitated or hindered integrated operations.	Q17–Q29	Theme 5: Data integration capability Theme 6: Infrastructure reliability Theme 7: Human and organizational capacity Theme 8: Resource continuity
Objective 3: to analyze the coordination difficulties which persisted after rollout, and how did agencies address them.	Q25–Q35	Theme 9: Continuing procedural fragmentation Theme 10: Infrastructure vulnerability Theme 11: Procedural adaptation Theme 12: Data-maintenance adaptation Theme 13: Technical adaptation Theme 14: Incomplete operational consolidation

After collecting data through relevants, the next stage was the data analysis. For data anaysis, a step-by-step approach was used in which total seven steps were involved as shown in Table 3.

Table 3: Data Processing and Analysis Procedure

Steps	Process Followed	Output
Step 1	Interview responses were entered and organized in Microsoft Excel.	Clean response sheet
Step 2	Responses were reviewed question by question.	Familiarity with data
Step 3	Repeated ideas and important points were identified.	Initial codes
Step 4	Similar codes were grouped together.	Categories and themes
Step 5	Fourteen final themes were linked with the three objectives.	Objective-wise analysis framework
Step 6	Simple counts were used to identify frequently mentioned issues.	Frequency-supported qualitative findings
Step 7	Findings were interpreted in relation to the research objectives.	analysis and summary

Coding method was simple. Frequency counts were used to show how frequently certain issues occurred within the data. These counts were collectively grouped as a sub-theme which were later organized into major themes.

4.2. Results

Based on the above-mentioned data analysis techniques, results were obtained to check the validity of E-tag implementation. Therefore, results were compiled according to the research questions,as given below from Table 4 to Table 6. For presenting results in an effective way, we segregated keywords into major code, minor code and supporting interviewe excerpt, which shows the all-related terms to e-tag implementation.

Table 4. Results for research question 1

RQ1: How did inter-agency coordination shape E - Tag implementation?

Major code	Minor code	*Supporting interview excerpt*
Shared implementation direction	Common mandate	*"A shared mandate and willingness to coordinate make a project success" - LEA-05*
	Leadership direction	*".... A clear mandate from the top, our prior motorway experience, and round the clock work" - FWO-03*
Coordination arrangements	Joint meetings and role allocation	*".... Joint coordination meetings and clear role assignment were given to members" - LEA-05*
	Designated contact persons	*".... we kept teams briefed daily during rollout and assigned a focal person for each entry point" - FWO-03*
Operational cooperation	Coordination around alerts	*".... coordination with police field units works well when an alert goes out" - SCA-03*
Boundaries of coordination	Delayed inter-agency access	*"In an urgent case, waiting for cross agency data access slows the work" - LEA-01*

Table 5. Results for research question 2

RQ2: What are the technical and organisational capacities that facilitated or hindered integrated operations?

Major code	Minor code	*Supporting interview excerpt*
Data integration capability	Legacy-system incompatibility	*"Some departments still rely on outdated software and databases that are not readily compatible with the technological system" - E&T-02*
	Availability of usable records	*".... technically the coordination worked, the bottleneck was always getting clean data from partner departments" - FWO-04*
Infrastructure reliability	Connectivity and backup power	*"Invest in connectivity and backup power early, everything depends on it"- FWO-04*
Human and organizational capacity	Transfer of previous experience	*"Our employees are accustomed to these kinds of projects so they adapted fast" - FWO-03*
	Role-specific training	*"Training to read alerts and escalate to appropriate unit must be given, it is lacking currently" - SCA-03*
	Concentration of specialist knowledge	*".... Adequate for daily operation, deeper troubleshooting still depends on key people" - FWO-04*
Resource continuity	Maintenance and phased upgrading	*".... yes, the project works well if maintenance funding continues and equipment is upgraded in phases" - FWO-03*

Table 6. Results for research question 3

RQ3: What coordination difficulties persisted after rollout, and how did agencies address them?

Major code	Minor code	*Supporting interview excerpt*
Continuing procedural fragmentation	Different systems and rules	*"Differing systems and rules between agencies slow data sharing" - LEA-05*
	Manual record updating	*"Manual updating still creates a 'lag' in the watchlist" - LEA-03*
Infrastructure vulnerability	Intermittent downtime	*"Occasional reader downtime during power failures hinder the work" - FWO-03*
Procedural adaptation	Clarification of access channels	*".... Request channels were further defined" - LEA-01*
	Agreement on common procedures	*"Agreed upon common procedures were laid down and request channels were formalized." - LEA-05*
Data-maintenance adaptation	Correction of watchlist information	*"Cleaning the watchlist data to cut down false matches" - SCA-03*
Technical adaptation	Backup power and staged correction	*".... UPS and backup power added, data corrected in stages" - FWO-04*
Incomplete operational consolidation	Continuing real-time sharing difficulties	*"Smooth real time data sharing is still a work in progress" - LEA-05*

Further, to provide a comprehensive overview of findings, all these findings are presented in a tree diagram (see Figure 2).

