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Policy Implications of E-Government Development Index Trends: A Case Study of Middle Eastern Countries

Sukma Aditya Ramadhan
Universitas Muhammadiyah Yogyakarta
sukma.aditya.psc23@mail.umy.ac.id

Achmad Nurmandi
Universitas Muhammadiyah Yogyakarta
nurmandi_achmad@umy.ac.id

Misran
Universitas Muhammadiyah Yogyakarta
misranalfarabi@gmail.com

Abstract

This research aims to provide a thorough analysis of the progress of e-government in the Middle East. Analyzing a biennial survey of 192 UN member states, this article reviews 10 Middle East and their level of development in the E-Government Development Index (EGDI). This study used quantitative methods using secondary data. The secondary data in this study was from the UN E-Government Knowledgebase. Then data from the E-Government Development Index (EDGI) and analysis of related scientific articles were used. The data covers the period from 2016 to 2022, and there are 192 UN member states. The reason behind this study is to provide insight into the factors influencing the development of e-government and to assist policymakers in designing strategies to improve e-government services. This study contributes to the theoretical debate regarding e-government by illustrating how technological infrastructure, political stability, and resource investment are essential for successful implementation. The focus of the research is to analyse the development of e-government in the Middle East. Reviewing the E-Government Development Index (EGDI) of 10 Middle Eastern countries, the study highlights the variability in e-government developments in the region. In particular, it noted that the United Arab Emirates' progress was due to infrastructure and education investments, as well as Afghanistan's challenges due to conflict and limited resources. These findings are essential for understanding the context of E-Government in these countries and assisting policymakers in designing strategies to improve e-government services and development.

Keywords: *EGDI, Online Services Index, Human Capital Index, Telecommunication Infrastructure Index, Asia Middle East*

INTRODUCTION

The development of information technology globally has experienced rapid progress, especially in the government sector. (Danuri, 2019). E-government or e-government has emerged as an innovative solution to optimise the efficiency and transparency of the public sector. The demands of the global community drive this trend to achieve efficiency, transparency, performance improvement, and innovation through the adoption of Internet and web-based services (Ronchi, 2019). E-government aims to revolutionise government operations to be more efficient, effective, and open. It provides superior, economical, and fast services and allows for the active involvement of citizens and the business sector in the government process (Lněnička, 2015). This transformation began in 1990 when the government started offering public e-sector services online, marking an important milestone on the road to a more modern and digitally connected government (Marin, 2022).

The implementation of e-government is expected to provide better and faster services to the community. The online system allows people to access services such as document submission, tax payment, and obtaining permits without having to visit government offices, thereby reducing bureaucracy and speeding up the service process (Singh et al., 2022; Hooda et al., 2022). In addition, e-government opens up opportunities to apply the principles of e-democracy, strengthening citizen involvement in government affairs (Adnan et al., 2022; Abied et al., 2022).

A critical aspect of e-government is increased transparency. Government information is publicly accessible to the public, which helps to prevent corrupt practices and allows for tighter scrutiny of government actions (Alomari et al., 2022; Sheoran & Vij, 2022). The e-government development index (EGDI) and the pace of the digital economy reinforce each other in a beneficial symbiosis. Developing countries have shown a high commitment to investing in e-government systems to provide more efficient services, involve the public in decision-making, and increase transparency and accountability (Bakon et al., 2020; Agbozo &; Asamoah, 2019 ; Tintin et al., 2018). However, the implementation of e-government requires more active promotional efforts to encourage citizen involvement in government affairs and build an open and collaborative government (Cifuentes Faura, 2022). The global e-government ranking serves as a compass for countries to strengthen their strategies, measuring the effectiveness of e-government through a comprehensive assessment that includes the quality of government services (Araújo &; Andrade, 2022). One of the critical reports that monitors the development of e-government is the UN E-Government Development Index (EGDI) (Baranov, 2022; Jain, 2022).

EGDI is used to measure the development of e-government in various regions and countries at the national level. Data from the UN E-Government Survey provides a comprehensive picture of the progress of e-government development, helping countries identify areas for improvement and adaptation of their strategies (Nations, 2022).

