Review of E-Government program: A case study on Islamic Republic of Iraq

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Abstract:

E-Government initiatives in Iraq have the potential to reshape the way public services are delivered by improving efficiency, transparency, and citizen engagement. Despite this promise, the journey toward successful implementation faces several challenges, including weak digital infrastructure, cybersecurity threats, and resistance to change among key stakeholders. At the same time, there are important enablers—such as government support, digital literacy programs, and the growth of information and communication technology (ICT)—that can help drive progress in this area. This review explores both the barriers and facilitators of e-government adoption in Iraq, with a particular focus on its connection to sustainable development. Prior research identifies major hurdles such as limited internet coverage, low digital skills, and bureaucratic red tape, but also points to factors like policy initiatives and foreign aid that can support digital transformation. Moreover, e-governance plays a growing role in promoting sustainability by cutting down on paperwork, conserving resources, and creating more inclusive access to government services. However, there is still limited evidence-based research examining how e-government initiatives directly contribute to sustainability outcomes in Iraq. This paper highlights the need for further studies and practical strategies that can help bridge this gap, ensuring that digital governance not only modernizes the public sector but also contributes to long-term social, economic, and environmental well-being.

Keywords: E-Government, Digital Governance, Public Administration, ICT Infrastructure

1. Introduction

The E-Government programs in Iraq have the potential to revolutionize public administration, enhance service delivery, and increase transparency. However, there are some barriers to successful implementation, such as a lack of adequate infrastructure, cybersecurity issues, and attitudinal resistance from stakeholders. On the other hand, there are a number of facilitators such as government aid, digital literacy initiatives, and progress in ICT that can enable the adoption of e-government services. These factors must be understood in order to formulate strategies that aim at addressing challenges and reaping the opportunities of digital governance.

The impact of e-governance on sustainability is also of great consideration because it has the potential to boost the economy, conserve the environment, and provide social equity by decreasing inefficiency in bureaucracy, reducing paperwork, and increasing digital access. This research looks at the barriers and the enables of e-governance in Iraq in the context of sustainable development. In Iraq, there are numerous literature sources describing the implementation of e-government which delve into advantages as well as the hurdles it will encounter. Research have found specific barriers such as poor internet availability, cybersecurity threats, inadequate digital skills, and red tape that obstruct the adoption of e-government services. On the other hand, some studies point out facilitating factors such as governmental actions, better ICT framework, and foreign aid that improve digital governance. Additionally, the references on the impact of sustainability of e-government programs casts the services as economically beneficial, environmentally friendly, and socially inclusive through the efficient and effective delivery of public services, resource optimization, and increased openness to government activities. Nonetheless, there is a lack of evidence-based research examining the effects of e-government implementation on sustainability in Iraq which suggests more studies are needed to design appropriate solutions to the problems of barriers and facilitating factors.

2. Literature Review

The adoption of e-government literature is crucial for understanding its driving and deterring factors for implementation and survival in various geographical regions. Many researches analyse the facilitators and inhibitors of e-government adoption with emphasis on its perceived usefulness, perceived ease of use, trust, and social participation.

Nguyen et al. (2024) pointed out the importance of trust and social media participation in cultivating e-government usage in Vietnam, noting the importance of users in digital governance. Similarly, Aswar et al. (2024) analyze the influence of uncertainty avoidance on attitude towards e-government usage and found out that there are acceptance gaps due to cultural and behavioural issues.

The development of e-government has also to do with the COVID-19 pandemic. Roztocki et al. (2024) argued that the pandemic prompted development of electronic governance projects in Poland that claimed requisite change and technology transformation. In another work, Sriyakul et al. (2022) analyse the link between e-government, economic growth, and

environmental sustainability in some Asian countries and argues that digital governance promotes sustainability by efficient resource management.

The satisfaction of users as well as the confidence of users are essential factors that influence the post usage of e-government services. Kala et al. (2024) apply the Technology Acceptance Model (TAM) together with the Information System Success Model (ISSM) to study how the satisfaction of users affects the trust of citizens in the e-government system and their intention to use it. Literature review taxonomy is presented in figure 1.