5. Discussion

This study focused on how inter-agency coordination and implementation capacity influenced Islamabad's E-Tag programme, and how agencies dealt with challenges that remained following deployment. During the interviews, respondents typically reported a system in place with cooperation between implementing organizations. But these positive assessments were accompanied by reports of delayed access to information, variabilities in records and ongoing differences in procedures. Together, these findings suggest that successful deployment and incomplete administrative integration can occur simultaneously. The case, as interpreted using the lens of Digital-Era Governance (DEG) (Dunleavy et al., 2006), offers a good example of how digitization can make government activities more connected while the mechanisms for reliable co-operation are still being built out.

DEG places a strong focus on three aspects of administrative transformation: reintegration, needs-based holism, and digitization. The present study is focused on reintegration and digitization, and it looks at integrating vehicle records, identification technologies, monitoring functions and enforcement activities within a common initiative. Its contribution relates to the practical conditions in which these linkages facilitated joint working and where departmental boundaries remained a constraint to operations (Dunleavy et al., 2006).

5.1. Inter-agency coordination and implementation

The results indicate that coordination facilitated implementation by ensuring organization cooperation on the different tasks. FWO participants spoke about deployment of infrastructure and technical support, participants from the field of Excise and Taxation mentioned registration records and verification, participants from the Safe City addressed monitoring and alerts, and participants from the police field talked about enforcement and

