



# Overcoming the Challenges to Develop the Future of E-government in Iraq: A Systematic Literature Review

Harith Al-Yawer<sup>1\*</sup>, Rahayu Ahmad<sup>2</sup>

<sup>1</sup>School of Computing, Universiti Utara Malaysia, Sintok, Kedah, Malaysia

<sup>2</sup>Institute for Advanced and Smart Digital Opportunities, School of Computing, Universiti Utara Malaysia, Sintok, Kedah, Malaysia

\*Corresponding Author Email: [Harith\\_azzam@ahsgs.uum.edu.my](mailto:Harith_azzam@ahsgs.uum.edu.my)

## Abstract

Despite the early start that Iraq had in the e-government project and its launch in 2004, the pace of development is rather slow. This study aims to identify the main themes of the technical challenges hindering the development of e-government in Iraq. Systematic literature review was employed in this study to collect and analyse papers published on e-government in Iraq to reveal the main themes of the technical challenges in e-government projects. The result obtained from the systematic literature review revealed six themes of technical challenges. These identified challenges are important to be addressed to accelerate the progress of e-government in Iraq.

**Keywords:** E-government, Challenges, Development, Iraq

## 1. Introduction

The leaps in information and communication technology are making it possible for governments to further apply and realise e-government projects [1]. E-government is directed to three categories of stakeholders, namely, citizens (G2C), business organisations (G2B), and government agencies (G2G) [2]. These three stakeholders are considered as the main benefactors of e-government systems. E-government has the ability to provide shortcuts to people in their daily lives. The benefits of e-government can be delivered to the stakeholders in the form of services and information [3]. These benefits provide users with convenience and comfortable abilities in accessing various kinds of information and services. Daily schedules for each user might vary a lot, thus, adhering to the operation hours of government offices is not convenient for most users.

The advancement of e-government has made it easier to look for information online and do transactions at home rather than going all the way to the perspective department to process some papers. For the e-government benefits to be successfully implemented, it is vital to develop an e-government system based on realistic considerations [4].

## 2. E-Government Challenges

E-government challenges are the real world limitations which might contradict the initial purposes of e-government. Replication of e-government experience might encounter several issues in the implementation phase due to the variation in user demands and restrictions imposed by the community and governments. Without clear goals prior to the implementation phase, e-government projects might even be considered as failed experiments. The failure of the post-implementation phase might be manifested as e-government projects have less impact on citizens' life compared to

the initial estimated impact [5]. Once the implementation phase is completed, the development phase is initiated to comply with the users' needs. The developers should recognise and overcome the challenges which hinder the development of e-government.

Since its launch in 2004, the present state of e-government in Iraq is in an infancy stage when compared to other countries [6]. This study will facilitate the progress to the next stage of e-government development as outlining the existing obstacles makes it possible to devise solutions. The systematic literature review conducted in this study aims to identify the technical challenges that have an impact on e-government development in Iraq. In the latest survey by United Nations [6], Iraq was ranked 41 out of 192 countries; with (e-government development index) EGDI of 0.3334 and (online service index) OSI of 0.3551.

E-government projects do not always deliver the full promised benefits and users do not automatically use available e-government services [7]. Most of the e-government projects fail because the gap is still wide between the initial design and realistic implementation [5]. The success of e-government depends on the ability to match the available benefits with the demands of the stakeholders. It will be easier to come up with the plans needed to implement the required projects with the knowledge of experts in the field. These plans are then translated into realistic designs that follow the same demands direction as the benefactors. This study sheds light on the current challenges of e-government in Iraq to realise the full potential of e-government benefits. E-government benefits have a great impact on society by saving time and money which enhances efficiency [8], promotes citizen participation [9], and increases transparency [10]. Although many studies [11, 12] have discussed the issues of e-government implementation and development, different countries have different strategies for e-government. E-government development can be achieved through re-engineering of government transactions and optimising the flow of information and services

[13]. Hence, the main objective of the study is to identify the technical challenges of e-government development in Iraq.