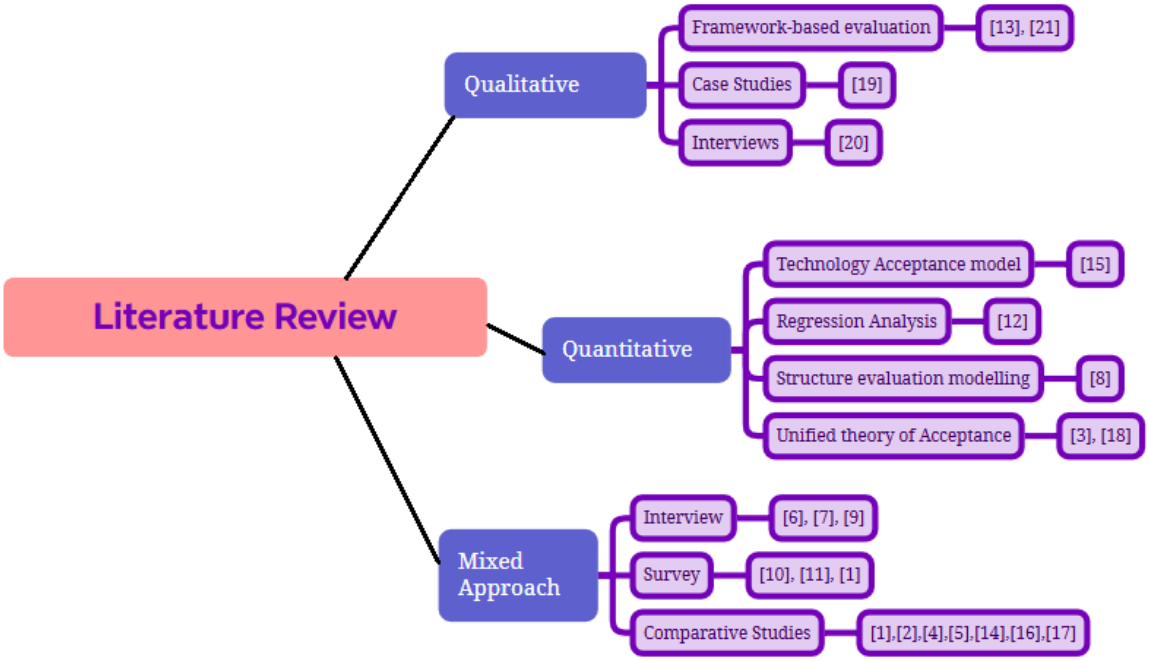

Figure 1. LR Taxonomy

Likewise, Tran Pham (2023) underscores the factor of administrative capacity in e-government functioning and citizen participation which calls for effective management in the processes of digital transformation.

Some studies consider demographic characteristics and socio cultural variables as determinants for the adoption of e-government. Muhammad and Kaya (2023) study adoption determinants in Nigeria and assess that a lack of digital literacy, security issues, and inadequate infrastructure serve as major obstacles. Ali et al. (2023) use structural equation modeling to study adoption determinants among public sector managers in Oman and find that organizational support and perceived value has high positive impact on success of adoption. Abdalla et al. (2023) modify

the UMEGA model by adding unified access nodes to analyse behavioural intention in Palestine and verify the vital role of system accessibility in citizen participation.

Mind map of techniques studied in literature review is presented in figure 2.

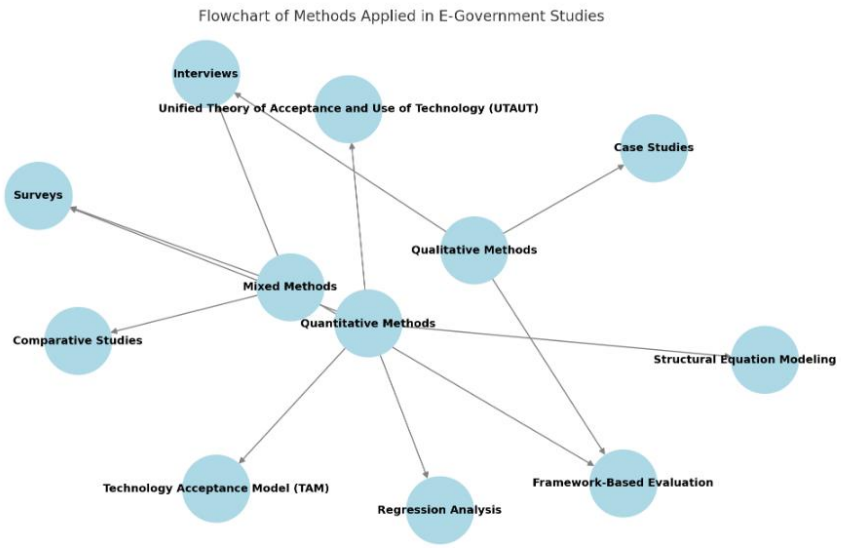

Figure 2. LR Mind map

From a more comprehensive viewpoint, Gupta et al. (2023) use the Analytic Hierarchy Process to determine the enabling and debilitating aspects for the acceptance of e-government by employees, emphasizing deeper attendance of organizational precursors. Other studies like Quintana et al (2022) research and develop e-theories for sustainable cooperation of stakeholders in e-government projects. As for Chopra et al. (2022), they analyse the impact of age as a moderating variable in the nexus of e-government adoption and employee performance.

Religion and culture also shapes the adoption of e-government. Ayyash et al. (2022) developed an Arab cultural dimensions model to account for differences in e-government adoption at the public administration level, while Almamy (2022) investigates the impact of religiosity in Saudi Arabia and contends that cultural beliefs have serious implications for the practice of digital governance. Structure of the Literature review is presented in figure 3 and structural elements are presented below:

2.1. Historical Evolution of E-Government

Over the last few decades, e-government has gone through substantial changes, growing from simple digital services to comprehensive platforms offered to the citizens that improve governance by enhancing transparency, efficiency, and participation. The very first attempts of e-government focused on automation of bureaucratic operations like tax payments and documents submission. With the fast development of information and communication technologies (ICT), there is increasing adoption of artificial intelligence, big data technology, and even blockchain, which have transformed public service delivery into a more open, data-oriented, and secured processes.

E-government adoption rates largely differ regionally, with developed nations utilizing digital governance more so than developing nations, who follow behind. In several developing nations, the absence of changeable public institutions contributes to stagnation due to inadequate infrastructure, volatile politics, poor economics, and underlying instability. Specifically, Iraq struggles to implement a comprehensive e-government system due to the history of political strife, cybersecurity issues, and a lack of basic digital skills. These factors inhibit the transformation towards modern governance that could improve administrative functions and increase citizen satisfaction.

