

E-Government in Iraq and Iran: A Comparative Study of Challenges, Barriers, and Requirements for Successful Implementation

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Abstract

The expansion of digital technologies has transformed public administration and created new expectations regarding the efficiency, accessibility, transparency, and continuity of governmental services. E-government has consequently become an important instrument of administrative modernization, particularly in countries seeking to reduce bureaucratic complexity and improve interaction between public institutions and citizens. This article provides a comparative analysis of e-government in Iraq and Iran, with particular emphasis on the challenges, barriers, and requirements that influence successful implementation. Using a comparative analytical approach, the study examines the institutional, technological, legal, organizational, human, security, and social dimensions of electronic government in both countries. The analysis shows that Iraq and Iran have both developed significant digital initiatives, but their experiences differ in terms of institutional maturity, infrastructure, coordination, and the degree of integration among government systems. Iraq continues to face major challenges related to uneven digital readiness, fragmented implementation, infrastructure limitations, insufficient interoperability, and the need for stronger institutional coordination. Iran, by contrast, has accumulated broader experience with electronic services and digital platforms, but continues to encounter difficulties related to institutional multiplicity, integration of existing systems, legacy platforms, data governance, and long-term sustainability. Despite these differences, both countries face common barriers, including organizational resistance, inadequate coordination, cybersecurity risks, legal uncertainty, human-resource limitations, unequal digital access, and insufficient public trust. The article concludes that successful e-government requires more than technological investment. It depends on long-term strategic planning, legal modernization, secure and interoperable infrastructure, institutional continuity, administrative simplification, professional capacity building, citizen-centered service design, and continuous performance evaluation. Sustainable digital transformation in both Iraq and Iran therefore requires the institutionalization of e-government as a permanent model of public administration rather than the expansion of isolated technological projects.

Keywords: E-Government; Iraq; Iran; Digital Transformation; Public Administration; Interoperability; Cybersecurity; Institutional Reform; Digital Governance

Received: 09 April 2025

Revised: 08 September 2025

Accepted: 16 September 2025

Published: 30 September 2025



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Citation: Noori Saeed Al-Bayati, M., & Mashhadi, A. (2025). E-Government in Iraq and Iran: A Comparative Study of Challenges, Barriers, and Requirements for Successful Implementation. *Legal Studies in Digital Age*, 4(3), 1-19.

1. Introduction

The rapid expansion of information and communication technologies has transformed the foundations upon which contemporary public administration operates. Government institutions are increasingly expected not merely to computerize traditional procedures but to redesign the relationships among public authorities, administrative employees, citizens, businesses, and other social actors through interconnected digital systems. E-government has therefore developed from a relatively narrow conception centered on the use of computers in government offices into a broader model of administrative transformation involving electronic service delivery, digital information management, institutional interoperability, transparency, administrative efficiency, and new forms of interaction between the state and society. Bouras emphasizes that e-government should be understood as a multidimensional transformation of governmental activity rather than as the simple introduction of technological equipment into administrative organizations (Bouras, 2020). This transformation has particular importance in public institutions where conventional administrative processes are characterized by extensive paperwork, lengthy procedures, organizational fragmentation, and direct dependence on face-to-face interaction between officials and service recipients. In such settings, digital government may provide mechanisms for reducing procedural complexity, accelerating transactions, improving the accessibility of public services, and creating more traceable administrative processes. The distinction between traditional and electronic administration is therefore not merely a distinction between paper and digital formats. It concerns different methods of organizing administrative work, processing information, making decisions, coordinating public institutions, and delivering services, as the comparative analysis of traditional and electronic administrative systems undertaken by Marzouk and colleagues demonstrates (Marzouk et al., 2024). The transition toward e-government should consequently be viewed as a process of administrative restructuring that requires technical capacity but also depends on institutional coordination, legal legitimacy, human resources, financial sustainability, organizational adaptation, and public confidence.

The significance of e-government is particularly evident in countries attempting to modernize public administration while simultaneously confronting structural economic, institutional, political, and technological constraints. Iraq and Iran constitute two useful cases for comparative analysis because both countries have pursued programs of administrative digitalization and electronic public service delivery, yet the development of these programs has occurred within different institutional and political environments and under different forms of domestic and external pressure. Iraq has faced the difficult task of constructing digital administrative capacity within a governmental environment affected by institutional fragmentation, security instability, uneven infrastructure, administrative complexity, and differing levels of technological preparedness among public institutions. Studies of Iraqi electronic governance have consequently emphasized that digital maturity varies among public organizations and that the acceleration of electronic governance is closely related to organizational readiness and the capacity of institutions to integrate digital systems into their operational structures (Al-Saray, 2022). Assessments based on international indicators have likewise demonstrated that the Iraqi experience cannot be evaluated solely by counting electronic initiatives, because meaningful e-government development depends on the broader relationship among telecommunications infrastructure, human capacity, digital services, and institutional performance (Jasim & Owaid, 2019). These conditions make Iraq an important case for examining how states can move from fragmented initiatives toward a coordinated and sustainable national system of electronic administration.

Iran represents a different but equally significant trajectory. The country has accumulated substantial experience with information technology, online administrative services, national digital platforms, and efforts to modernize governmental processes, yet the Iranian experience has also been characterized by challenges involving institutional multiplicity, inconsistent implementation, technological constraints, incomplete interoperability, and difficulties in coordinating digital projects across administrative organizations. Research into failed or underperforming e-government development initiatives in Iran indicates that the obstacles are not exclusively technological but include organizational, managerial, cultural, and implementation-related factors (Behboudi et al., 2019). Earlier examinations of Iranian cities similarly demonstrated that e-government potential varies according to the administrative and technological capacity available at the local level and that successful implementation requires adaptation to institutional circumstances rather than the mechanical transplantation of external models (Mousavi et al., 2008). The Iranian case therefore illustrates the difficulty of transforming dispersed digital initiatives into an integrated

governmental ecosystem. It also demonstrates the importance of designing implementation strategies capable of operating under economic and technological constraints while maintaining sufficient institutional flexibility to support gradual modernization.

Despite the growing importance of digital transformation in both countries, the evaluation of e-government frequently suffers from an excessively technological approach. The existence of websites, portals, applications, databases, or computerized offices does not itself establish the existence of effective e-government. A digital platform may formally exist while remaining disconnected from other agencies, providing only limited services, requiring citizens to complete substantial parts of the transaction through conventional procedures, or operating without sufficient administrative support. Likewise, electronic services may reproduce rather than eliminate traditional bureaucratic problems when existing procedures are merely transferred into digital form without organizational redesign. Al-Tai's examination of technological transformation and public services stresses the relationship between digital government and the restructuring of public-service delivery rather than the simple presence of new technological tools (Al-Tai, 2013). The analytical emphasis must therefore move from the question of whether governments possess digital systems to the more important questions of whether these systems are institutionally integrated, legally recognized, administratively sustainable, accessible to citizens, secure from technological risks, and capable of improving the quality of public services. Such a perspective is particularly relevant to Iraq and Iran, where public-sector digitalization has developed incrementally and where different ministries and agencies may possess different degrees of digital readiness.

A further conceptual issue concerns the relationship between e-government and governance. E-government can contribute to improved governance by increasing the accessibility of administrative information, facilitating communication with citizens, creating electronic records, reducing opportunities for discretionary intervention in routine transactions, and strengthening institutional monitoring. However, these effects are neither automatic nor inevitable. Digitalization may improve administrative efficiency while leaving deeper organizational deficiencies unchanged, and poorly designed electronic systems may create new forms of exclusion or administrative complexity. Kardan and Sadeghiani, in examining the Iranian experience and the relationship between e-government and e-democracy, demonstrate that technological development should not automatically be equated with broader political or participatory transformation (Kardan & Sadeghiani, 2011). The distinction is important because this article focuses primarily on the administrative dimension of e-government: the capacity of public institutions to transform procedures, coordinate information, provide electronic services, and establish sustainable channels of interaction with citizens. Questions of transparency and participation remain important, but they are considered here insofar as they are connected to administrative performance, service reliability, and public trust.