Some studies that have reviewed the analysis of the e-government development index in the Middle East include; Hi et al., (2021), looking at the challenges, especially in developing countries, Anwar et al., (2016), Public satisfaction with e-government services, ElMassah & Mohieldin, (2020) Digital transformation and localizing the Sustainable Development Goals (SDGs), C. Wang &; Ma, (2022), Government satisfaction, transparency, accountability, and performance. Kuldosheva (2021), With a focus on technological advancements, there is a gap between design and implementation in the digitization of public services, including E-Government infrastructure and interoperability of government authorities. Treceñe, (2022), ICT infrastructure development, Dobrolyubova, (2021), The effectiveness and efficiency of public administration. Jain, (2022) Check whether policy implications could affect the improvement of EGDI. Al-Refai, (2020) The development of e-government encourages economic growth in GCC countries. In previous studies, there needed

to be a discussion about the e-government Development Index in the Middle East.

The theoretical debate about e-government focuses on effectiveness, efficiency, transparency, and public participation. E-government is expected to improve the efficiency of government operations, increase transparency through broader access to public information, and increase citizen participation in the government decision-making process. Research by Twizeyimana & Andersson (2019) shows that e-government has excellent potential to improve the effectiveness and efficiency of government operations by reducing bureaucracy and accelerating the public service process. However, the effectiveness of e-government is highly dependent on the quality of information technology infrastructure and the digital skills of civil servants (Twizeyimana & Andersson, 2019). E-government can also increase transparency by providing open access to government information, which can reduce corruption and increase government accountability. This transparency allows the public to monitor and evaluate government policies and expenditures (Agbozo & Asamoah, 2019). E-government also has the potential to increase public participation by providing an e-participation platform where citizens can give input, express opinions, and participate in the electoral process electronically, which can strengthen democracy and increase government legitimacy (Adnan et al., 2022)

This research shows that technological infrastructure, political stability, and resource investment are essential for the successful implementation of e-government. The UAE has successfully improved operational effectiveness and efficiency through significant investments in technology infrastructure and digital training for civil servants (Arafat et al., 2017). The adoption of new technologies, such as blockchain in the UAE improves data security and transparency, which helps build public trust in e-government services (Almuraqab, 2017). In addition, the improvement of digital skills and the provision of e-participation platforms in the UAE has increased public participation in the governance process, which is in line with the finding that e-government can strengthen the democratic involvement of citizens. (Adnan et al., 2022).

The purpose of this study is to analyze the Development index in the Middle East by examining the UN E-Government Survey 2016-2022. This research makes a significant contribution in both theoretical and practical aspects. From a theoretical perspective, this study not only corroborates empirical evidence and confirms the results of previous research but also develops and updates findings in similar fields. This study objectively presents crucial data and conclusions to understand the context of E-Government in a country. Notably, this study focuses on the E-Government Development Index (EGDI) in the Middle East, an index that measures and shows the development of E-Government in developing countries. From a practical point of view, the results and strategies proposed in this study are essential to assist policymakers and governments in designing and implementing policies and procedures that will improve E-Government services and development.

This research reveals that digital infrastructure is very important for the success of e-government. In some Middle Eastern countries, significant investments in IT infrastructure have accelerated the development of e-government, while countries with less developed infrastructure are facing difficulties. Political stability is also a crucial element; for example, Afghanistan has experienced significant obstacles in the development of e-government due to prolonged conflict and limited access to resources. These results show the importance of political stability and resources. The study also emphasizes the need for solid national policies to support e-government, as seen from the progress in the UAE. The level of e-government development varies in Middle Eastern countries, reflecting differences in technological capacity, policies, and investment priorities. This study proposes a more in-depth analysis to identify the factors that contribute to this variability and strategies to overcome barriers. In addition, e-government is closely related to increasing

public participation and government transparency. While there has been progress in some countries, more research is needed on how e-government can be more effective in improving citizen engagement and government transparency. The study highlights that although some Middle Eastern countries have made significant progress, there are still many challenges that need to be overcome in the development of e -government.