Nguyen et al. (2024) and Tran Pham (2023) delve deeper to add that the adoption of e-governance in transition economies is influenced by a constellation of historical, political, and economic phenomena. Iraq can learn from other countries that have successfully overcome those challenges to help them deal with these obstacles. Iraq stands to benefit greatly by adopting these international approaches, therefore being able to break free from the constraints set, and build a robust sustainable digital governance framework in alignment with international standards.

2.2. Comparative Analysis of E-Government Adoption Models

To systematically examine user behaviour, acceptance, and resistance towards e-government, several models have been proposed, and the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Theory of Planned Behaviour (TPB) are the most prominent ones offered. TAM emphasizes the role of usability and usefulness in the adoption of digital services, while UTAUT incorporates social influence and facilitating conditions. Perceived ease of use, perceived usefulness, trust, and technological readiness are perspectives that greatly impact the adoption rates. On the other hand, the TPB

model incorporates behavioural intentions and attitudes along with perceived behavioural control to predict technology adoption.

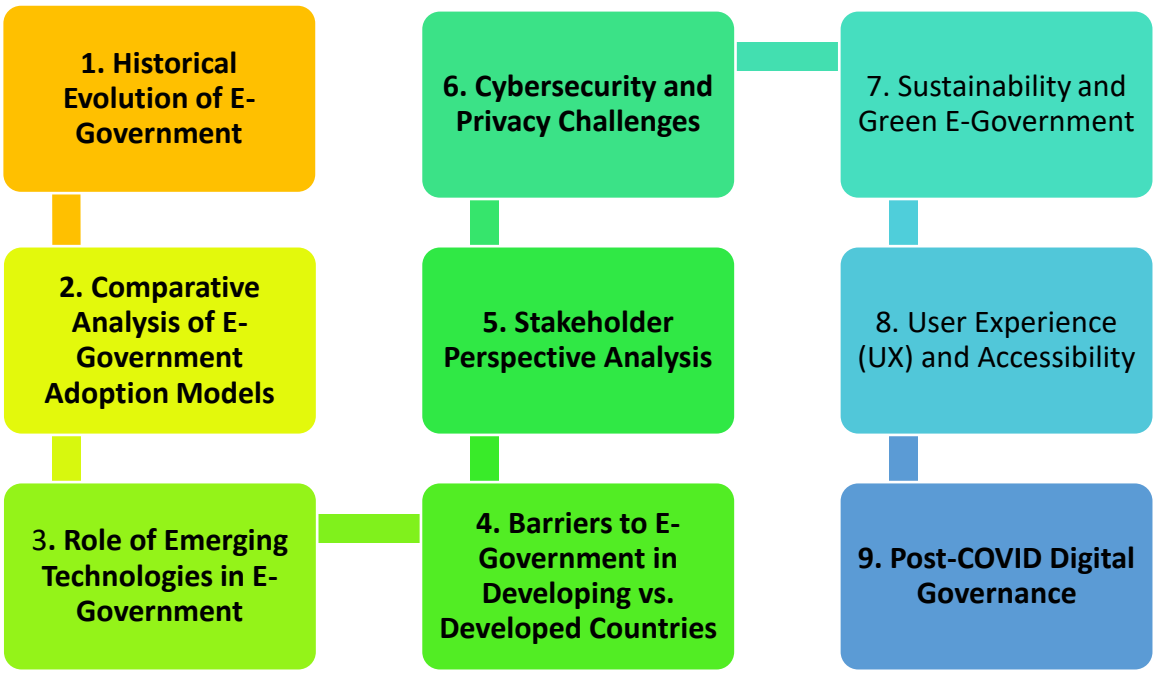

Figure 3. Structure of LR

Even though there are numerous studies dealing with the implementation of these models in e-government Iraq is not well studied. The socio-political and infrastructural issues that affect the adoption of digital governance in Iraq are far more complex than those offered by the conventional models.

Kala et al. (2024) and Muhammad & Kaya (2023) argued that these regions were already using these theoretical frameworks but the case of Iraq remains unexplored. This part seeks to find a suitable model for analysing e-government adoption in Iraq by studying different adoption frameworks. A blended model is the best option to comprehend the barriers and drivers of digital governance in Iraq because it takes into account the context of the country.

2.3 Role of Emerging Technologies in E-Government

With the advent of new technologies like artificial intelligence (AI), blockchain, and the Internet of things (IoT), e-government services have greatly improved all over the world. These technologies improve the efficiency and accessibility of public services by enhancing transparency, automating administrative functions, and increasing data protection. AI chatbots and automated systems improve interactions, blockchain secures digital transactions, and IoT improves the management of infrastructure through monitoring. Many developed countries have more responsive and effective governance models because of the years of investment in these technologies.

Like many other countries, Iraq is also facing challenges in adopting more advanced digitization practices. Integrating these technologies into the country's e-government system is almost impossible due to low digital literacy, poor ICT infrastructure, and constant cybersecurity issues. Further hindrances include a lack of skilled personnel, insufficient funding in digital transformation, and inactive policies. Gupta et al. (2023) and Quintana et al. (2022)'s research categorically illustrates the potential of emerging technologies to enhance the effectiveness of the government by dealing with the bureaucracy, curtailing malpractices, and bettering service delivery. These studies are frequently based on more advanced digital economies, which helps them provide useful information, but do not focus on how a country like Iraq could utilize these technologies for its unique socio-political and economic environment.

The potential for AI, blockchain, and IoT integration with governance in Iraq needs further examination. This can only be achieved through the formulation of well-defined contextual strategies, policy changes, and even vigorous efforts towards the needed skill and knowledge development to cope with the existing governance gaps in the country and to build a more secure, efficient, and transparent e-government.