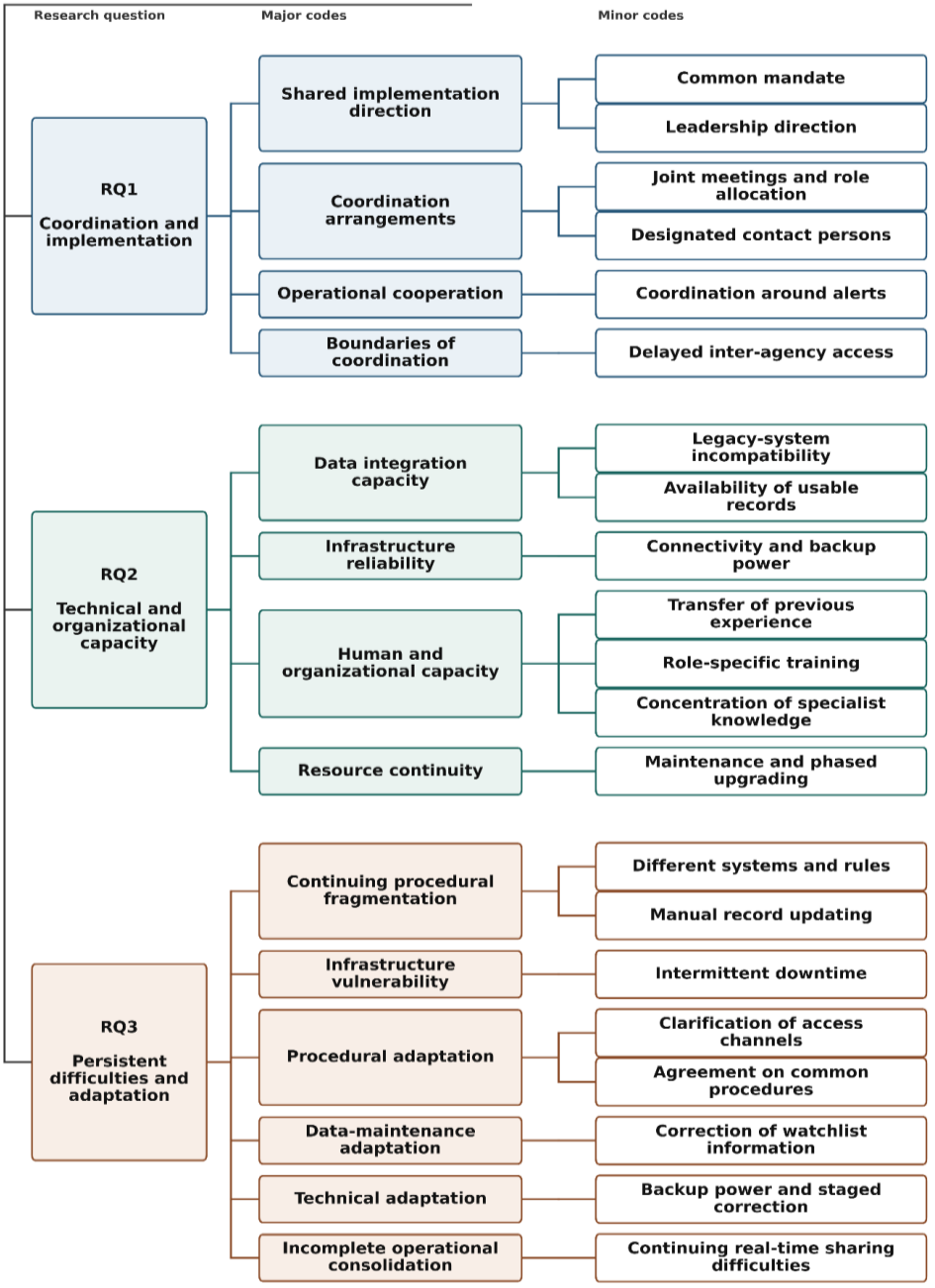


Figure 2: Tree Diagram

investigative use. The project was thus reliant on agencies linking their efforts, and not on a single agency providing the whole system. Participants linked progress in implementation to a common mandate, the allocation of responsibilities, joint meetings and lines of communication. These arrangements seem to have facilitated the conversion of a common goal into concrete activities. For instance, daily briefings, focal people, and co-ordination meetings between agencies show how the agencies have organized themselves in their work during deployment. In terms of reintegration, these practices established organizational linkages and enabled different administrative operations to be part of a common operational process (Christensen & Lægreid, 2007). However, the interviews make a distinction between cooperation at deployment time and the ease of information exchange during normal operations. Some respondents indicated that overall coordination was good but noted challenges in the ability to get reliable data from departments or timely access to information. Respondent FWO-04, for example, noted difficulties accessing data from partner departments, and another respondent LEA-05 highlighted the hurdles existing in the systems and rules that impede the sharing of data across various departments. These narratives indicate that procedural details of day-to-day collaboration were not necessarily automatically addressed by an agreement on goals for implementation. The complete process of coordination supporting E-Tag implementation is shown in Figure 3.