Literature Review

E-Government

E-government generally summarizes three areas of activity that use Information and Communication Technology (ICT): improving the efficiency and effectiveness of government executive functions, including the delivery of public services; increasing government transparency by giving citizens better access to a wide range of information; and enable fundamental changes in the relationship between citizens and public sector organizations, with repercussions on democratic processes and governance structures (Hariguna et al., 2022). Electronic government (e-government) is one of the digital platforms that facilitates the provision of government services to society with two-way connections that can adapt to changes in technology, design, and strategy. Information in e-government is not only normative, but can also involve direct two-way interaction that benefits both parties (Pazmiño-Sarango et al., 2022 ; Lindgren et al., 2021). E-Government is the concept of sending government information and services online through the Internet or other digital platforms. More than just being a new channel in the provision of government services, e-government also aims to provide transparency and efficiency in the administration (Güler et al., 2020). In this context, in parallel with the advancement of the Internet and the ever-increasing growth in penetration rates, government websites were initiated as platforms that present information, technological applications, and various resources to citizens (Tejedo-Romero et al., 2022).

The concept of E-Government should not only include the utilisation of Computer Information Technology (ICT) by the public sector, but also describe the use of ICT that aims to change governance positively. The goal is to increase efficiency, easy accessibility, and transparency (Osah & Pade-Khene, 2020). The development of e-government can be tracked around the world by analyzing the United Nations E-Government Survey report. Every two years since 2001, the UN Department of Economic and Social Policy has surveyed the level of development of e-government services in all 193 member states. However, it is only since 2003 that the UN has presented the collected data in the form of reports (Zioło et al., 2022). Electronic Government or E-Government is a significant part of the global government modernization initiative (Mellouli et al., 2020). System integration is a common approach in the development of E -Government, with the aim of improving efficiency and coordination in the provision of public services. This integration process involves unifying existing systems and data, with a view to reducing redundancy and improving government responses to community needs more quickly (Bwalya & Mutula, 2016).

The United Nations E-Government Development Index (EDGI)

The e-government development index (EGDI) is based on expert surveys used by the United Nations to measure ICT adoption in government for the delivery of essential public services. The E-Government Development Index presents the state of E-Government Development of the Member States of the United Nations. EGDI is a composite measure of three critical dimensions of e-government, namely, online service provision, telecommunications connectivity, and human capacity (United Nations, 2010) (Chipeta, 2018).

The following is an explanation of the three dimensions of e-government. The Online Services Index is a measuring tool that determines the maturity level of a country's e-government website. It includes an evaluation of national websites and related portals, as well as websites of various ministries, including education, labor, social services, health, finance, and environment. The Telecommunication Infrastructure Index

(TCI) measures the performance of a country's telecommunications infrastructure. The assessment is based on five leading indicators: number of internet users, number of fixed-line lines, number of mobile phone subscribers, number of fixed internet subscriptions, and availability of fixed broadband facilities. HCI (Human Capital Index) is calculated by taking into account the literacy and education rates of adults in a country (Zhao et al., 2022; Aniscenko et al., 2017 ; Kabbar, 2020 ; Alkhatri et al., 2017).

Before normalising the three component indicators, the first step is to apply the Z-score standardisation procedure to each component indicator. This is done to ensure that EGDI is equally affected by three component indexes, meaning that each component index will have a similar variance after the standardization of the Z-score. Without a Z-score standardisation process, EGDI will tend to be more influenced by component indices that have the most significant variation. After standardising the Z-score, the arithmetic mean became a corresponding statistical indicator, where the term "equal weight" effectively meant "equal importance." To calculate the standard Z-score of each component indicator:

$$Xnew = \frac{(x-\mu)}{\sigma}$$

X is a raw score that should be standardised;
μ is the population average;
σ is the standard deviation of the population.