2.4. Barriers to E-Government in Developing vs. Developed Countries

Countries that are more developed have managed to integrate e-governments systems into their infrastructure by relying on the already present digital framework, optimal leadership, and overall public confidence. On the other hand, developing nations have yet to fully integrate e-government services due to economic challenges, cultural reluctance, and insufficient

technology. Iraq suffers from poor internet coverage, lack of skilled users, distrust in state bodies, and strong apprehension for data privacy as some of the most important issues. All these problems make both citizens and officials reluctant to adopt digital governance, which makes the whole situation worse.

Studies like Roztocki et al. (2024) and Muhammad & Kaya (2023) look into how the very same issues differ depending on where they are, emphasizing the role of the economy, the level of development of the government, and the laws guiding e-governance system in a country. For example, both Nigeria and Indonesia encounter similar challenges regarding inadequate infrastructure and cybersecurity, yet both countries have invested in policy solutions such as civic education programs, policy changes, and programs that promote digital skills.

These lessons learned serve as an example to Iraq showing how certain measures can successfully deal with common obstacles.

Iraq's digital governance model must take into consideration the lessons from other developing nations. Through an examination of existing case studies and best practices, Iraq has the capacity to formulate policies that deal with specific issues such as better protection of cyberspace, greater access to the internet, and trust building through transparent digital service delivery. Further research ought to concentrate on developing policy proposals for Iraq that incorporate external best practices and insights while considering the country's internal socio-political context.

2.5. Stakeholder Perspective Analysis

The successful implementation of e-government involves the participation of several actors including, government representatives, citizen and the private sector. Each of these groups has a defined role in the formulation of digital governance policies and in the provision of e-government services. The worries of these stakeholders including privacy concerns, accessibility and efficiency of the system greatly influence adoption and sustainability of the system. As an example, a government worker may not accept change because there is no accompanying digital training. Conversely, a citizen may be reluctant to embrace e-services because of trust and usability issues.

Studies such as Nguyen et al. (2024) and Ali et al. (2023) focus on the critical participation of employees in the public sector and citizens in the adoption of e-government. In a number of

nations, civil servants have increased the adoption rates because of well organized digital training programs, awareness campaigns, and other incentives. But in Iraq, a lack of awareness, digital literacy, and unwillingness to change on the part of government employees pose big problems. A lot of officials in the public sector do not have the necessary skills to operate and hence promote digital services. Not to add, in Iraq, citizen participation is limited because of fear of data insecurity, unreliable services, and lack of government transparency.

All perspectives of stakeholders must be addressed if the system is to work in the long run and ensure user satisfaction. There is a need for collaboration among the stakeholders to build with policy attention aimed at trusting and friendly user service.

Iraq would benefit from the implementation of context-specific engagement strategies towards a transition to an integrated e-government system. Therefore, further research is needed to identify those strategies which would motivate all stakeholders to actively participate.

2.6. Cybersecurity and Privacy Challenges

The most important issue to arise with the advancement of e-government is cybersecurity. With the provision of digital services comes the collection, storeing, and transfer of citizen's sensitive information. As governments digitize services, the likelihood of data theft, identity fraud, and cyber assault rises, thus making security a crucial priority. Relative to citizens, most governments have advanced threats of fraud cybersecurity infrastructure in place. Countries that have sophisticated cyber security systems in place are able to reduce these negative impacts and secure the digital governance system. Concentrating on Iraq, cyber security gaps are the major challenge of implementing e-government systems, due to lack of appropriate regulatory framework, inadequate security mechanism, and the prevailing negative perception towards internet systems.

Abdalla et al. (2023) and Gupta et al. (2023) research shows how security issues directly limit e-government acceptance. In several developing countries, extensive cyber security incidents and the danger of insufficient data protection has attempted many citizens to stop using online governmental services.

In Iraq, the lack of robust encryption methods, insufficient cyber laws, and low levels of public knowledge worsens the problem. Citizens might still be unwilling to trust digital services

without proactive security measures being implemented, which slows the transition to a fully functional e-government ecosystem.

Policymakers need to focus on improving cyber security if they want Iraq's e-government projects to succeed. Iraq has to implement strong encryption methods, multi-factor security protocols, comprehensive cyber policies, and even blockchain based identity authentication systems. Clear data protection policies need to be defined, along with investment in cyber security educational programs and periodic security audits to build public confidence in the government and ensure the adoption of e-governments.

2.7. Sustainability and Green E-Government

Sustainability in e-governments goes beyond the digital transformation and includes the reduction of the environmental effect of public administration. There are initiatives by the governments of different countries for "green" digital technologies that aim at improving energy efficiency, reducing the use of paper, and managing public resources effectively. The use of Cloud computing, paperless governance, and smart cities are among the initiatives that contribute towards sustainable e-governance by reducing carbon emissions while enhancing service delivery. Sustainable practices are utilized in the management of digital services in developed countries, and these nations progress continuously in incorporating sustainability to their e-government services.

Iraq, on the other hand, still faces obstacles, particularly in efforts to advance green digital infrastructure systems. There are no clear sustainable e-government policies that can be used to implement energy-efficient data centres and electronic document management systems within the country. As noted by Sriyakul et al. (2022) and Quintana et al. (2022), e-government policies ought to provide services that foster economic, social, and environmental sustainability as service delivery is digitized. These studies also discuss the positive impacts of ICT eco-friendly infrastructure and renewable energy integration, as well as waste policy on the sustainability of governance in the digital age.