The successful implementation of e-government also depends on the establishment of an enabling environment. Guesouri and Salhi identify a range of requirements for successful e-government in national settings, indicating that technological resources must be accompanied by administrative, organizational, human, and institutional conditions (Guesouri & Salhi, 2015). Similarly, research on electronic-service implementation has shown that the availability of infrastructure and technological applications is insufficient when institutional requirements are not adequately addressed (Al-Kharabsheh, 2021). These observations are particularly important for comparative research because the same technology may produce different outcomes under different administrative conditions. A technically sophisticated platform may perform poorly when responsibilities are unclear, agencies refuse to exchange information, employees lack appropriate training, or citizens distrust online transactions. Conversely, gradual digitalization may produce significant improvements even under resource constraints when it is supported by institutional coordination, clear strategic priorities, stable implementation, and continuous evaluation.

The objective of this article is to provide a comparative analysis of the development, challenges, barriers, and requirements for successful e-government implementation in Iraq and Iran. The article does not seek to rank the two countries or identify one experience as categorically superior. Rather, it examines the similarities and differences between their trajectories in order to identify structural factors that shape electronic-government implementation. The central argument is that the principal obstacles facing e-government in both countries arise from the interaction of technological, institutional, legal, organizational, human, and social factors, although the relative importance and manifestation of these factors differ between the two cases. Accordingly, the article asks how e-government has developed in Iraq and Iran, what major barriers have affected implementation, which challenges are shared and which are country-specific, and what institutional and policy requirements

are necessary for transforming fragmented digital initiatives into sustainable systems of electronic public administration. The comparative approach is especially useful because it allows common problems such as interoperability, cybersecurity, organizational resistance, human-capital limitations, and citizen trust to be examined alongside the particular political and administrative conditions shaping each national experience.

Methodologically, the article adopts a comparative analytical approach based on the examination of the institutional and administrative dimensions of e-government in Iraq and Iran. It concentrates on those aspects most directly relevant to implementation: strategic planning, institutional coordination, public-service digitalization, digital infrastructure, database integration, organizational capacity, human resources, legal and regulatory preparedness, cybersecurity, risk management, public accessibility, and trust. Material that does not contribute directly to these dimensions is excluded in order to maintain an article-level analytical focus. The analysis proceeds from the premise that e-government is a cumulative and long-term process rather than a single technological project. This perspective corresponds to the sustainability-oriented understanding of electronic governance in which continuity, institutionalization, and adaptive capacity are essential to preserving the value of digital transformation over time (Bousalem, 2017). The following sections therefore examine Iraq and Iran separately before bringing the two experiences into a common comparative framework capable of identifying the requirements for sustainable and successful e-government.

2. E-Government in Iraq: Development, Current Conditions, and Principal Challenges

The development of e-government in Iraq must be understood within the broader context of administrative modernization and state institutional reconstruction. Electronic government emerged as an attractive policy mechanism because conventional administrative procedures were frequently associated with extensive documentation, slow transactions, fragmented organizational responsibilities, and substantial reliance on direct interaction between citizens and public employees. Digitalization offered the possibility of reorganizing these processes through electronic records, online applications, integrated databases, and remote service delivery. Yet the Iraqi experience also demonstrates that the transformation from conventional administration to e-government cannot be accomplished by technological procurement alone. Basem's analysis of the strategic framework for digital transformation in Iraq highlights the importance of embedding e-government within a wider governmental strategy rather than treating separate technological initiatives as self-contained projects (Basem, 2024). The central difficulty has therefore been the transition from dispersed technological adoption to an integrated model in which electronic administration becomes an ordinary and stable component of public-sector operation.

An important feature of the Iraqi experience has been the uneven development of digital capacity across governmental institutions. Some organizations have introduced electronic systems and online services, while others continue to rely heavily on conventional administrative processes. This unevenness creates a situation in which citizens may encounter advanced digital procedures in one institution but paper-based requirements in another. The problem becomes more complex when a single public service requires coordination among multiple organizations. Even if one agency has developed a functional electronic platform, the overall transaction may remain dependent on traditional processes when other agencies involved in the same administrative chain lack interoperable systems. The assessment of Iraq through United Nations e-government indicators demonstrates the importance of evaluating digital development as an integrated combination of online services, infrastructure, and human capacity rather than as isolated technological achievements (Jasim & Owaid, 2019). From this perspective, the Iraqi challenge is not simply to increase the number of electronic services but to ensure that they function within a coherent administrative environment.

Institutional fragmentation represents one of the most important obstacles to this objective. Public agencies may develop their own platforms, databases, standards, and operational procedures without sufficient coordination with other institutions. Such decentralized experimentation can initially encourage innovation, but over time it may generate incompatible systems, duplicated expenditures, inconsistent data standards, and uncertainty regarding institutional responsibility. Basem argues for a strategic framework capable of coordinating digital transformation in Iraq precisely because isolated initiatives cannot by themselves produce a national e-government system (Basem, 2024). The absence of unified planning also weakens the ability of government to establish priorities. When agencies pursue separate digital projects according to immediate institutional needs, investment may be directed toward visible technological outputs while less visible but essential foundations, such as data

architecture, interoperability standards, identity management, cybersecurity protocols, and institutional monitoring, remain insufficiently developed. The result can be a collection of electronic projects rather than an integrated electronic government.

The integration of governmental databases is especially important because many administrative services depend on information already held by another public authority. Under traditional procedures, citizens often function as intermediaries between government organizations by obtaining certificates, copies, approvals, or documentary evidence from one agency and submitting them to another. Effective e-government should reduce this burden by allowing authorized governmental systems to exchange information directly. Al-Tai's study of technological transformation and its effect on public services demonstrates that electronic government can improve service provision when technology is integrated with the operational requirements of public institutions (Al-Tai, 2013). In Iraq, however, interoperability is constrained by variations in technical capacity, institutional practices, data quality, and organizational willingness to exchange information. Database integration therefore requires more than technical connectivity. It requires common standards, clearly defined authority for data access, institutional responsibility for data accuracy, secure exchange mechanisms, and procedures governing the use and protection of information.

Digital infrastructure constitutes another major dimension of implementation. Reliable e-government depends on stable communication networks, adequate computing infrastructure, secure hosting environments, dependable power supply, and sufficient connectivity for both governmental institutions and service users. Weakness in any of these areas can reduce the effectiveness of electronic platforms even when the software itself is appropriately designed. The relationship between digital maturity and the acceleration of electronic governance identified by Al-Saray indicates that organizational ability to benefit from technological systems depends on the broader level of digital preparedness within public institutions (Al-Saray, 2022). Digital maturity involves not only equipment but also operating procedures, information-management capacity, leadership commitment, employee skills, and institutional experience in managing technological change. For Iraq, strengthening infrastructure must therefore occur simultaneously with the development of administrative capacity; otherwise, investment in physical technology may fail to translate into sustainable institutional transformation.

Human resources are particularly significant because administrative employees remain central actors in electronic government. Digitalization changes the nature of their responsibilities rather than eliminating their role. Employees must be able to operate digital systems, verify electronic information, respond to technical difficulties, process electronically submitted requests, protect confidential data, and adapt to changes in workflow. Resistance to digital transformation can emerge when employees perceive new systems as difficult, unreliable, threatening to established routines, or inconsistent with their accumulated experience. Guesouri and Salhi regard human and organizational readiness as fundamental conditions for successful national e-government programs (Guesouri & Salhi, 2015). This suggests that training should not be treated as a one-time technical exercise undertaken immediately before launching a new system. Instead, professional development should accompany the entire digitalization process and should include technological literacy, information security, digital administrative procedures, and understanding of the institutional objectives of reform.