Table 1. Taxonomy of Research Literature

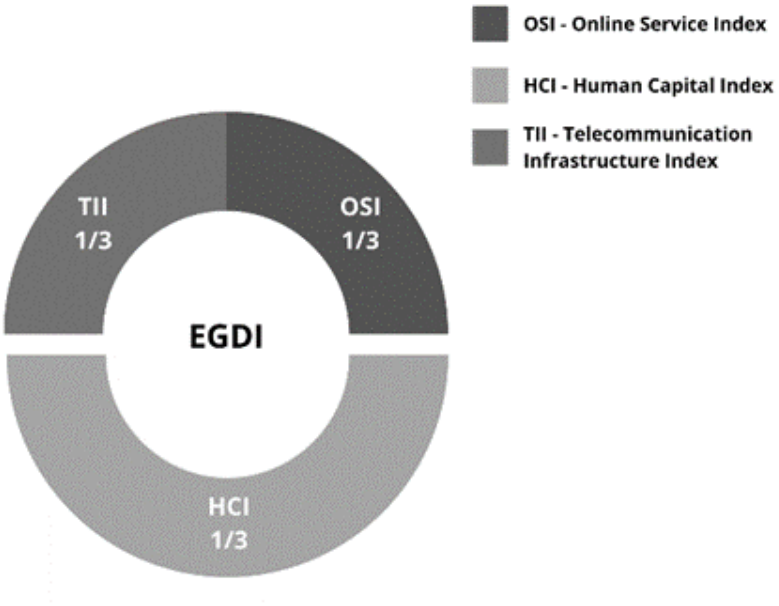
No	Authors	Theory/Model	Variable or key concepts	Adoption or use of target	Sample Population
1.	(Turmanidze et al., 2020)	E-Government Indicator	Development indices (DI); e-Government development index (EGDI); Human capital index (HCI); Online service index (OSI); Telecommunications infrastructure index (TII)	E-Government Development	Local Government
2.	(Ivanova et al., 2023)	N/A	Assessment; Digital government; Digital Transformation; E-Government; E-Government Development Index	Lack of Index Methodology (EGDI)	Country
3.	(Kabbar, 2020)	Metrics E-Government Development Index (EGDI)	E-government; Egdi; Online government services; United Nations	E-Government Development	Participating countries
4.	(Ahmadi et al., 2022)	GIS-based EGDI estimation framework	EGDI, E-Gov, TII, HCI, OSI	e-Gov Penetration	Local Government
5.	(Dhaoui, 2022)	Econometric modelling and comparative analysis methods.	E-government; Good governance; Sustainable development; MENA countries	E-government for sustainable development	MENA Countries
6.	(Sophia Yuliantini &; Nurman-di, 2023)	N/A	E-Government Development Index; European Union Countries; Worldwide Governance Indicator	E-Government Development Index	European Union member countries.

7.	(Azoeva et al., 2022)	N/A	Gross domestic product per capita; EAEU countries; e-government; human capital; telecommunications infrastructure; e-Government Development Index	E-Government Development Index	Eurasian Economic Union (EAEU) countries
8.	(Gupta et al., 2020)	E-governance Assessment Framework	E-Governance; E-governance development index; India; United Nations	Developing Nations	Local Government
9.	(Castro & Lopes, 2022)	Logit Model	Sustainable development; E-government; Adjusted net savings; Natural Resources	Development Sustainable	Countries
10.	(Al-Refai, 2020)	E-Government Indicators	e-government; e-government development index; economic growth; Gulf Cooperation Council	Impact of e-government on economic growth	6 Gulf Cooperation Council countries
11.	(Majerova, 2019)	E-Government Indicators	E-government Development Index	Public Administration	Visegrad Group countries
12.	(Lněnička, 2015)	N/A	E-Government; Public sector	E-Government Development Index	European Union Member States
13.	(Salihi et al., 2018)	World Wide Web Consortium	Accessibility; e-government; physically challenged users; websites; web-accessibility.	E-Government Service and Web 2.0	e-government websites
14.	(Bougherra et al., 2023)	Mixed Method	E-government; Democracies; Autocracies	E-Government Performance	Local Government

Source: www.scopus.com (2015-2022)

METHODS

This study used quantitative methods using secondary data. The secondary data in this study was from the UN E-Government Knowledgebase. Then data from the E-Government Development Index (EDGI) and analysis of related scientific articles were used. The data collection is taken from the E-Government Development Index (EDGI) 2016-2022 data, OSI Index, TII, and HCI. Mathematically, EDGI is the result of a calculation that uses a weighted average of three critical dimensions of e-government. Three dimensions include : (1) the Online Service Index (OSI), (2) the Telecommunication Infrastructure Index (TII), and (3) the Human Capital Index (HCI). Each of these indices is a composite of various factors that can be investigated and analyzed independently. (Nations, 2022)