### 3. Systematic Literature Review Methodology

Systematic literature review was conducted based on the methodology adapted from [14]. The search was conducted in December 2017 to identify journals published in English from 2010 to 2017 using three databases: Scopus, IEEE Explore, and Google Scholar. The keywords for the search criteria were “e-government”, “challenges”, “development”, and “Iraq”. The criteria for inclusion were journal articles published between 2010 and 2017, written in English, and the challenges of e-government in Iraq were stated. The exclusion process of non-related papers is explained in “Fig. 1”.

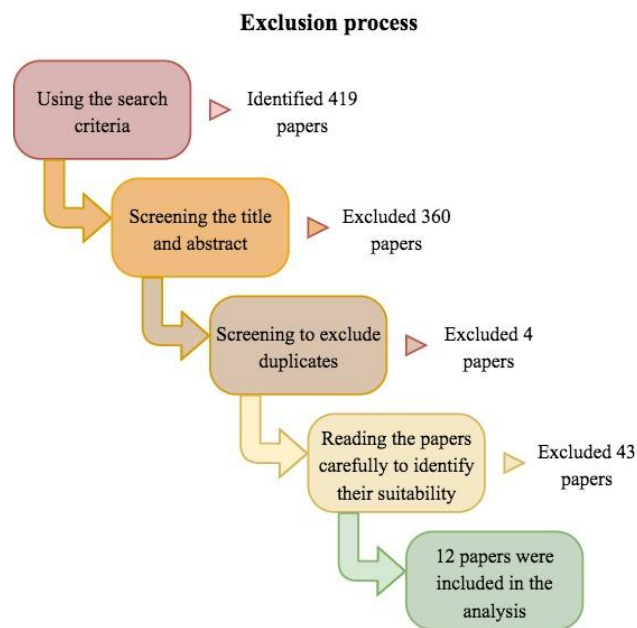


Fig. 1: The exclusion process of non-related papers in the systematic literature review

In the first stage, 419 papers were identified and screened to exclude papers which are not related to e-government in Iraq. The first screening was done based on the title and abstract of the papers which resulted in the inclusion of 59 papers that relate to e-government in Iraq. The second screening process involves excluding duplicated papers which resulted in the exclusion of 4 papers. The third screening was done by thoroughly reading the papers which resulted in 43 papers being excluded as they are not journal papers or not related to the challenges of e-government in Iraq. A final number of 12 papers were found to meet the criteria of this study and these papers discuss the technical challenges of e-government in Iraq. Each paper was read with careful consideration to identify the technical challenges. The analysis of the gathered literature resulted in the identification of the current technical challenges of e-government development in Iraq. The challenges were found to form six main themes, namely, telecommunication infrastructure, database, e-government website, security, user’s participation, and IT skills.

### 4. Results and Discussion

The development of e-government in Iraq is facing a number of challenges. Thus, this should be addressed to take e-government to the next level. In this study, the technical challenges in the development of e-government in Iraq were identified using a systematic literature review. The technical challenges are divided into six main themes. These themes reflect the main points that should be addressed in the future to improve the current e-

government in Iraq. The analysis of reviewed papers took into consideration all the factors affecting e-government in Iraq. These factors were grouped into themes based on their technical perspectives. It should be mentioned that the aim of this study was to discover the technical challenges only. The results gathered from the analysis revealed the existence of non-technical challenges and were eliminated because they were out of the scope of the current study. Recognising the technical challenges gathered in this study will assist e-government in Iraq to advance to the next level. At the moment, the limitations placed on e-government in Iraq restrict the ability to make online payments and limit the number of citizens’ online transactions. Challenge themes, characteristics of each theme and the possible solutions to each challenge are shown in “Table 1”.