Organizational resistance is closely related to the way digital transformation is introduced. A rapid transition that disregards existing administrative capacity may produce confusion and encourage employees and citizens to return to familiar paper-based procedures. A gradual approach is therefore more appropriate where institutional readiness is uneven. The experience discussed in studies of digital maturity in Iraqi public-service organizations suggests that organizational adaptation affects the speed with which electronic governance becomes operationally meaningful (Al-Saray, 2022). Gradual implementation does not imply indefinite delay. Rather, it involves sequencing reforms so that technical infrastructure, employee capacity, administrative procedures, and public access develop in parallel. Pilot programs can be useful where they are systematically evaluated and subsequently integrated into broader policy, but they become counterproductive when they remain isolated experiments that are repeatedly replaced by new initiatives.

The legal and regulatory environment is another indispensable component of e-government. Electronic transactions require clarity concerning the legal validity of digital records, authentication, electronic signatures, administrative responsibility, data protection, privacy, cybersecurity obligations, and the evidentiary status of electronic communications. Without sufficient legal certainty, public employees may be reluctant to rely entirely on electronic procedures and may preserve parallel paper systems as a precaution. This undermines the efficiency advantages of digitalization because citizens and institutions are required to complete both electronic and conventional procedures. Research into e-government requirements demonstrates that effective

electronic service delivery depends on a supportive administrative and regulatory environment rather than technological resources alone (Al-Kharabsheh, 2021). In the Iraqi context, legal reform should therefore be closely coordinated with institutional digitalization so that electronic procedures are not merely technically possible but administratively authoritative and legally dependable.

Financial sustainability further complicates the implementation process. Digital transformation requires initial investment in infrastructure, software, cybersecurity, data management, training, maintenance, and system integration. However, the greater challenge often lies in recurrent expenditure. A platform that receives funding for initial development but lacks resources for maintenance, security updates, technical support, system expansion, and employee training may quickly become obsolete. Bousalem's emphasis on sustainability in electronic governance is relevant here because digital projects generate value only when institutions can maintain and adapt them over time (Bousalem, 2017). The Iraqi approach should therefore prioritize systems capable of incremental development, interoperability, and long-term maintenance rather than investing in isolated platforms whose continuation depends on temporary funding or particular administrative leadership.

Citizen acceptance constitutes another decisive factor. E-government is effective only when intended users are willing and able to use electronic services. Citizens must understand how platforms operate, trust the reliability of digital procedures, possess sufficient digital skills, and have reasonable access to internet connectivity and appropriate devices. Public awareness is therefore part of administrative implementation rather than merely a communication exercise. Where citizens are unfamiliar with online procedures, they may continue to prefer face-to-face transactions even when digital alternatives are technically available. The expansion of electronic services should accordingly be accompanied by clear instructions, accessible interfaces, assistance channels, and transitional support. Marzouk and colleagues show that electronic administration changes not only internal governmental processes but also the manner in which users interact with public institutions (Marzouk et al., 2024). The quality of this interaction directly influences trust in the broader project of digital government.

Cybersecurity has become increasingly important as government services move online. Digital platforms contain personal information, administrative records, financial data, identity information, and other sensitive materials whose compromise can have serious consequences for both citizens and institutions. E-government therefore expands the operational responsibilities of the state into the field of digital risk management. Al-Samarrai's discussion of e-government and network technologies underlines the centrality of networked technological environments to electronic administrative activity (Al-Samarrai, 2003). In such environments, cybersecurity must be incorporated into system design, institutional governance, employee training, access management, backup procedures, and incident response. Security cannot be treated as an additional technical feature introduced after a service has been developed. It is a condition of continuity because repeated disruptions, breaches, or losses of data can undermine public confidence and cause institutions to revert to conventional procedures.

The Iraqi experience therefore demonstrates that the principal challenge lies in transforming individual digital initiatives into a stable administrative system. This requires strategic continuity, institutional coordination, database interoperability, human-resource development, regulatory support, cybersecurity, sustainable funding, and citizen-oriented service design. Iraq's e-government future depends less on the simple acquisition of newer technologies than on the capacity to construct institutional arrangements that enable existing and future technologies to function together. A national framework capable of establishing standards, distributing responsibilities, monitoring implementation, and evaluating outcomes would reduce fragmentation and provide a foundation for cumulative development. Such a framework should also accommodate differences in institutional readiness by permitting gradual implementation while maintaining common national objectives. Successful e-government in Iraq should therefore be understood as the institutionalization of digital administration rather than the multiplication of electronic projects.

3. E-Government in Iran: Development, Current Conditions, and Principal Challenges

Iran's experience with e-government has developed through a relatively long process of technological modernization, expansion of communications infrastructure, creation of government portals, and adoption of electronic administrative services. The Iranian case is therefore not primarily characterized by the absence of digital initiatives but by the challenge of consolidating, coordinating, and sustaining them across a complex governmental structure. Early assessments of e-government potential in Iranian cities already indicated that implementation capacity varied considerably according to local administrative

conditions and technological preparedness (Mousavi et al., 2008). This variation remains analytically important because national e-government strategies ultimately depend on their implementation by ministries, agencies, municipalities, and other organizations with different levels of resources and managerial capability. The central issue is consequently how diverse public institutions can be incorporated into a coherent digital-administration architecture while preserving the flexibility necessary to respond to different organizational functions.

One of the most persistent challenges in the Iranian experience is institutional multiplicity. Government organizations frequently possess their own information systems, databases, administrative procedures, and sector-specific platforms. Such specialization is often necessary because public institutions perform different functions, but it becomes problematic when digital systems are developed without a common architecture. Research examining the causes of failure in Iranian e-government development plans has identified institutional and organizational factors among the major barriers to successful implementation (Behboudi et al., 2019). Fragmentation can lead to duplicated technological investments, incompatible databases, inconsistent service standards, and increased difficulty for citizens who must navigate several separate government portals. Effective digital transformation therefore requires mechanisms capable of coordinating autonomous institutions without eliminating necessary functional differentiation.

A unified strategic orientation is particularly important in this context. E-government projects should be linked to an overarching conception of administrative transformation that defines common objectives, priorities, implementation stages, and standards. Saghafi and colleagues proposed a customized foresight model for Iranian e-government, illustrating the importance of anticipating future institutional and technological requirements rather than relying solely on short-term implementation decisions (Saghafi et al., 2010). Strategic foresight is especially relevant when technological conditions change rapidly because governmental systems typically remain in operation for long periods. Platforms designed without consideration of scalability, interoperability, cybersecurity, and future service expansion may become obsolete before their institutional objectives are achieved. Long-term planning should therefore identify not only which services should be digitized but also how systems will evolve, how data will be exchanged, how cybersecurity will be maintained, and how performance will be evaluated.

The integration of digital platforms represents a related challenge. A citizen-centered e-government model should minimize the need for users to understand the internal institutional structure of the state. Citizens should ideally be able to access public services through integrated channels even when completing a particular transaction requires coordination among several government agencies. When institutions operate separate platforms, the administrative burden of locating the appropriate organization, submitting repetitive information, and following multiple procedures is shifted to the citizen. Studies of Iranian e-government portals have demonstrated that information quality influences users' engagement with government electronic services (Soury et al., 2008). The significance of information quality extends beyond the accuracy of website content. It includes consistency, completeness, reliability, accessibility, and the ability of a platform to provide the information necessary for users to complete transactions without resorting to parallel offline procedures.

Database interoperability is therefore essential. The existence of independent databases within government agencies may be justified for operational or security reasons, but effective service integration requires authorized mechanisms for exchanging information. Without interoperability, citizens may repeatedly provide data that the state already possesses, and agencies may maintain duplicate records that differ in accuracy or format. Behboudi and colleagues' analysis of Iranian e-government development failures suggests that successful reform requires attention to coordination and implementation structures rather than isolated technological systems (Behboudi et al., 2019). Interoperability must consequently be addressed as an institutional governance issue. Technical standards are necessary, but agencies also need rules governing data ownership, access rights, verification responsibility, privacy, retention, correction, and inter-organizational exchange.