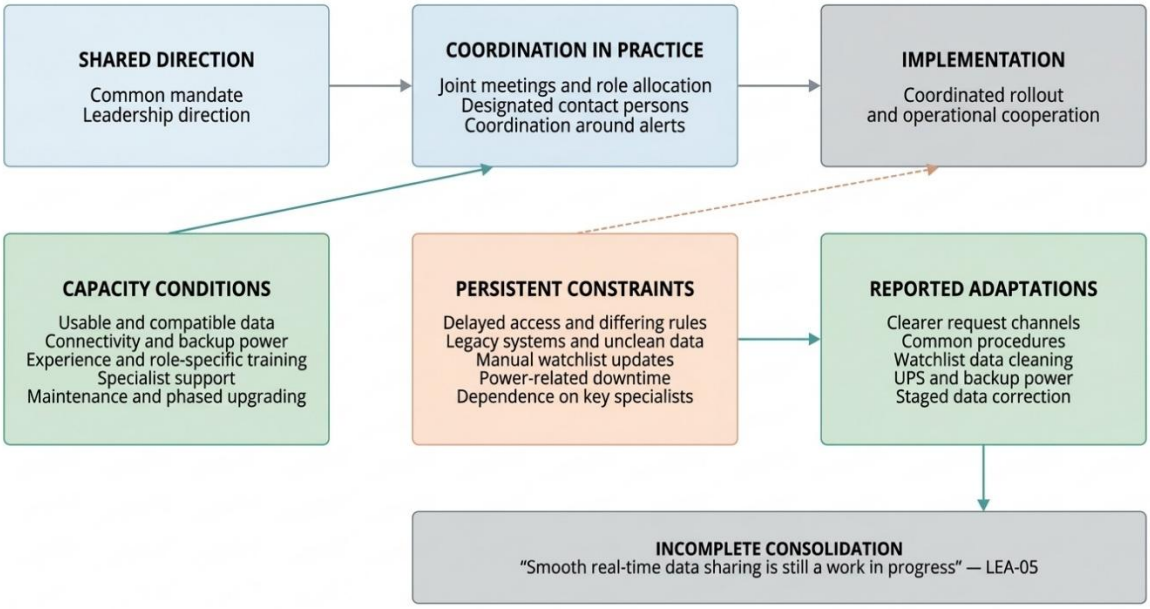


Figure 3: Coordination Process Supporting E-Tag implementation

Regarding findings for the first research question, we therefore can conclude: inter-agency coordination supported deployment, but its effectiveness varied across activities. Agencies with equipment and responsibility set up in advance did not necessarily have access to up-to-date information, due to the arrangements in place. This interpretation goes beyond just seeing coordination as a general factor for success but also delineates the scope of practice (Di Giulio & Vecchi, 2021). Reintegration here included not only a

collective implementation plan, but also the creation of reliable linkages between on-going activities in the various departments.

5.2. Technical and organisational capacity

The second research question was related to the extent to which technical and organizational capacities facilitated or hindered integrated operations. The results show that these capacities were highly related. The infrastructure to support electronic identification comprised of readers, communication networks, databases, and monitoring devices. Their usefulness was contingent upon proper records, stable power, working connections and people who can run equipment and troubleshooting.

This relationship is most evident with database integration. Legacy formats, synchronization and record compatibility were challenging for technical participants. From the accounts of interviewees, one can infer that still work was needed to make systems interoperable, that is, to make information move between systems. Even if the department has equipped the personnel with technical equipment, the personnel faced a delay or unreliable matches if ownership information or watchlist information was not up to date. Thus, the case calls attention to data quality and record maintenance as the loopholes that an organization must address because these directly impact technical performance.

Implementation capacity was also influenced by the staff experience and training. FWO participants spoke of previous experience and familiarity with motorway tagging, and other institutional participants spoke of a briefing for monitoring, enforcement or verification. These kinds of accounts indicate that agencies relied on current capacities as they gained knowledge for E-Tag operations. However, FWO-04's observation that deeper troubleshooting depended on key personnel skills indicates that routine operational readiness could coexist with a narrower distribution of specialised expertise.

These findings align with a conceptualization of public-sector digital transformation that goes beyond just introducing technology (Almulhim & Yigitcanlar, 2025). It also involves changes in processes and organizational practices. The interview-based account of digital transformation given by Mergel et al. (2019) points to this larger organization change. The E-Tag case brings in a concrete example of this broader organizational change that extends beyond its boundaries. Infrastructure-enabled integrated operations by communicating diligently with staff, inter-agency collaboration, enhancing personnel competencies, laying down relevant procedures, and the ability to keep records in use, all these indicate relevant technical and organizational capabilities (Nurhamzah et al., 2025; Madaki et al., 2024).

There is also a difference between the resources provided at the initial stage and the ongoing support during operations of the project. Institutional participants generally indicated that resources for deployment were adequate, but many interviewees highlighted the need to focus on future maintenance, equipment replacement, and refresher training. These responses do not necessarily reflect a current system-wide lack of funds but have identified that continued supply of resources is necessary to maintain operations. Capacity should therefore be seen within the framework as something that needs to be kept running when the operational needs and technologies evolve.

5.3. Persistent difficulties and institutional adaptation

The interviews indicate that agencies reacted to implementation issues by making technical adaptations and working arrangements, addressing the third research question. Participants reported some other registration facilities, backup power, data correction, clear request channels and changes in field procedure. These accounts show an adaptation in practice as agencies face issues in implementing and using them.

But the adjustments reported did not solve all of the problems. Police personnel pointed to delays in receiving information and keeping watch lists up to date, and traffic officers pointed to pressure at access points where flagged vehicles needed to be intervened with, if the point of access is narrow. These issues relate to the digital information interface and require administrative action. Electronic identification did not guarantee that data was always up to date, transferred to those in charge in a timely manner or that conditions on the ground were favorable for an effective response.

Differences between organizational accounts are analytically useful. Some technical participants felt that earlier compatibility issues had been solved, while for the operational participants there remained issues with access to or use of information. Technical staff could provide a measure of progress based on the availability of the system and connectivity and enforcement staff could provide a measure of progress based on the availability of information in time to complete a specific task. The results thus indicate that integration may be more or less complete from one organisational point of view than another.

The reported responses were also diverse. Backup power focused on the infrastructure vulnerabilities while clearer request procedures focused on how agencies organized the request for information. This distinction suggests that persistent difficulties required responses matched their underlying causes. Changes in equipment may be able to resolve interruptions but would not necessarily resolve responsibility or access arrangements. A presentation of the continuing difficulties and agency responses is given in Figure 4.