Table 1: Technical Challenges of E-government in Iraq

Challenge themes	Characteristics	Possible solutions
Telecommunication infrastructure	Advanced ICT tools cannot be utilized due to the existing outdated telecommunication infrastructure.	Upgrade the current telecommunication infrastructure to utilize new ICT tools
Database	Current databases in every government agency is different and do not have proper security measures.	Merge scattered databases, enable information sharing between government agencies, and establish security measures for data retrieval.
E-government website	E-government websites have outdated information due to the lack of constant updates. Existing services are few. Improper websites designs.	Constant update on the current e-government websites to provide essential service, up-to-date information and necessary contents. Design user-friendly interface that strives for simplicity and great layout.
Security	Lack of security measures in e-government websites and citizens’ database.	Provide security measures to ensure users’ privacy and data protection.
User participation	Complaints from users are usually ignored and users do not have the ability to establish a proper communication with e-government developers.	Enable the real role of users as potential testers and the source of feedbacks.
IT skills	The current IT skills in the population are quite low with no proper knowledge of the usage of e-government.	Share more information on the services available on e-government websites and improve the population’s IT skills through education and training.

#### 4.1. Telecommunication Infrastructure

Iraq suffered from major setbacks after the war in 2003 which held back the development of the basic requirements needed to develop e-government and the telecommunication infrastructure in specific. Obsolete existing telecommunication infrastructure has a negative impact on the stability of the Internet connection which is the backbone of e-government development. Upgrading the current infrastructure offers a faster connection that can be utilised by advanced ICT tools [15]. Exchange of information is essential in every society regardless of the development level. Exchange of information might not occur without the availability of advanced

ICT tools. Currently, outdated telecommunication infrastructure in Iraq is considered one of the main challenges standing in the face of e-government development [16, 17, 18, 19, 20, 21, 22, 23].

#### 4.2. Database

The existence of a database to store the huge amount of data processed in and out of the government agencies is a necessity to establish a successful e-government system. E-government depends on the right dissemination of data and the connection provided to many agencies to securely transfer that data. The importance of a database is cemented since data processing and information retrieval are mainly used for the benefit of citizens' transactions. The exchange of information on a large scale might be a hard task to achieve without the existence of a centralised database. Iraq has many databases that were built over a long period of time and in different sectors of government offices. For e-government of Iraq, the challenges concerning database are the absence of a centralisation[19], availability of data [24], interoperability [19, 25, 17, 16, 24], data encryption[26], authentication to access database[20], and the right distribution of data[20]. It is a difficult task to solve all the issues concerning databases which are scattered around the government agencies in Iraq. However, solving these issues is essential to remove any redundancy in the records, protect each user's data, and track citizens' transactions.

#### 4.3. E-government Website

In Iraq, e-government websites suffer from inadequate content [24, 16], absence of important services and functions [22, 26, 16, 23], and non-optimised performance, and also poor design [22, 20, 26]. The criteria to assess e-government websites are different depending on the evaluation measures used in each study[27]. Since websites are considered the main interface for users to access e-government services, the design and performance of such websites should be top notch. Website design has a great impact on users since it involves arrangement of information, navigation map, and visuals [28]. Great functionality presents the user with the ability to acquire a service or search for information effortlessly on e-government websites [29]. The arrangement of information and the method used to display that information (i.e. website design) can be used to shape users' perception and their views on e-government websites [30, 31]. There are other things that have to be taken into consideration when talking about e-government websites, namely, quality of contents, structure of pages, number of e-services provided, and visibility on search engines.

#### 4.4. Security

With the advancement in technology such as cloud computing and the Internet can provide new capabilities to the existing e-government systems. These new technologies present some benefits along with compromises to the users' data and the ability to control that data. The major challenges concerning security in Iraq are the lack of security measures[16, 20, 21, 26, 23] such as confidentiality of user's data [22, 26] and proper authentication of user's identity [26]. Security is the protection from unauthorised access, modification of data, and disclosing information to third parties. This protection extends to cover information, systems, assets, and preserving control over them. Security is one of the fundamental requirements of e-government. The usage of e-government services will be at minimum levels without any proper security measures. Enabling security measures such as identification or authentication can help in fulfilling security requirements and promotes the feeling of "being secured" to the users.

#### 4.5. User Participation

User participation in the system development is considered essential and poses a great challenge to the development of e-government in Iraq [17, 20, 22]. While it is possible for the system developers to design a great system, the features and services introduced in that system might not be a real necessity for users. However; e-government system will be abandoned by users if such system introduced confusing functions and needless services. Faulty systems such as that will happen in the absence of user participation. The ability to participate in the system development process will present developers with insights and feedback from users which will serve as guides to identify defects in an e-government system. In information system, user involvement in the development process is expected to contribute to its success, especially when the users find the system to be relevantly important to them. User involvement in the software development is the feeling of importance and relevance of the system to the user. On the other hand, user participation refers to the user taking part in the activities of system development alongside the developers. It is notable that system developers think about users when designing a system yet user participation is also important in deciding the direction of system development.