Source: (Knowledgebase, 2023)

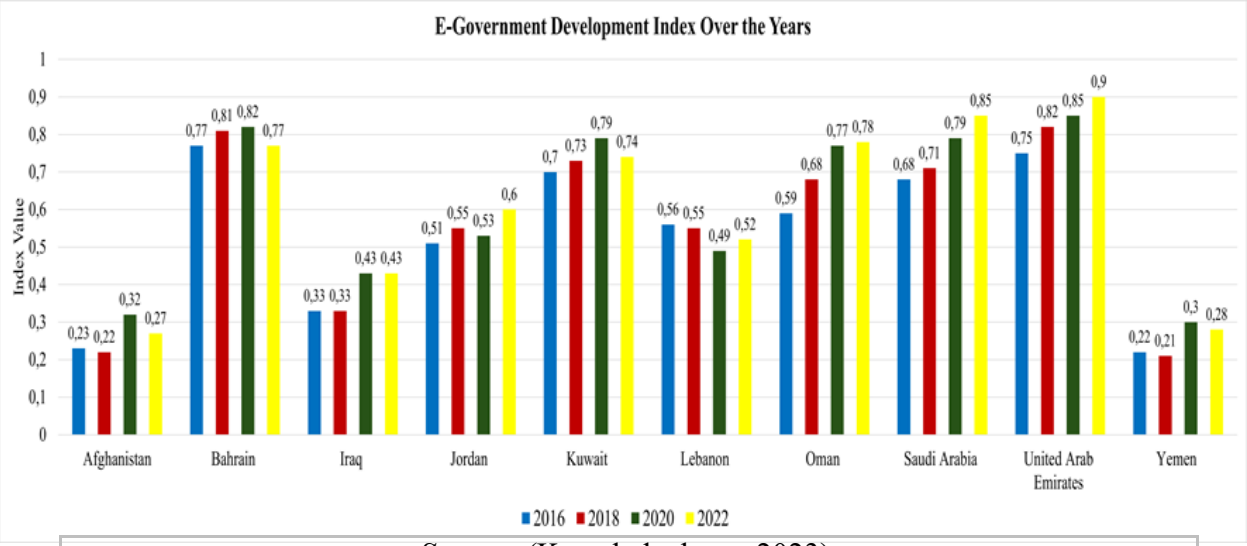
Figure 1. The Three Components of the E-Government Development Index (EGDI)

EGDI= 1/3 [OSI Normalized $_{+HCI}$ No Normalize $_{+ TII}$ Normalized$_{]}$

The E-Government Development Index provides an overview of the development of E-Government in the member states of the United Nations. By evaluating website development patterns within a country, the E-Government Development Index incorporates aspects of access, such as infrastructure and education levels, to reflect how a country uses information technology to encourage access and inclusion of its people. EGDI is a composite indicator covering three critical dimensions of E-Government: online service provision, telecommunications connectivity, and human capacity.

Before providing the E-government index for the Middle East and its analysis, it is necessary to consider several things in order to avoid confusion related to the information presented, as follows: Countries included in the Middle East are the focus of study and analysis. These countries are Iraq, Jordan, Kuwait, Lebanon, Afghanistan, Oman, Bahrain, United Arab Emirates, Yemen, and Saudi Arabia. The study concentrated on the Middle East due to significant variations in e-government development observed across the region. Countries such as the United Arab Emirates have made substantial progress through massive investments in infrastructure and education, while Afghanistan faces challenges due to ongoing conflict and limited resources. This variability provides an opportunity to explore the factors that affect the development of e-government at the regional level. The Middle East has considerable geopolitical and economic significance. Given its rich natural resources and strategic position, understanding how information technology and e-government are developing in this field offers valuable insights into the interaction between technology and geopolitical and economic factors.