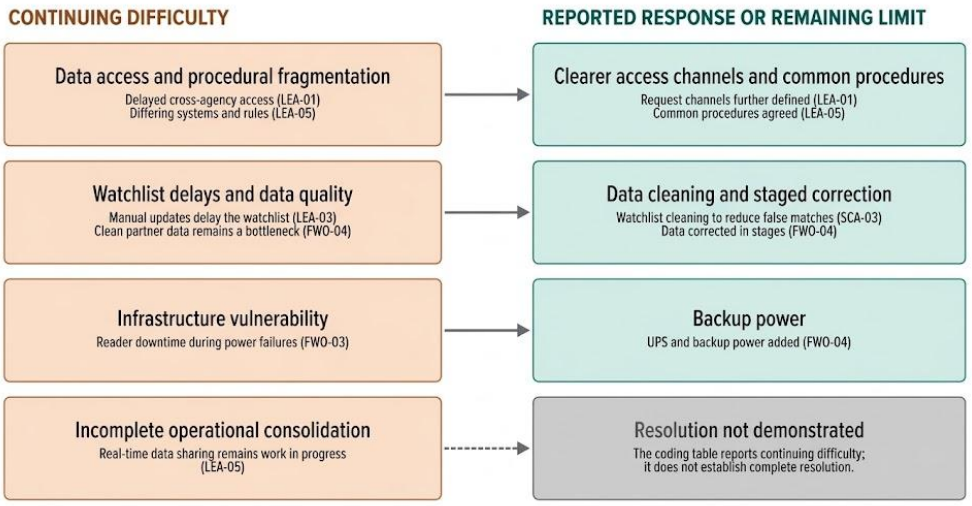


Figure 4: Challenges and Responses

The evidence indicates that reintegration is an ongoing administrative process. However, this process is based on retrospective interviews and not on an observation over time. Additionally, reported adjustments need to be separated from reported recommendations for additional training, faster access, or greater automation, because these represent perceived needs, but not necessarily an actual change.

6. Conclusion, theoretical contribution and practical implications

Collectively the results provide a case-based elaboration of reintegration in DEG (Dunleavy et al., 2025). They suggest that technical connectivity and administrative integration can develop unevenly. The agencies can negotiate procedures, data responsibilities and access arrangements needed for consistent joint working and establish an operational digital system. The return is thus manifested in various ways and at varying levels of activities within a single programme.

This unevenness is explained in the framework by the coordination/capacity relationship. Coordination and organizational capacities determined how organised contributions could be integrated into practice, while technical and organizational capacities determined whether they could be merged well. The persistent difficulties revealed areas where those connections were incomplete. The adaptations reported, in turn, provide examples of how agencies tried to reinforce them. These relationships are interpretive explanations.

The research also distinguishes progress in the implementation from operational consolidation. While the completion of major deployment activities was a significant milestone, participants reported that the information access, updating, and coordinated response questions remained an issue after the successful deployment. This differentiation offers a more nuanced understanding of the digital governance progress than just calling an initiative a success or failure.

Not all dimensions of DEG (Dunleavy et al., 2025) are established by the analysis. It is most evident with relation to administrative functions and the use of digital technologies in those functions. There is less evidence of more general institutional redesign in response to citizens' needs. Accordingly, the contribution towards theory is limited to reintegration in practice and not full confirmation of DEG dimensions.

The results indicate that digital projects should be evaluated not only based on milestones of their deployment, but also on the quality of their ongoing and regular joint collaboration. In addition to equipment provision and progress with registration, consideration must be paid to include the consistency of records, timely authorized access to data, assign responsibility for updates, and how problems are handled that span coordination across departments. Arrangements that define who is responsible for information handling, what kind of access will be given, and how errors and delays will be addressed should be put in place in conjunction with the shared implementation goals.

Capacity building should also go beyond the installation and introductory training. The interviews have identified the need to maintain infrastructure, spread specialist knowledge more widely and train for various agencies according to the allocated tasks. Parties also expressed interest in the data access and protection; this indicates that operational efficiency and accountability need to be considered concurrently, with well-defined access responsibilities and auditable procedures.

The study was not able to obtain operational records or to directly test the system's performance, so it cannot determine how much change occurred in crime, traffic, or administration. It contributes by providing understanding of the coordination, capacities, and ongoing adaptations of the shared digital governance project as experienced by the participants.

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