To achieve the global sustainability goals of green Iraq, there is need to work on policies and investment on green IT cloud-solutions and digital literacy that enable resource efficiency. Further studies ought to determine how renewable energy can be harnessed to power government data centres and the deployment of AI-enabled smart governance in Iraq.

2.8. User Experience (UX) and Accessibility

Appropriate accesses to e-government services should be provided with a focus on ease of use, reach out to all citizens regardless of their diversity, and ensure their participation. Inactivity brought about poor user experience (UX) design may result in reluctance to use the digital government service which contributes to a lack of participation and loss of purpose. Some features highly essential in UX design of e-government systems include: ease in moving from one interface to another, ease in use of mobile devices, provision of several languages, and provision of assistive aids for persons with disabilities. In many developed countries, there is a focus on human-centered design as an approach to increasing user satisfaction and system uptake.

Iraq suffers from serious usability (UX) or User Experience issues that render its e-government services ineffective. Citizens of the country having low digital literacy levels are unable to make use of the available services due to the absence of support in other languages besides English, insufficient provision of mobile interfaces, and lacking ease of use. Furthermore, technical problems, elaborate and confusing designs, and failure to deliver service all contribute to poor usability. Kala et al (2024) and Alryalat et al (2023) state that the user experience in e-governments platforms is studied across many countries' regions so that the factors that make them unresponsive, simple and accessible are understood to increase their use.

These studies illustrate how changes related to user experience alone can have a major positive impact in the overall public sentiment towards digital governance.

To increase citizen participation in Iraq, there is a need to rethink the design of e-government services by employing responsive web design, AI-based chatbots, voice recognition, and content that is tailored to the local audience. Moreover, training the users and providing basic computer literacy classes should be offered to enable citizens, especially those living in the countryside, to easily access e-government services. Future research in Iraq should track and evaluate user feedback on the e-government subsystem to constantly improve service delivery.

2.9. Post-COVID Digital Governance

The COVID-19 pandemic greatly sped up the shifting of government services into the digital sphere. The majority of countries had to quickly implement a shift towards online governance

in order to maintain relevant public services during lockdowns and other restrictions. Remote access to public services such as health care, social welfare, business registration, and other branches needed digital governance platforms, digital ID systems, and online service delivery portals. The armed conflicts were a stark reminder of the necessity for effective policies regarding public preparedness, cybersecurity, as well as a sound IT infrastructure and ensuring the continuity of public administration functions.

In Iraq, the pandemic is seen to have added impetus in relation to the use of digital services and activities as government agencies tried to remotely serve citizens. However, underdeveloped infrastructures, the digital divide, and lack of readiness prevented the full deployment of e-governance systems. The limited reach of the internet, absence of reliable digital identity systems, and insufficient cybersecurity also made the shift towards a fully digital governed state difficult. The rapid demand for online services has revealed shortfalls in the electronic framework of government in Iraq, reinforcing the case for a long term strategic plan aimed at building capacity.

Research like that of Roztocki et al. (2024) and Sriyakul et al. (2022) analyses how governments across the globe dealt with new digital challenges in a post-pandemic world, which is useful for Iraq's e-governance development. In order to establish sustainable digital governance, Iraq must strengthen IT infrastructure and digital literacy levels, develop plans to ensure robust cybersecurity, and design measures to deal with possible future disruptions. Iraq will benefit from other countries' digital transformation experiences when formulating a robust and resilient e-government strategy.

Reference	Method	Feature	Dataset	Strength	Limitation	Gap Identified
Nguyen et al. (2024)	Survey	Perceived usefulness, ease of use, trust, social media engagement	Vietnam citizens	Highlights role of trust and social media	Limited to Vietnam, lacks cross-cultural comparison	Need for broader validation across different regions
Roztocki et al. (2024)	Pilot study	COVID-19 impact on e-government	Poland case study	Shows pandemic-driven acceleration of e-government	Small-scale study, lacks generalizability	Need for longitudinal studies on pandemic effects
Aswar et al. (2024)	Survey	Uncertainty avoidance and e-government adoption	Indonesian citizens	Cultural perspective on adoption behavior	Focused on one cultural dimension	Exploration of additional socio-cultural factors
Kala et al. (2024)	TAM-ISSM framework	User satisfaction and trust in e-government	Online survey data	Strong theoretical integration	No experimental validation	Need for real-world implementation analysis
Tran Pham (2023)	Empirical study	Government administrative capacity and e-government adoption	Transition country data	Links governance efficiency to adoption rates	Context-specific findings	Broader applicability across governance models

Reference	Method	Feature	Dataset	Strength	Limitation	Gap Identified
Muhammad & Kaya (2023)	Survey	Factors affecting adoption	Nigerian citizens	Identifies digital literacy and security concerns	Limited to Nigerian context	Need for comparative studies in other African nations
Ali et al. (2023)	Structural Equation Modeling	E-government adoption among public sector managers	Oman dataset	Organizational readiness analysis	Focused only on managerial perspective	Inclusion of citizen perceptions needed
Abdalla et al. (2023)	Extended UMEGA model	Behavioural intention in e-government adoption	Palestinian dataset	Incorporates unified access points	System usability challenges	Testing in different e-government systems needed
Gupta et al. (2023)	Analytic Hierarchy Process	Employee adoption factors	Government employees	Prioritization of adoption barriers	Organizational bias in ranking factors	Need for validation across diverse workplaces
Quintana et al. (2022)	Theoretical analysis	Stakeholder cooperation in e-government	Conceptual framework	Strategic view of sustainability	Lacks empirical testing	Empirical validation in different e-government models
Chopra et al. (2022)	Quantitative study	Employee performance and e-government	Employee datasets	Identifies moderating role of age	Lacks qualitative insights	Need for mixed-method approach