The sustainability of digital platforms presents another challenge. Public institutions frequently focus considerable attention on the initial development and launch of electronic systems, while maintenance and adaptation receive less emphasis. Yet digital systems require continuous modification because administrative procedures change, security vulnerabilities emerge, user demand increases, and technological standards evolve. Borna and Seifloo's examination of electronic government in Iran highlights the broader environmental and social consequences associated with the development of digital administration (Borna & Seifloo, 2014). These effects cannot be sustained when electronic services operate as temporary or unstable initiatives. A

platform that functions effectively at launch but deteriorates because of insufficient maintenance can damage confidence more seriously than the absence of an electronic service, since users come to perceive digital channels as unreliable.

Institutional continuity is closely connected to sustainability. Digital transformation typically requires a period extending beyond individual administrative appointments or short planning cycles. Changes in organizational leadership can result in modifications to technological priorities, replacement of existing systems, or abandonment of partially implemented projects. Such discontinuity prevents the accumulation of institutional experience and wastes technological investment. The longitudinal analysis by Kardan and Sadeghiani demonstrates that e-government development in Iran should be understood over time rather than through isolated assessments of individual projects (Kardan & Sadeghiani, 2011). Stable digital transformation requires mechanisms that preserve strategic direction while allowing individual systems to be evaluated and improved. Continuity should not mean retaining ineffective technologies indefinitely; rather, it means establishing an institutional process through which changes are based on systematic assessment instead of administrative discontinuity.

Economic and technological constraints also influence Iranian digital transformation. E-government requires hardware, software, cybersecurity services, specialized expertise, communications infrastructure, and long-term maintenance capacity. Where access to particular technologies or external suppliers is constrained, public institutions may need to rely more heavily on domestically available systems and expertise. Such conditions can stimulate local technological development but may also create challenges concerning compatibility, modernization, and system integration. Saghafi and colleagues' foresight-oriented approach is relevant because technological planning must take account of the specific conditions under which Iranian institutions operate (Saghafi et al., 2010). Sustainable digital policy should therefore favor architectures that can be maintained and developed under realistic domestic conditions rather than systems that depend heavily on resources that may not remain consistently available.

The human dimension remains equally important. Public employees are responsible for implementing electronic administrative procedures and therefore shape the practical success of digital transformation. Employees who lack appropriate technical skills may underuse electronic systems, develop informal workarounds, or preserve paper-based procedures in parallel. Conversely, qualified personnel can identify process improvements and help adapt technology to the actual needs of public institutions. Marzouk and colleagues' comparison of traditional and electronic administration demonstrates that the transition affects organizational roles, workflow, decision-making processes, and administrative performance (Marzouk et al., 2024). Training should consequently go beyond the mechanical operation of software. It should prepare employees to work within digital processes, manage electronic records, protect information, understand data-sharing responsibilities, and respond to citizens through electronic channels.

Organizational culture may either reinforce or undermine such training. Administrative institutions with highly rigid procedures may incorporate technology without changing underlying work practices, producing an electronic version of the same bureaucratic process. This phenomenon is significant because the efficiency gains expected from e-government often depend on process redesign. If a traditional procedure requires several approvals, repeated data entry, and unnecessary documentary requirements, transferring each stage to an electronic platform does not necessarily create an efficient service. Behboudi and colleagues' findings concerning the causes of unsuccessful e-government development in Iran reinforce the argument that reform must address organizational and managerial factors alongside technology (Behboudi et al., 2019). Digitization should therefore be preceded or accompanied by administrative simplification, clarification of responsibilities, and elimination of redundant procedural stages.

Cybersecurity and digital-risk management have become increasingly central as Iranian governmental services have expanded their reliance on electronic systems. The more interconnected government databases become, the more important it is to prevent unauthorized access, manipulation, service disruption, and loss of information. Security measures must cover technological infrastructure, institutional procedures, human behavior, and crisis management. Borna and Seifloo draw attention to the wider consequences of electronic government beyond technical efficiency (Borna & Seifloo, 2014), and cybersecurity should similarly be understood as an institutional matter because failures can affect service continuity, citizen confidence, and the legitimacy of digital administration. A technically secure platform may still be vulnerable if employees use weak access practices, responsibilities are unclear, or institutions lack coordinated incident-response procedures.

Digital security is also directly related to public trust. Citizens who provide personal information to governmental systems need confidence that their data will be protected and used for legitimate administrative purposes. Even where actual security levels are high, unclear communication or inconsistent service performance may reduce perceived reliability. Soury and colleagues demonstrate the significance of information-related factors in the use of Iran's e-government portal (Soury et al., 2008). Trust is therefore produced by the combined effects of security, information quality, accessibility, institutional reputation, and continuity. Government platforms must perform predictably, provide accurate information, explain procedures clearly, and offer mechanisms through which users can obtain assistance when problems occur.

Accessibility also determines whether digital government produces administrative inclusion or creates new barriers. Individuals differ in their digital literacy, connectivity, age, disability status, and familiarity with government technologies. Electronic services should therefore be designed so that digitalization reduces rather than redistributes administrative burdens. A system that is efficient for technologically experienced users but inaccessible to other groups cannot fully replace traditional channels. The broader requirements for successful e-government identified by Guesouri and Salhi show that implementation must take account of social and human dimensions as well as technological ones (Guesouri & Salhi, 2015). Iran's digital transformation should consequently combine expansion of online services with usability standards, public education, accessible design, and support mechanisms.

The Iranian experience demonstrates that digital government has reached a stage in which institutional integration is more important than the mere expansion of separate electronic initiatives. The future challenge is to convert accumulated technological and administrative experience into a more unified system characterized by interoperable databases, stable platforms, clear institutional responsibility, sustainable development, effective cybersecurity, skilled personnel, and reliable citizen-centered services. The issue is therefore not whether Iran possesses the technological basis for e-government but whether institutional arrangements can enable diverse systems to function as components of an integrated governmental architecture. Achieving this objective requires a shift from project-centered digitalization toward system-centered governance in which electronic administration becomes embedded within the permanent structure of public-sector management.

4. Comparative Analysis of Challenges, Barriers, and Requirements for Successful E-Government

Comparison between Iraq and Iran demonstrates that both countries face a common structural problem: the distance between introducing digital technologies and institutionalizing digital government. In both cases, governmental organizations have adopted electronic systems and developed digital services, but the existence of such initiatives does not automatically produce an integrated e-government environment. The fundamental challenge is the construction of an administrative ecosystem in which technological systems, legal rules, organizational responsibilities, databases, human resources, and citizen-facing services operate coherently. Bouras's conceptual treatment of e-government supports this multidimensional interpretation by emphasizing that electronic government concerns the transformation of governmental functioning rather than the isolated use of technology (Bouras, 2020). The comparison nevertheless reveals different starting conditions. Iraq's principal challenge involves building greater consistency and maturity across public institutions whose technological capacities remain uneven, while Iran's challenge more strongly concerns coordination and integration among systems that have developed over a longer period. These distinctions affect the appropriate reform priorities, but they do not alter the underlying conclusion that institutional integration determines whether technological investment can produce durable administrative improvement.