#### 4.6. IT Skills

For users of e-government websites in Iraq, the lack of IT skills needed to navigate websites and request a service is what makes it an essential challenge [16, 17, 19, 21, 32, 23]. The process of acquiring most of the basic IT skills are also overlooked by governments [33]. While no fancy skills are required to upload a photo or share personal information, the skills to protect that data are still necessary [34]. For instance, giving permission to access private data to apps or programs without the proper knowledge of the risks might compromise user's privacy. Some of the user's personal information might be disclosed to third parties without their consent or knowledge. For users to acquire the basic IT skills, more information can be provided by the government on the basic uses and threats from using online tools.

### 5. Discussion and Conclusion

This study employed a systematic review to present rich data on the cause of setbacks in the e-government development in Iraq. The main objective was to specify the main themes of technical challenges which obstructs e-government development in Iraq. The data collected from papers were analysed to prove the existence of the six themes of challenges. The identified six themes are low IT skills, old telecommunication infrastructure, no e-government database, lack of security measures, no user participation, and poor website design and performance. The ability to reach the next stage of development becomes possible when the challenges are made known to the e-government developers. Since the themes of these challenges were identified, it is easy for the people-in-charge to focus their improvements on certain areas in the current e-government of Iraq. Telecommunication infrastructure in Iraq is not as developed to the point where users can enjoy uninterrupted access to the e-services provided by the government. According to a survey published by [6], similar cases are found in other developing countries where the telecommunication infrastructure index registered lower.

The first phase of development should be the enhancement of telecommunication infrastructure and connecting the scattered databases which are considered to be the most important challenges to be solved in the beginning stages. Since outdated telecommunication infrastructure can slow down any development made on e-government, it was one of the necessary challenges that must be solved as quickly as possible. The database challenge is considered a necessity because, without a suitable centralised

database, information sharing between government agencies can be limited or non-existent. The second phase of development can be initialised by adding more e-services to e-government websites and enhancing the websites for a better user experience. The second phase of development should include applying security measures to protect users' data and transactions. With the inclusion of security and enhancement of the websites, the two basic and important goals of e-government can be achieved which are the provision of information and services. The last phase of development comprised of the involvement of user in the development process of e-government and improving the IT skills of users. With new threats to the users' data and daily technological updates, it might be possible to conclude that knowledge and IT skills are constantly evolving. The change extends to the users' preferences and requests which in time may ensure the pairing between users' needs and developers' insights is continuous. The third phase of e-government development will be the last phase and it can be counted as the non-stopping phase as users' needs and knowledge are regularly changing. The findings of this study revealed the existence of six main themes of challenges as the cause of issues in the development of e-government in Iraq. The issues found in the literature were grouped together based on the type of their impact on e-government development. As a result, each theme represents specific parts of the technical challenges gathered from the systematic literature review. Recognising the technical challenges gathered in this study will assist e-government in Iraq to advance to the next level. At the moment, the limitations placed on e-government in Iraq restrict the ability to make online payments and limit the number of citizens' online transactions. Also, the gathered literature from the systematic review of the literature showed the existence of non-technical challenges, however, they were excluded since they did not meet the scope of this study. Future possibilities of e-government might be seen through empowering societies and enabling users' customisation of their services.