Reference	Method	Feature	Dataset	Strength	Limitation	Gap Identified
Ayyash et al. (2022)	Empirical study	Arab cultural dimensions in e-government adoption	Public sector organizations	Provides cultural adaptation model	Focused on public sector only	Exploration of private sector perspectives
Almamy (2022)	Survey	Role of religiosity in e-government adoption	Saudi Arabia	Unique perspective on cultural values	Limited to a religious context	Need for secular comparisons in similar regions

2.10 Gap Analysis

Multiple gaps in e-government adoption, especially in the inhibitors, facilitators and sustainability sections, indicate the necessity of further research in Iraq. Nguyen et al. (2024) and Aswar et al (2024) focus on trust, social media participation, and cultural elements such as avoidance of ambiguity in the adoption of e-government, but they focus on Vietnam and Indonesia which are too specific. These results need to be confirmed in Iraq so that the impact of cultural and institutional differences on adoption can be evaluated. At the same time, Roztocki et al. (2024) analyzes the effect of COVID-19 pandemic on e-government acceleration in Poland, but there is no ethnographic history in relation to a post-conflict state like Iraq, which requires an understanding of long term sustainability.

Governance efficiency and administrative ability as determinants to e-government adoption as proposed by Tran Pham (2023) is important, though in Iraq's case, it is still unmapped in the context of its weak governance system. In the same manner, Muhammad & Kaya (2023) and Ali et al. (2023) studied the adoption of the technology in Nigeria and Oman, respectively, but there is absence of an Iraq-cantered study that would focus on means of infrastructure and security of the region. Kala et al. (2024) examine user satisfaction and trust through the lens of TAM-ISSM framework, but their findings lack real-world implementation analysis, which is crucial for Iraq's developing digital infrastructure.

Seeking new avenues for research is common in organizational adoption as seen with Gupta et al. (2023) where employee adoption pertains to government jobs, but validation is still needed due to Iraq's public sector difficulties. Abdalla et al. (2023) talk about system usability problems concerning Palestinian e-government services, but do not include adoptions as a problem area which is particularly pertinent to Iraq. Quintana et al. (2022) suggest a strategic approach to stakeholder cooperation, but there is no evidence to Checkpoint Iraq, which requires empirical testing if such frameworks work in the institutional context of Iraq.

Likewise, Chopra et al. (2022) speaks about the impact of employee specific characteristics on e-government adoption and focus on age as one of the moderators. However, there is a need for a more comprehensive multigenerational approach to delineate the difference in generations in the Iraqi workforce. Ayyash et al. (2022) cover the Arab cultural dimensions of public sector adoption, leaving out the private sector's view which is crucial in understanding e-government adoption in Iraq. Finally, Almamy (2022) studies the impact of religion on e-government

adoption in Saudi Arabia, leaving out Iraq which has rich ethnical and religious diversity and would need deeper analysis on secular and cultural factors.

Addressing these research gaps will contribute to a comprehensive understanding of the facilitators and inhibitors of e-government in Iraq and its implications for sustainability.

3. Factors Influencing E-Government Adoption

Numerous studies have examined the factors that affect e-government adoption using citizenships readiness to adopt online government services as a basis. These studies raise the importance of studying e-government adoption in socio-economic and policy contexts.

3.1. Technology Acceptance Trust: Nguyen et. al (2024) explored the role of social media usage, trust, and perceived usefulness and ease in e-government services adoption in Vietnam. The study was based on TAM and concluded that trust significantly affects citizens' intentions to utilize digital government portals. The study also highlighted that citizen who consider e-government services to provide useful solutions and are easy to use are more inclined to seize them. There was also the argument that social media helps in creating awareness and public trust on government digital services. Like Aswar et al. (2024), While analysing uncertain new cultures for uncertainty avoidance sociocultural factors, tried to measure its impact on e-government adoption. They concluded that countries characterized by high uncertainty avoidance syndrome adopt e-government services at a much lower rate because of the concerns with data privacy, the risk of security breaches and technology rejection.

This necessitates governments to implement robust data protection policies and trust-building initiatives to promote adoption.

3.2. COVID-19 and E-Government Development: Roztocki et al. (2024) investigated how the COVID-19 pandemic affected e-government adoption in Poland. The study revealed that during the pandemic period, citizens used digital government services more frequently to perform important tasks, such as requesting financial aid, getting health information, and obtaining official documents. The crisis acted as an accelerator of speeding up digital transformation in the public sector, forcing governments to increase their digital capabilities and deliver improved services. The study reveals that periods of crisis can drive long-term digitalization by proving the ease and efficiency of e-government services to reluctant users.

However, the study suggests that more action needs to be taken to maintain digital engagement beyond the crisis threshold.

E-Government Trust, User Satisfaction, and its Effects on E-Government Continuance Intention: Kala et al. (2024) highlighted the relationship and correlation between citizen trust towards e-government services, user satisfaction, and the intention of further service use, by utilizing an integrated TAM and ISSM model. The results showed that users' satisfaction with the service is high due to the rapid speed and effectiveness of the website which features advanced, systematized, and well-organized services.