Strategic planning is the first shared requirement. Digital transformation cannot be sustained through a succession of disconnected projects. Iraq requires a coherent national framework capable of guiding agencies with different levels of technological readiness, and Basem explicitly emphasizes the strategic dimension of digital transformation in the Iraqi context (Basem, 2024). Iran similarly requires coordination across numerous public institutions and long-term planning capable of integrating existing systems. Saghafi and colleagues' e-government foresight model underscores the importance of anticipating future technological and institutional conditions in the Iranian setting (Saghafi et al., 2010). In both countries, national strategy should define objectives, implementation stages, interoperability requirements, institutional responsibilities, cybersecurity principles, evaluation mechanisms, and financing arrangements. A strategy that merely announces broad goals such as "digital

transformation” or “electronic service delivery” is insufficient. Effective strategy must translate these goals into institutional obligations and measurable outcomes.

Institutional coordination is closely related to strategic planning but deserves independent attention because formal strategies frequently fail when administrative organizations pursue their own priorities. Government ministries and agencies generally possess specialized mandates and organizational autonomy, and digital transformation may reinforce rather than reduce fragmentation if each institution independently develops its own platform. The Iraqi case illustrates how uneven digital maturity among public organizations can create incompatible levels of readiness (Al-Saray, 2022). The Iranian experience demonstrates how institutional fragmentation can persist even when technological infrastructure is relatively developed, as organizational and managerial factors have contributed to unsuccessful e-government plans (Behboudi et al., 2019). Both countries therefore require coordination mechanisms possessing sufficient authority to establish common standards while allowing agencies to maintain function-specific systems where necessary. The objective should not be technological uniformity but operational interoperability.

Interoperability is one of the clearest areas in which the two experiences converge. E-government becomes genuinely transformative when public institutions can exchange information securely and reduce the need for citizens to transfer documents manually between agencies. Under fragmented conditions, electronic services may simply digitize individual stages of a broader paper-based process. Al-Tai connects technological transformation with changes in the functioning of public services (Al-Tai, 2013), suggesting that the value of technology lies in its capacity to alter service-delivery processes. Interoperability should therefore be designed around administrative transactions rather than around individual institutional systems. Governments need common data standards, mechanisms for secure exchange, reliable digital identification, rules governing access and correction, and procedures for determining which agency is responsible for the accuracy of particular information.

Iran has an advantage in this area because its longer experience with e-government provides a broader technological and institutional base from which integration can proceed, but this experience also means that legacy systems may complicate interoperability. Existing systems often reflect different technical standards and organizational priorities, making integration expensive and administratively difficult. Iraq, by contrast, may in some areas possess an opportunity to avoid such path dependence by adopting shared standards before digital systems become more deeply entrenched. Nevertheless, uneven institutional readiness can make national implementation difficult. This difference demonstrates why the same policy cannot simply be applied identically in both countries. Iraq may need to prioritize minimum digital-capacity standards and foundational infrastructure, whereas Iran may place greater emphasis on connecting existing systems and rationalizing overlapping platforms.

Legal preparedness is another common requirement. Electronic government changes the form in which administrative decisions, applications, records, approvals, payments, communications, and evidence are produced and stored. These changes require legal recognition. Research on e-government requirements and electronic services demonstrates that organizational and regulatory conditions directly influence the effectiveness of digital service implementation (Al-Kharabsheh, 2021). Legal ambiguity can encourage employees to maintain paper records even after electronic systems are introduced, thereby creating duplicate procedures. Legal reform should clarify the validity of electronic records, authentication mechanisms, digital signatures, institutional liability, data protection, privacy obligations, archival standards, and procedures for challenging electronically produced administrative decisions. Both Iraq and Iran need legal frameworks capable of supporting digital administration without becoming so technologically specific that legislation rapidly becomes obsolete.

Cybersecurity should be integrated into these legal and administrative frameworks. The expansion of digital government increases the potential consequences of cyber incidents because essential public services and large quantities of sensitive information become dependent on connected systems. Al-Samarrai’s examination of e-government and network technologies reflects the early recognition that electronic administration is inseparable from networked technological infrastructure (Al-Samarrai, 2003). In contemporary e-government, cybersecurity must therefore be treated as a governance function. Institutional responsibilities should be defined in advance, security standards should be mandatory rather than discretionary, government employees should receive regular training, and incident-response mechanisms should enable coordinated action

across agencies. This is particularly important where databases are integrated because the benefits of interoperability are accompanied by the risk that vulnerabilities can affect multiple institutions.

Cybersecurity also illustrates the interaction between technical and social dimensions of e-government. Citizens may avoid digital services if they fear misuse of personal information, identity theft, loss of data, or unreliable service delivery. Public trust is therefore not generated through technological modernization alone. It emerges when systems repeatedly demonstrate reliability. In Iran, research into the use of government portals has shown the importance of information quality to user engagement (Soury et al., 2008). In Iraq, the success of digital services similarly depends on whether citizens perceive them as more accessible and dependable than traditional alternatives. Trust must be earned through clear procedures, accurate information, service continuity, security, responsive support, and visible administrative accountability.

The digital divide is another shared challenge, although its form may vary between the two countries. E-government reforms often assume that users possess internet access, appropriate devices, digital literacy, and familiarity with electronic procedures. Such assumptions can exclude populations with limited connectivity or technological skills. The development of electronic administration should therefore not be evaluated solely according to the number of online services. Jasim and Owaid's use of United Nations indicators in assessing Iraq demonstrates the relevance of infrastructure and human-capacity dimensions to overall e-government performance (Jasim & Owaid, 2019). Similar considerations apply to Iran, where extensive digital infrastructure does not eliminate differences in access or user capability. A successful model should combine digital expansion with assistance centers, accessible platform design, simplified procedures, and educational measures so that modernization does not create new forms of administrative exclusion.

Human-capital development is essential on the governmental side as well. Public employees are not passive recipients of digital reform; they implement, interpret, and adapt it. Training should therefore be connected to institutional transformation. Guesouri and Salhi identify human-resource preparedness among the conditions necessary for successful e-government (Guesouri & Salhi, 2015). Employees need technical competence, but they also need to understand how digitalization changes workflow, responsibility, data management, communication with citizens, and administrative decision-making. Training programs that focus narrowly on software interfaces are unlikely to overcome resistance when employees do not understand why procedures are changing or how new systems affect institutional objectives.

Organizational resistance may be particularly strong when digitalization threatens established routines or informal patterns of administrative influence. Electronic systems can standardize procedures, create traceable records, and reduce opportunities for discretionary intervention in routine transactions. These features may improve administrative integrity but can also encounter resistance from employees or organizational units accustomed to traditional processes. Marzouk and colleagues' comparison of traditional and electronic administration shows that digital transformation alters the structure of administrative performance rather than merely changing the tools through which the same work is carried out (Marzouk et al., 2024). Change management is consequently essential. Leaders must communicate objectives, involve employees in implementation, identify workflow problems, and redesign procedures in cooperation with the officials who use them.

Administrative simplification should precede or accompany digitalization. One of the most serious risks in e-government is the digital reproduction of inefficient bureaucracy. If an administrative service requires unnecessary approvals, repeated documentation, and complex institutional routing, placing the same requirements online may reduce travel but will not fundamentally improve the process. Digital transformation creates an opportunity to reconsider why particular procedural steps exist and whether they remain necessary. Al-Tai's treatment of technological change and public services reinforces the relationship between digitalization and service reorganization (Al-Tai, 2013). Both Iraq and Iran should therefore incorporate business-process redesign into e-government policy so that technological platforms are built around simplified administrative logic.

Financial sustainability represents a further common requirement. E-government systems entail continuing costs for infrastructure, licenses, maintenance, technical staff, cybersecurity, training, backups, system upgrades, and support services. Bousalem's analysis of electronic governance and sustainability is particularly relevant because digital projects that cannot be maintained may consume significant resources without creating lasting institutional value (Bousalem, 2017). Iraq may face greater difficulty in securing consistent resources for nationwide digital development where competing public-sector priorities

remain pressing, while Iran may confront constraints affecting access to particular technologies and external services. Both cases demonstrate the need to evaluate total lifecycle costs rather than focusing primarily on initial project expenditure.