## References

- [1] M. Kurfalı, A. Arifoglu, G. Tokdemir and Y. Paçin, "Adoption of e-government services in Turkey," *Computers in Human Behavior*, vol. 66, pp. 168-178, 2017.
- [2] V. Pandey and S. Gupta, "Understanding G2G e-government project impasse: A stakeholder theory perspective," *Information Development*, vol. 33, no. 4, pp. 361-374, 2017.
- [3] K. Pedersen, "Realizing e-government benefits with minimal capabilities," *Transforming Government: People, Process and Policy*, vol. 11, no. 2, pp. 262-285, 2017.
- [4] R. Heeks, "Information systems and developing countries: Failure, success, and local improvisations," *The information society*, vol. 18, no. 2, pp. 101-112, 2002.
- [5] L. Anthopoulos, C. G. Reddick, I. Giannakidou and N. Mavridis, "Why e-government projects fail? An analysis of the Healthcare.gov website," *Government Information Quarterly*, vol. 33, no. 1, pp. 161-73, 2016.
- [6] UNPAN, "United Nations E-government Survey 2016: E-government in support of sustainable development," New York: UNPAN, 2016.
- [7] N. A. Nguyen, "A Cross-Cultural Study on e-Government Services Delivery," *The Electronic Journal Information Systems Evaluation*, vol. 19, no. 2, pp. 121-134, 2016.
- [8] L. Waller and A. Genius, "Barriers to transforming government in Jamaica: challenges to implementing initiatives to enhance the efficiency, effectiveness and service delivery of government through ICTs (e-Government)," *Transforming Government: People, Process and Policy*, vol. 9, no. 4, pp. 480-497, 2015.
- [9] E. Nica, "Sustainable Development and Citizen-centric E-government Services," *Economics, Management, and Financial Markets*, vol. 10, no. 3, p. 69-74, 2015.
- [10] E. Bonsón, S. Royo and M. Ratkai, "Citizens' engagement on local governments' Facebook sites. An empirical analysis: The impact of different media and content types in Western Europe," *Government Information Quarterly*, vol. 32, no. 1, pp. 52-62, 2015.
- [11] E. Claver-Cortés, S. de Juana-Espinosa and J. Valdes-Conca, "E-Government Implementation, Work Process Changes and Competency Training in Spanish Town Councils," *International Journal of Synergy and Research*, vol. 5, p. 5-18, 2017.
- [12] D. Napitupulu and D. I. Sensuse, "The critical success factors study for e-Government implementation," *International Journal of Computer Application*, vol. 89, no. 16, pp. 23-32, 2014.
- [13] [M. J. Ahn and Y. C. Chen, "The Promises and Opportunities of Information Technology in Government," in *Routledge Handbook on Information Technology in Government*, vol. 3, Taylor & Francis, 2017, pp. 3-8.
- [14] C. Okoli, "A guide to conducting a standalone systematic literature review," *Communications of the Association for Information Systems*, vol. 37, no. 1, pp. 879-910, 2015.
- [15] R. S. Naoum and Z. A. Nadhim, "An Enhanced Model for e-Government (A Comparative Study between Jordanian and Iraqi Citizens)," *International Journal of Advanced Computer Research*, vol. 4, no. 1, pp. 11-18, 2014.
- [16] M. A. Mohammed, B. M. Aboobaidar, H. Ibrahim, H. A. Abdullah, M. H. Ali, M. M. Jaber and A. Shawkat, "E-government and its Challenges in Developing Countries: Case Study Iraqi e-Government," *The Social Sciences*, vol. 11, no. 17, pp. 4310-4319, 2016.
- [17] A. A. Al Ijarah, A. A. Zwain and L. A. Al-Hakim, "The adoption of e-government services in the Iraqi Higher Education Context: An application of the UTAUT model in the University of Kufa," *Journal of Information Engineering and Applications*, vol. 3, no. 10, pp. 77-84, 2013.
- [18] S. S. Dawood, "Kurdistan Region E-Government, Requirements and Benefits," *Journal of Emerging Trends in Computing and Information Sciences*, vol. 3, no. 10, pp. 1358-1367, 2012.
- [19] H. H. Al-jebory and H. A. Al-saadi, "All the Public Services by a Single Point in Electronic Government: Government Portal in Iraq," *Journal of Al-Qadisiyah for computer science and mathematics*, vol. 3, no. 1, pp. 254-262, 2017.
- [20] M. k. Faaeq, K. Alqasa and E. M. Al-Matari, "Technology Adoption and Innovation of E-Government in Republic of Iraq," *Asian Social Science*, vol. 11, no. 3, pp. 135-145, 2015.
- [21] K. M. Ahmad and J. Campbell, "Citizen perceptions of e-government in the Kurdistan region of Iraq," *Australasian Journal of Information Systems*, vol. 19, pp. 1-29, 2015.
- [22] D. S. Al Azzawy, "Review on Challenges in Building Knowledge based Societies through E-Governance Framework: Technology and Management Issues from Global Perspective," *Indian Journal of Science and Technology*, vol. 10, no. 28, 2017.
- [23] O. J. A. A. S. a. K. T. O. Ameh, "Significant factors causing cost overruns in telecommunication projects in Nigeria," *Journal of Construction in Developing Countries*, vol. 15, no. 2, pp. 49-67, 2010.
- [24] H. S. Abdulwahid, A. A. Mutalib, S. A. M. Yusof and S. J. Ali, "Designing and implementation Iraqi e-government front office online system," *Journal of Knowledge Management, Economics and Information Technology*, vol. 4, no. 2, pp. 1-11, 2014.
- [25] J. T. Abaas, A. S. Shibghatullah and M. M. Jaber, "Use Information Sharing Environment Concept to Design Electronic Intelligence Framework for Support E-Government: Iraq as Case Study," *Advances in Computing*, vol. 4, no. 1, pp. 22-24, 2014.
- [26] M. K. Ibrahim and M. A. J. Hamid, "Secure e-government framework: design and implementation," *International Journal of Science, Engineering and Computer Technology*, vol. 3, no. 5, pp. 186-193, 2013.
- [27] J. Wu and D. Guo, "Measuring E-government performance of provincial government website in China with slacks-based efficiency measurement," *Technological forecasting and social change*, vol. 96, pp. 25-31, 2015.
- [28] S. F. Pengnate and R. Sarathy, "An experimental investigation of the influence of website emotional design features on trust in unfamiliar online vendors," *Computers in Human Behavior*, vol. 67, pp. 49-60, 2017.
- [29] M. M. Jeon, "Customers' perceived website service quality and its effects on e-loyalty," *International Journal of Contemporary Hospitality Management*, vol. 29, no. 1, pp. 438-457, 2017.
- [30] X. Peng, D. Peak, V. Prybutok and C. Xu, "The effect of product aesthetics information on website appeal in online shopping," *Nankai Business Review International*, vol. 8, no. 2, pp. 190-209, 2017.
- [31] A. Riaz, S. Gregor and A. Lin, "Biophilia and biophobia in website design: Improving internet information dissemination," *Information & Management*, vol. 55, no. 2, pp. 199-214, 2018.