Satisfied users of e-government platforms make it a point to suggest it to other people. In addition, trust in the government's ability to conduct secure digital transactions was associated with increased adoption rates. Therefore, it is reasonable to conclude that policymakers must be made aware of the need to pay greater attention to service quality, system stability, and resolve user problems in order to ensure that e-government initiatives are successful in the long run.

3.3. Administrative Capacity and Policy Influence: Tran Pham (2023) studied the impact of government administrative capacity towards performance of e-governments and the adoption rate. The study found out that effective governance, efficient policymaking, and clear regulatory frameworks enhance public confidence in the Sion of the digital government. Governments committed to make a transformation through the investment of infrastructure, streamlining bureaucracy, and teaching civilian digital literacy will most likely have an embrace of e-government services. The research also validated that lack of defined policies and ineffective administrative control would lead to low levels of trust, security challenges, and low adoption rates. Thus, good institutional structures and strong policy environments are clearly the basis for effective e-government success.

3.4. Economic and Demographic Drivers: Muhammad & Kaya (2023) examined the adoption intentions of Nigerian citizens towards e-government services and identified the principal economic and demographic drivers of adoption. Their study revealed that citizens from lower-income groups have high barriers to overcome, such as poor internet penetration, low digital literacy, and unaffordability. The study also established those young citizens and more educated citizen are likely to adopt e-government services, whereas older citizens find it difficult to adopt digital services due to unfamiliarity with technology. These findings

justify the requirement for specialized digital literacy programs, technology adoption financial incentives, and tailored e-government solutions to bridge the digital divide and achieve mass adoption.

On careful reading of these research studies, we realize that the adoption of e-government is a result of a complex mix of technological, social, economic, and policy-based factors. Overcoming such challenges through strategic policy-making, trust-building activities, and user-focused service design can lead to higher adoption and effectiveness of e-government services worldwide.

3.5. Structural and Social Factors

Structural Equation Modelling Strategies: Ali et al. (2023) claimed that the Omani public sector employees have adopted e-government services and explained its causes using SEM. Organizational structure, leadership, digital readiness, and perceived usefulness were elements that were tested for their impact on the adoption of devolved government services. The results suggested that having an organization with clearly defined structures positively impacts the adoption levels when there are open digital governance policies. The research further established that employees are more inclined to engage with the e-government facilities when there is sufficient training, technical support, and managerial intervention. Resistance to change was an issue that caused the greatest concern, particularly in modification resistant overly hierarchical organizations. The Study suggests that Government institutions should give primary attention to the development of policies on e-service innovation, as well as stimulating adaptive digital service provision and continuous learning for the effective implementation of e-government services in the public sector.

3.6. Digital Divide and Citizen Participation: Abdalla et al. (2023) examined the role of citizen participation and access to electronic resources in e-government adoption using UMEGA and Single Unified Access Points. The digital divide and access constraints pose a significant barrier to the adoption of Palestinian e-government service. The study accomplished discovered that the user engagement with e-services through the e-portals drastically increases if governments create several access points such as mobile applications, self-service kiosks, and multilingual web portals. The study also highlighted that people belonging to low-income households and rural areas have difficulties accessing e-government portals due to poor internet access and low digital literacy which deepens the digital divide. Their study puts forth that

interface designed with and without the assistance of the internet complemented by personal support and digital literacy schemes could help e-government schemes be adopted by everyone. The research points towards the necessity of designing robust digital literacy strategies aimed at addressing the needs of users who have little knowledge about technology and computing.

All of these studies showcase how both structural issues and those dependant on the users are important in determining how effective e-government services are adopted.

Structural readiness, leadership support, accessibility, and digital inclusivity must be considered when designing effective e-government strategies. Addressing these aspects can help governments enhance adoption rates, improve public trust, and create a more efficient digital governance ecosystem.

3.7. E-Government and Sustainable Development

- **Effects on Environment and Economy**: Sriyakul et al's investigation of e-government adoption across selected Asian countries in 2022 revealed some interesting results. One of their main points is that e-government initiatives promote economic growth by increasing efficiency in public administration, reducing transaction costs, and increasing overall transparency in the business environment. The aforementioned study was able to conclude that digital governance improves productivity by facilitating investment and entrepreneurship through deregulation, minimizing red tape as well as supporting foreign direct investment with appropriate legislations. At the same time, the research also pointed out its adverse effects on sustaining the environment. Adoption of e-government helps reduce carbon emissions through reduction of paper-based services as well as travel, but there are also greater consumption of energy intended for expansion and digitation of the economy, new data centres, and ultimately greater amounts of e-waste. In this context ,the study emphasizes that for e-government to have some net good impact on the environment, steps should be taken in green ICT policy, investment in energy efficient digital systems, and proper disposal of electronic waste. In addition, e-government approaches and policies should blend concepts of sustainability by integrating renewable energy principles for powering data centres and

encouraging eco-friendly digital services, can help balance economic benefits with environmental responsibility.

- **Strategic Cooperation Among Stakeholders:** • Quinetta and others (2022) studied how stakeholder collaboration helps with the adoption of e-government, e-participation, and social make media engagements along with fostering governance sustainability. They stated that successful e-government projects rest on the collaboration of government agencies, business sector, non-governmental organizations, and the public. The analysis established that stakeholder participation helps in the governance of e-services, which enhances their acceptance and effectiveness. E-participation, such as online consultations, digital public services, and social media citizen engagement, was found to be critical in trust and inclusivity in governance. This research also found out that governments' use of social media for communicating and interacting with citizens led to increased e-government services adoption in the country. The study also found out that the openness of many agencies improves service delivery, creates accountability, and helps in the acceptance of e-government policies and programs, which are more responsive to the society. In order to attain sustainable e-government, the government are required to formulate policies that foster collaboration across sectors, user feedback mechanisms, and align digital initiatives with broader social and economic development goals.