Sustainability is also institutional. A digital system becomes genuinely embedded in government when its operation does not depend exclusively on a particular minister, manager, donor, contractor, or reform initiative. Longitudinal analysis of e-government in Iran demonstrates the importance of examining transformation across time (Kardan & Sadeghiani, 2011). The same principle applies in Iraq, where successive initiatives will produce limited cumulative effects if each begins from a different technological or institutional foundation. Governments should establish permanent structures responsible for maintaining standards, preserving institutional knowledge, evaluating systems, and coordinating future development. Digital transformation should thereby become part of ordinary administrative governance rather than a temporary modernization campaign.

Citizen-centered design provides another common requirement. The internal organization of government should not determine the complexity experienced by the public. Citizens ordinarily seek outcomes such as obtaining a license, registering a business, receiving a certificate, paying a fee, or submitting an application; they should not be required to understand which databases or agencies participate in the process. Studies of portal use in Iran indicate that information quality affects users' willingness and ability to interact with e-government systems (Soury et al., 2008). Accordingly, platforms should be designed around user needs, provide clear instructions, minimize repeated data entry, display transaction status, offer assistance, and communicate decisions transparently. Similar principles are relevant to Iraq, where improving the practical experience of users can increase acceptance of digital channels and reduce dependence on face-to-face administration.

A further comparative issue concerns the relationship between electronic government and transparency. Digital systems can create records of applications, decisions, payments, and processing times, thereby strengthening the capacity for oversight. However, transparency is not an automatic consequence of technology. Systems must be designed so that records are retained, auditable, and accessible to authorized oversight bodies. Kardan and Sadeghiani's analysis of the connection between e-government and e-democracy in Iran demonstrates that technological development alone does not guarantee broader governance outcomes (Kardan & Sadeghiani, 2011). The same caution applies to administrative accountability. Digitalization can support transparency, but institutional rules determine whether the information generated by electronic systems is actually used for monitoring and evaluation.

Performance measurement is therefore indispensable. Governments need indicators that assess not only how many services have been placed online but also whether citizens actually use them, whether processing times have declined, whether administrative costs have changed, whether error rates have decreased, whether platforms remain available, and whether users are satisfied. Jasim and Owaid's examination of United Nations indicators in the Iraqi context provides a basis for understanding the value of systematic measurement (Jasim & Owaid, 2019). National governments should supplement international indices with operational indicators tailored to specific services. Measurement should inform future investment so that successful initiatives can be expanded and ineffective ones redesigned.

The comparison ultimately indicates that Iraq and Iran require different emphases within a broadly similar reform framework. Iraq needs to strengthen foundational digital capacity, reduce disparities among government organizations, establish unified national standards, and ensure that new initiatives contribute to cumulative institutional development. Iran needs to deepen interoperability, rationalize existing systems, improve coordination among institutions, and ensure the long-term sustainability and integration of platforms developed through previous phases of digitalization. Iran's earlier experience may offer lessons concerning the risks of fragmented technological development, while Iraq's ongoing transformation creates an opportunity to establish interoperability and governance standards at earlier stages. Comparative learning should therefore focus on processes rather than simply copying specific technological solutions.

Successful implementation in both countries can be conceptualized as the alignment of six interdependent capacities: strategic capacity, institutional capacity, technological capacity, legal capacity, human capacity, and social capacity. Strategic capacity establishes direction and continuity. Institutional capacity determines whether agencies can coordinate and redesign procedures. Technological capacity provides infrastructure, interoperability, and secure systems. Legal capacity legitimizes electronic transactions and protects rights. Human capacity enables employees to operate and adapt systems. Social capacity ensures that citizens can access and trust digital services. Weakness in any one dimension can undermine the others. Advanced

technology without institutional coordination produces fragmentation; legislation without infrastructure remains ineffective; infrastructure without trained personnel remains underused; and services without public trust fail to replace traditional channels. E-government should therefore be implemented as an integrated administrative reform rather than a collection of technological projects.

5. Requirements for Sustainable and Successful E-Government in Iraq and Iran

The transition from fragmented digital initiatives to sustainable e-government requires a comprehensive approach in which reform is designed around the long-term functioning of public administration. The first requirement is a stable national vision that defines e-government as a permanent dimension of state administration rather than a temporary modernization program. In Iraq, Basem's strategic analysis demonstrates the need for a national framework capable of organizing digital transformation and coordinating government institutions (Basem, 2024). In Iran, Saghafi and colleagues' foresight model similarly reflects the importance of long-range planning adapted to national institutional conditions (Saghafi et al., 2010). A sustainable strategy should survive changes in administrative leadership and should provide enough continuity to allow technological systems, organizational practices, and human expertise to develop cumulatively. This requires legal and institutional anchoring so that the direction of reform is not repeatedly altered by short-term priorities.

Such a strategy should establish a central governance architecture without creating excessive administrative centralization. A national coordinating body or clearly defined intergovernmental mechanism should set interoperability standards, cybersecurity requirements, data-governance principles, service-quality criteria, and evaluation procedures. Individual agencies should remain able to develop systems suited to their substantive responsibilities, but these systems should operate within common national standards. The fragmented-development problems identified in studies of Iranian e-government failures demonstrate the consequences of insufficient coordination (Behboudi et al., 2019). Similar fragmentation remains a concern in Iraq, particularly where institutions possess different levels of digital maturity (Al-Saray, 2022). The objective should therefore be coordinated decentralization: agencies retain operational autonomy while participating in a common digital-government architecture.

A second requirement is the creation of an interoperability framework. Interoperability should be treated as a national administrative policy rather than a technical matter delegated exclusively to information-technology departments. The framework should define shared data standards, interfaces for inter-agency exchange, authentication mechanisms, identity-management protocols, information-security rules, and procedures for updating and correcting government data. The connection between technological transformation and public-service improvement identified by Al-Tai suggests that the real value of digital systems lies in their ability to reshape administrative processes (Al-Tai, 2013). Interoperability makes such reshaping possible because information can move through government systems without requiring citizens to repeatedly perform the role of information carrier.

Data governance must accompany interoperability. Public institutions need clearly assigned responsibilities for collecting, storing, validating, sharing, correcting, and deleting data. Electronic government significantly increases the volume and strategic importance of information held by administrative institutions. Without governance rules, integration can generate disputes over authority, inconsistent datasets, or privacy concerns. The quality of information has already been identified as a factor affecting the use of Iranian government portals (Soury et al., 2008). Data quality should therefore be treated as a governmental performance issue. Institutions responsible for authoritative datasets should maintain accuracy standards, while mechanisms should allow citizens to identify and correct errors that affect administrative transactions.

Legal modernization constitutes a third essential requirement. Existing administrative law may have developed around physical documents, written signatures, face-to-face procedures, and paper archives. Digital government changes the medium through which administrative acts occur and therefore requires legal recognition of electronic processes. Al-Kharabsheh's study of e-government requirements and electronic services indicates that effective digital implementation depends on an enabling institutional environment (Al-Kharabsheh, 2021). Legal frameworks in Iraq and Iran should provide clear rules on electronic identification, signatures, digital records, notifications, administrative evidence, online payments, privacy, data protection,

cybersecurity responsibilities, and institutional liability. Such rules should be technologically neutral where possible so that they remain applicable as platforms and technical standards evolve.

Legal safeguards are especially important for public confidence. Citizens should know which institution is responsible when digital systems malfunction, data are inaccurate, payments fail, or electronic decisions are disputed. E-government should not weaken procedural rights merely because interactions occur electronically. Instead, digital systems should make administrative rights easier to exercise by providing records, transaction histories, electronic confirmations, and clear appeal mechanisms. This dimension is closely connected to governance. Kardan and Sadeghiani's longitudinal examination of e-government and e-democracy in Iran demonstrates that technological systems do not automatically produce accountable institutions ([Kardan & Sadeghiani, 2011](#)). Legal design is therefore necessary to ensure that administrative digitalization supports rather than obscures responsibility.