- [32] W. R. B. S. Osman, M. H. Abdulraheem and M. M. Nadzir, "Factors That Influence the Citizens' Participation in E-Government Decision," *Research Journal of Applied Sciences, Engineering and Technology*, vol. 14, no. 9, pp. 341-346, 2017.
- [33] E. Wihlborg, K. Hedstrom and H. Larsson, "E-government for all—Norm-critical perspectives and public values in digitalization," 2017.
- [34] A. Alkhwaldi, M. Kamala and R. Qahwaji, "From e-government to cloud-government: Challenges of Jordanian citizens' acceptance for public services," 2017.
- [35] J. G. Kimani, "Challenges Facing Integration and Use of ICT in the Management of County Governments in Kenya," *Journal of Information and Technology*, vol. 1, no. 1, pp. 1-11, 2017.
- [36] V. Iyengar, S. Pillai, J. Pednekar and M. Abhyankar, "Enablers for Digital Empowerment in Technology using Interpretive Structural Modeling (ISM) and MICMAC Analysis," *International Journal of Applied Business and Economic Research*, vol. 15, no. 2, pp. 161-176, 2017.
- [37] L. Anthopoulos, C. G. Reddick, I. Giannakidou and N. Mavridis, "Why e-government projects fail? An analysis of the Healthcare.gov website," *Government Information Quarterly*, vol. 33, no. 1, pp. 161-173, 2016.
- [38] B. K. Joseph, "Determining Factors Influencing E-Government Development in the Developing World: A Case Study of Zambia," *Journal of e-Government Studies and Best Practices*, pp. 1-16, 2017.