The basis of this sub-index is the belief that E-Government should involve multiple dimensions in order for people to benefit from online services and information. The study used data from the United Nations E-Government Development Index (EGDI). This index score is considered an independent and credible source in the context of E-Government development. A brief description of each statistically analyzed variable in the study is presented below.



Source: (Knowledgebase, 2023)

Figure 2. Middle East Countries EGDI Score in 2016-2022

EGDI: (0.34x online services index) + (0.33x telecommunications index) + (0.33x Human Capital Index)

In the range of EGDI values from 0 to 1, the countries are divided into four tiers. Mathematically, the levels are defined as follows: very high EGDI values (0.75 to 1.00 inclusive), high EGDI values (0.50 to 0.7499 inclusive), medium EGDI values (0.25 to 0.4999 inclusive), and low EGDI values (0.0 to 0.2499 inclusive) (Knowledgebase, 2023). In all references to this range in text and graphic elements, each value is rounded for clarity and expressed as follows: 0.75 to 1.00, 0.50 to 0.75, 0.25 to 0.50, and 0.00 to 0.25. For a deeper understanding of the situation of country subgroups with equivalent levels of performance within each EGDI group, each EGDI group is redivided into four intervals or quartiles with similar definitions.

FINDINGS AND DISCUSSION

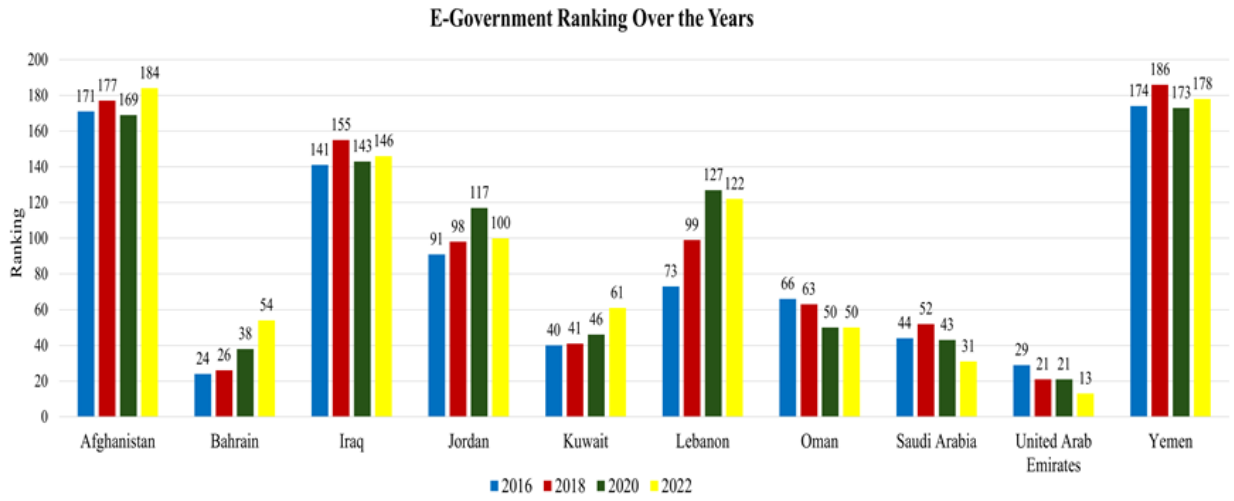
Findings

This research consists of five parts, namely Part I, which discusses the E-Government Development Index (EGDI); Part II, which discusses E-Government Ranking; Part III, which examines the Online Service Index (OSI); Part IV, which reviews the Human Capital Index (HCI), and Part V which discusses the Telecommunication Infrastructure Index (TII). These five pieces of data will be presented with reference to the last five years.

E-Government Development Index (EGDI)

The E-Government Development Index (EGDI) ranks it from highest to lowest. Scores that are in the range of 0.75 to 1.00 are classified as very high scores, scores between 0.50 to 0.75 are classified as high scores, scores in the range of 0.25 to 0.50 are categorized as medium scores, and scores less than 0.25 are categorized as low scores. (Younus et al., 2023). Figure 2 is organized as follows: The first column shows the representation of Middle Eastern countries, while the Country EGDI Score data from year to year is shown in the other column.