A fourth requirement is cybersecurity by design. Security measures should be incorporated from the earliest stages of platform planning rather than added after systems become operational. Networked government creates dependencies across institutions, and disruption in one component can affect several services. Al-Samarrai's work on e-government and network technologies highlights the centrality of technological networks to modern administrative systems ([Al-Samarrai, 2003](#)). Governments should consequently establish minimum security standards, risk-classification systems, incident-reporting procedures, access controls, employee-security requirements, backup policies, disaster-recovery plans, and coordinated response structures. Particularly sensitive services should undergo regular security assessment, while institutional leaders should be accountable for compliance rather than treating cybersecurity as the exclusive responsibility of technical personnel.

Digital resilience should complement cybersecurity. No complex information system can completely eliminate the possibility of technical failure or malicious attack. Sustainable e-government therefore depends on the capacity to maintain or rapidly restore essential functions when disruption occurs. Redundant infrastructure, secure backups, continuity planning, alternative communication channels, and tested recovery procedures should form part of administrative planning. Borna and Seifloo's analysis of the wider effects of electronic government in Iran illustrates that digitalization has consequences extending beyond the technological sphere ([Borna & Seifloo, 2014](#)). A prolonged interruption of a governmental digital platform can affect citizens' access to essential administrative rights and services, making resilience a public-administration requirement rather than merely a technical objective.

A fifth requirement is sustained investment in human resources. Governments often devote considerable funds to hardware and software while underinvesting in employee development. This imbalance can substantially reduce the effectiveness of digital projects. Guesouri and Salhi emphasize human and organizational requirements in their analysis of successful e-government ([Guesouri & Salhi, 2015](#)). Training in Iraq and Iran should be continuous and role-specific. Technical employees need advanced skills in system administration, cybersecurity, integration, and data management. Administrative employees require competence in electronic workflow, digital records, privacy, security procedures, and communication with citizens through online channels. Managers need the capacity to supervise technology-intensive organizations, evaluate performance data, and lead institutional change.

Institutional incentives should support this training. Employees are unlikely to fully embrace digital systems when organizational evaluation continues to reward traditional practices or when electronic procedures create additional work without replacing existing requirements. Marzouk and colleagues demonstrate that electronic administration represents a distinct mode of administrative performance ([Marzouk et al., 2024](#)). Governments should therefore align job descriptions, performance evaluation, internal procedures, and promotion criteria with digital responsibilities. Employee involvement in system design can also improve implementation because frontline officials often possess detailed knowledge of procedural inefficiencies that external technology developers may overlook.

A sixth requirement is systematic process redesign. Before a public service is digitized, the responsible institution should map the existing procedure, identify redundant stages, determine which documents are genuinely necessary, clarify decision authority, and simplify the workflow. Transferring an inefficient process onto an electronic platform preserves the inefficiency. The relationship between technology and public-service transformation discussed by Al-Tai demonstrates that digitalization should change the logic of service delivery ([Al-Tai, 2013](#)). Process redesign also reduces technological complexity because

simpler administrative procedures require fewer system interactions and are easier for both employees and citizens to understand.

A seventh requirement concerns platform sustainability. Systems should be designed for continuous development, not merely successful launch. Bousalem's focus on sustainability in electronic governance underscores the importance of institutional continuity (Bousalem, 2017). Public institutions should plan for maintenance, software updates, security patches, capacity expansion, technical support, user feedback, and future integration. Procurement arrangements should avoid excessive dependence on particular suppliers where this would prevent institutions from maintaining or modifying their own systems. Documentation should be preserved so that knowledge remains within government even when individual employees or contractors change.

Financial planning should consequently adopt a lifecycle perspective. The cost of a digital system includes design, development, infrastructure, migration of legacy data, integration, staff training, security, maintenance, user support, and eventual modernization or replacement. Projects should be evaluated according to long-term public value rather than the visibility of their initial launch. This is especially important for Iraq, where scarce administrative resources should be directed toward systems that contribute to national integration, and for Iran, where technological constraints make sustainable domestic capacity particularly significant. Cost-sharing arrangements may be appropriate where several institutions use common infrastructure, and shared government platforms can reduce duplication when designed with sufficient flexibility.

An eighth requirement is citizen-centered design and inclusive access. Electronic government exists to improve administrative interaction, and service design should therefore begin with the user's objective rather than the organizational structure of government. Information should be presented clearly, unnecessary technical terminology should be avoided, interfaces should function across commonly used devices, and users should be able to determine the status of transactions. Soury and colleagues' work on Iran's e-government portal demonstrates the importance of information quality to platform use (Soury et al., 2008). Information should therefore be complete, current, consistent, and directly connected to the requirements of the relevant service.

Digital inclusion should be incorporated into this citizen-centered approach. Not all citizens possess equal access to technology or equal levels of digital literacy. Governments should maintain assisted digital channels, public access points, telephone support, or other mechanisms during the transition period. These measures should not become permanent substitutes for improving usability; rather, they should ensure that vulnerable groups are not excluded while digital capacity expands. Jasim and Owaid's assessment of Iraq through international e-government indicators illustrates that human capacity and infrastructure remain integral to overall development (Jasim & Owaid, 2019). National digital strategies should therefore connect administrative digitalization with broader policies concerning connectivity and digital literacy.

A ninth requirement is public trust. Trust should be treated as an outcome of institutional performance rather than as a product of promotional campaigns. Citizens trust digital government when systems function consistently, protect information, provide accurate results, and offer effective remedies when problems occur. Frequent breakdowns, unexplained delays, contradictory information, or inaccessible complaint mechanisms undermine trust even when the underlying technology is sophisticated. In the Iranian context, information quality has been shown to influence engagement with e-government portals (Soury et al., 2008). In Iraq, increasing digital maturity within public institutions can similarly contribute to more predictable and trustworthy services (Al-Saray, 2022). Governments should therefore measure user experience and incorporate feedback into platform improvement.

A tenth requirement is systematic performance evaluation. Governments need to determine whether digital systems actually achieve administrative objectives. International indicators are useful for comparison, and the Iraqi assessment undertaken by Jasim and Owaid illustrates their analytical value (Jasim & Owaid, 2019), but national evaluation should extend to service-specific outcomes. Relevant indicators include transaction completion rates, processing time, platform availability, user satisfaction, cost per transaction, error rates, percentage of procedures completed fully online, degree of inter-agency data exchange, cybersecurity incidents, and the proportion of citizens requiring offline assistance. Evaluation should be continuous and should influence budgeting and future development.

The final requirement is an incremental but cumulative implementation model. Both Iraq and Iran should avoid two extremes: attempting to transform the entire administrative system simultaneously and pursuing isolated pilot projects without

integration. Gradual implementation allows institutions to learn from experience and adjust systems before broader expansion. Mousavi and colleagues' evaluation of e-government potential in Iranian cities demonstrates the value of considering specific institutional conditions rather than assuming identical readiness everywhere (Mousavi et al., 2008). However, gradual development must remain cumulative. Each stage should conform to common standards and contribute to the eventual national architecture. Pilot programs should produce reusable infrastructure, standards, procedures, and institutional knowledge instead of remaining separate experiments.

For Iraq, this approach implies prioritizing foundational infrastructure, institutional readiness, nationwide standards, secure digital identity, and interoperability from the earliest stages of development. For Iran, it implies consolidating existing systems, reducing duplication, strengthening cross-government integration, modernizing legacy platforms, and increasing consistency in data governance and cybersecurity. Neither country requires a single technological solution. Both require an institutional model capable of continuously incorporating technological change. E-government becomes successful when digital administration ceases to be perceived as an exceptional reform project and becomes the ordinary method through which government organizes information, coordinates institutions, and provides services.