By examining these studies, it becomes evident that the success of e-government adoption is influenced not only by technological and administrative factors but also by economic, environmental, and social considerations. Addressing sustainability challenges, fostering stakeholder collaboration, and integrating eco-friendly digital solutions can contribute to a more effective, inclusive, and responsible digital governance framework.

3.8. Cultural and Behavioural Factors

Role of Culture and Religion: Ayyash et al (2022) used the impact values model to explain Arab cultural dimensions with regards to practices within e-government services in public organizations. Their study revealed that at the core of subservient cultures like, hierarchy, collectivism, and uncertainty avoidance which stems from a subservient culture, greatly determines the level of acceptance and usage of digital government is services. The research

underlined that most of Arab countries tend to have a high concentration of power culture whereby decision making is reserved for senior officials within the organization which can be problematic in relation to the speed of digital transformation. Also, general attitude towards privacy, data safety, and government engagement poses a challenge to citizens' trust in e-government systems. For higher adoption rates, the study notes that governments must employ measures that are sensitive to the local culture. These measures include guaranteeing data, consulting with community leaders on campaigns, and building systems within the borders of ordered governance. Likewise, Almamy (2022) investigated the impact of religion on trust and acceptance of e government services in Saudi Arabia. The study found that religious beliefs shape citizens' views on governance, particularly in matters concerning privacy, data governance ethics, and government power. People who held strong religious beliefs tended to trust government e-services more when it was certain that the software was moral and ethical in accordance with Islam. Also, it was pointed out in the research that religious groups and leaders can also enhance the awareness of e-governance as they are credible sources of information in the society. The results suggest that there is a creation of governance policies which accommodate cultural and religious sentiments in all the Society value and still achieve government digitalization objectives.

3.8.1. **Demographic Factors Moderators:** Chopra et al. (2022) focused on younger employees and performance with respect to certain demographic features like age in regard to e-governance and its adoption in the organization. The findings showed that younger employees, who are generally more accustomed to using modern technology, are able to undergo changes in a digital environment more easily and are more productive. Trough out the research, this specific group of participants exhibited higher productivity, low time taken to complete assigned tasks, and higher willingness to work with ESP, unlike the older cohorts. On the other hand, older employees had to cope with issues such as a lack of adequate skills in using information technologies, unwillingness to accept changes, and problems switching from traditional management styles to more digital-focused ones. As a conclusion, the research emphasized that utilizing e-governance in organizations should be more targeted based on the age demographic filling the gap between the old and the new with appropriate training programs. Digital competency workshops and personalized training sessions along with user friendly designs can make it easier for older employees to transition to e-government platforms.

Moreover, the study highlighted how factors such as age also affect how people view the trustworthiness, security, and usability of e-government services. Younger employees accepted the use of government-issued applications, AI-based decision-making systems, and other digital communications more readily than their older counterparts who were more concerned about the safety, privacy, and complexity of the systems. These conclusions suggest that all-inclusive strategies for digital transformation to a multicultural and multi-competence workforce may be required. Meeting the generational divide with appropriate training, user-friendly design, and increased transparency within the organization can increase productivity and boost e-government services' usage rates.

It is clear from studying these works that e-governance acceptance and execution are vastly affected by cultural, demographic, and even religious elements. These factors can be resolved through proactive policymaking, stakeholder participation, and specialized assistance by government services across diverse populations.

Conclusion

Investing in researching e-government is a key priority for many countries; however, concerning Iraq, there are some important gaps. One of the major gaps is the absence of Iraq-specific researches relating to the contextual issues, policies, and adoption characteristics of users. Most studies available offer generic information about other developing countries. However, Iraq is facing unique socio-political and infrastructural challenges that require more specific approaches. Moreover, the effectiveness of blockchain technologies in enhancing security, transparency, and efficiency in the e-government of Iraq has not received much attention. While blockchain technology has been deployed in digital governance systems across the globe, its relevance to Iraq's public administration remains unknown.

Most studies also tend to concentrate on the short term, with hardly any attempts at longitudinal examination of the impact of digital transformation on governance. For example, Sriyakul et al. (2022) and AlHadid et al. (2022) focus in detail on policy changes part during the implementation phase of e-government systems, the change in user interactions, and how integration of new technologies to governance serves the purpose of improving governance.

Policymakers in Iraq do not have the required information aiding formulation of effective, flexible, and comprehensive e-government solutions.

In addition to this, there is a lack of attention paid to green digital infrastructure, energy-efficient data centers, and green IT policies which makes sustainability-related research in e-governance scarce. More attention could be directed towards how Iraq can apply sustainability principles within the context of e-governance to comply with international standards and best practices. Closing these research gaps will lead to a more efficient, secure, and proactive e-government system in Iraq.

All in all, the literature has shown that e-government adoption is a multi-dimensional construct which is comprised of technological, organizational, cultural, and personal dimensions. Certain elements enhance the likelihood of acceptance, for instance, trust, administrative efficiency, and ease of access. On the other hand, acceptance is limited by security challenges, infrastructural challenges, and socio-cultural hurdles. Specifically targeting regions such as Iraq where digital transformation poses certain difficulties and opportunities requires more focus in developing e-government sustainability strategies.

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