6. Conclusion

The comparative examination of e-government in Iraq and Iran demonstrates that digital transformation in public administration is fundamentally an institutional process supported by technology rather than a technological process that automatically transforms institutions. Both countries have developed electronic initiatives, digital services, administrative information systems, and governmental platforms, yet the effectiveness of these developments depends on whether they are incorporated into coherent and sustainable systems of administration. The central challenge is therefore not simply to increase the quantity of technology available to public institutions but to establish the strategic, organizational, legal, technical, human, and social conditions under which digital systems can function reliably and collectively.

The Iraqi experience reveals a trajectory in which the development of e-government remains closely connected to the broader task of strengthening institutional capacity and administrative coordination. Uneven digital readiness among public institutions, fragmented implementation, differences in infrastructure, limited interoperability, human-resource constraints, and the need for stronger organizational continuity have complicated the movement from separate electronic projects to an integrated national system. The most important priority for Iraq is consequently the construction of common foundations. National standards, interoperable infrastructure, clear institutional responsibilities, secure data exchange, sustainable financing, continuous employee development, and coordinated implementation are required if new digital projects are to generate cumulative rather than isolated benefits.

Iran's experience reflects a more mature but differently structured set of challenges. Digital-government initiatives have developed over a longer period, and governmental institutions possess substantial experience with electronic systems and online services. The principal difficulty is therefore increasingly one of integration, consolidation, and sustainability. Institutional multiplicity, separate databases, legacy systems, overlapping platforms, inconsistent implementation, organizational resistance, and challenges associated with long-term maintenance can prevent an established technological base from functioning as a unified digital-government environment. Iran's priority should accordingly be to deepen interoperability, coordinate institutional strategies, rationalize duplicated systems, strengthen data governance, modernize existing platforms, and ensure that digital transformation is sustained across changes in administrative leadership and technological conditions.

Despite these differences, the comparison identifies several common barriers. Both countries face the danger of treating digital transformation as a collection of technical projects rather than as a restructuring of public administration. Both must address institutional fragmentation, interoperability, cybersecurity, employee capability, legal recognition of electronic processes, citizen trust, service accessibility, and long-term sustainability. Both also confront the risk of reproducing conventional bureaucracy in electronic form. If complex and unnecessary procedures are merely transferred to online platforms, governments may create digital bureaucracy without achieving meaningful administrative reform. Process simplification must therefore become an integral part of electronic-government development.

The comparison further demonstrates that the success of e-government cannot be measured by the number of websites, applications, portals, or computerized offices. Meaningful indicators concern whether citizens can complete transactions

without unnecessary physical attendance, whether government organizations can exchange information securely, whether administrative decisions are processed more efficiently, whether electronic records are legally authoritative, whether systems remain operational and secure, and whether citizens actually prefer digital channels because they provide a more reliable and accessible experience. Evaluation should therefore concentrate on administrative outcomes rather than technological visibility.

Institutional interoperability emerges as one of the most important requirements for both Iraq and Iran. The state should function digitally as a connected administrative system even when its internal structure consists of numerous ministries, agencies, municipalities, and specialized institutions. Citizens should not be required to act as intermediaries among governmental databases or repeatedly submit information that public institutions already possess. Secure information exchange can reduce administrative burdens, improve data accuracy, shorten processing times, and permit the development of integrated services. However, interoperability must be governed by clear rules regarding access, responsibility, privacy, data quality, and security.

Cybersecurity is equally fundamental because the expansion of digital government increases both the value of government information systems and the consequences of their disruption. Security should therefore be embedded within governance structures and administrative procedures rather than confined to technical departments. Government institutions require common security standards, clear allocation of responsibilities, trained employees, incident-response arrangements, backup infrastructure, and continuity planning. The objective is not merely to prevent unauthorized access but to ensure that electronic public services remain dependable under changing technological conditions and emerging threats.

Human resources remain one of the decisive factors determining whether these reforms succeed. Digital government changes how public employees work, communicate, process information, and exercise administrative responsibility. Successful transformation therefore requires continuous professional development, organizational incentives, leadership commitment, and employee participation in process redesign. Resistance should not be regarded merely as an individual unwillingness to adopt technology. It often reflects uncertainty about responsibilities, inadequate training, unreliable systems, duplication between electronic and paper procedures, or insufficient understanding of reform objectives. Addressing these institutional causes is more effective than simply requiring employees to use new technologies.

Citizen trust and accessibility must also remain central. A technically sophisticated e-government system has limited value if large groups of citizens cannot use it or do not believe that it is reliable. Trust develops through repeated experience with stable services, accurate information, secure transactions, transparent procedures, and effective mechanisms for resolving problems. Inclusive design is therefore essential. Digital platforms should simplify interaction with the state, not require users to possess detailed knowledge of governmental structure or advanced technological skills. Assisted channels should remain available where necessary, particularly during periods of transition, while governments continue to improve digital literacy and platform usability.

The comparative evidence also supports a gradual model of implementation. Neither Iraq nor Iran is likely to benefit from attempting to replace all conventional administrative mechanisms simultaneously. Reform should proceed in carefully sequenced stages that reflect institutional readiness and public needs. Yet gradual development must remain cumulative. Each new platform or service should conform to national standards, contribute to interoperability, strengthen shared infrastructure, and generate institutional knowledge that can be reused in subsequent stages. Gradualism should therefore mean coordinated progression rather than fragmented experimentation.

For Iraq, the most appropriate path involves strengthening the foundations upon which future electronic services will depend. Priority should be given to national governance structures for digital transformation, common technical and data standards, development of institutional digital maturity, infrastructure reliability, cybersecurity capacity, legal recognition of electronic procedures, and professional training. High-impact public services can then be progressively integrated into shared digital environments. The objective should be to prevent current initiatives from becoming technologically isolated and to ensure that investments made today remain compatible with future national integration.

For Iran, the emphasis should be placed on consolidating the digital structures already created. Existing platforms and databases should be assessed according to interoperability, functionality, security, user experience, and long-term sustainability. Overlapping systems should be rationalized where appropriate, institutional coordination should be strengthened, and data-governance responsibilities should be clarified. Particular attention should be given to reducing the dependence of digital

reform on temporary administrative priorities and ensuring that systems continue to evolve through systematic evaluation and institutional learning.

Ultimately, successful e-government in both Iraq and Iran requires the institutionalization of digital administration. Technology must cease to be treated as an external addition to conventional government and become integrated into the ordinary structures through which public institutions plan, communicate, exchange information, make decisions, and deliver services. This transition will not occur through technology alone. It requires consistent political and administrative commitment, coherent national strategy, legal modernization, organizational reform, interoperable infrastructure, cybersecurity, competent human resources, sustainable financing, citizen-centered design, and continuous evaluation.

The long-term objective should therefore be neither complete technological centralization nor unlimited institutional digital autonomy. A more effective model is one in which national standards and shared infrastructure provide coherence while individual institutions retain sufficient flexibility to develop services appropriate to their mandates. Within such a framework, digital government can evolve incrementally without becoming fragmented. It can also adapt to technological change without repeatedly abandoning previous investments.

The experience of Iraq and Iran illustrates a broader principle relevant to states undergoing digital administrative transformation: the most difficult stage is not introducing technology into government but transforming government so that technology can be used coherently, securely, and sustainably. When electronic systems are supported by institutional coordination, clear law, competent personnel, secure infrastructure, reliable data, and public confidence, they can substantially improve the relationship between citizens and public administration. When these foundations are absent, digital projects may increase complexity rather than reduce it. The future of e-government in both countries therefore depends on shifting attention from the expansion of isolated technological initiatives toward the construction of integrated, resilient, and citizen-oriented systems of digital public administration.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

Acknowledgments

Authors thank all who helped us through this study.

Conflict of Interest

The authors report no conflict of interest.

Funding/Financial Support

According to the authors, this article has no financial support.

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