Figure 2 illustrates the index of e-government development in the Middle East during the period 2016-2022, with index scores showing varying levels. Afghanistan experiences fluctuations in the e-government development index each year, with a score in the low category of 0.30. Afghanistan has experienced a prolonged period of political instability and conflict, severely affecting the government's efforts to develop and maintain e-government infrastructure (Samsor, 2021). In this context, decades of conflict and war, including the invasion of the Soviet Union in 1979 and ongoing conflicts with the Taliban military group



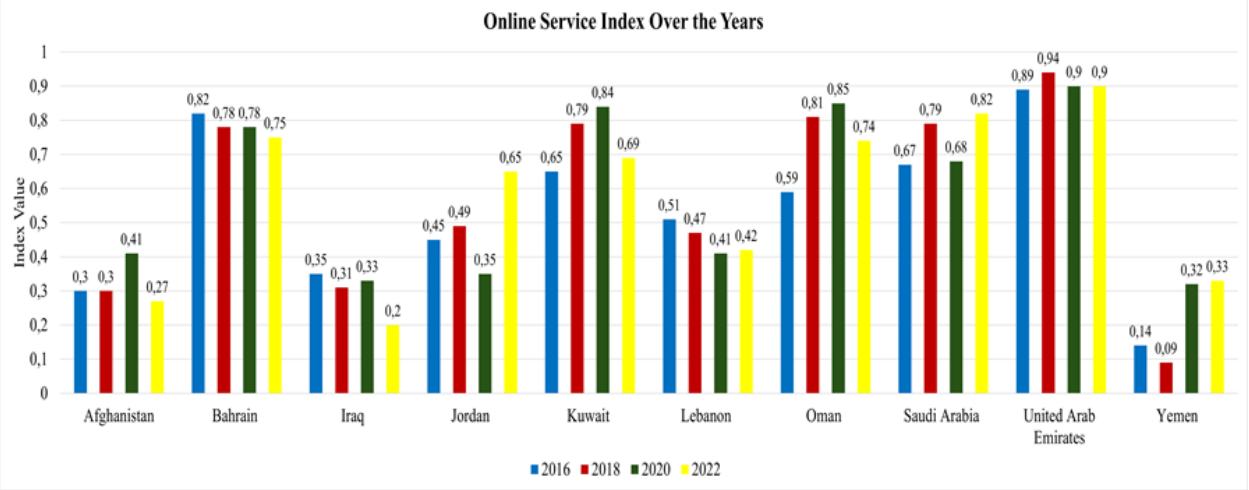
Source: (Knowledgebase, 2023)

Figure 3. EGDI Ranking of Middle East Countries 2016-2022

resulting from this conflict, have damaged infrastructure and disrupted the country's social and economic development (Ahmadi et al., 2022). Meanwhile, The United Arab Emirates has seen annual improvements, reaching a peak in 2022. The UAE has implemented various strategic initiatives and robust policies to advance e-government. For instance, their UAE Vision 2021 encompasses numerous digital and technological initiatives aimed at enhancing government services and improving information and communication technology infrastructure (Minister's Initiatives, 2024; Saberi & Hamdan, 2019). Substantial investments in technology infrastructure have been pivotal. Enhancements in internet access, the development of broadband networks, and the adoption of cutting-edge technologies such as blockchain and artificial intelligence have played crucial roles in improving electronic government services. (Al-Refai, 2020). Collaboration between the public and private sectors in the development and implementation of e-government projects has accelerated technological progress. This partnership facilitates the transfer of knowledge, resources, and technology from the private to the public sector. (Said, 2019). The UAE government is also focused on enhancing the digital skills of its population through training and educational programs (Alwaely et al., 2022). In addition, a report from the UAE Ministry of Finance shows a significant budget allocation for digital infrastructure projects, with funds allocated at 30% of the total annual budget for information and communication technology development (Ministry of Finance, 2022). This has created a more skilled workforce proficient in using digital technologies and contributing to the successful implementation of e-government initiatives. A combination of proactive policies, investment in technology infrastructure, user -friendly digital services, public-private collaboration, a focus on innovation, and enhanced digital skills among the population has propelled the UAE to significant growth in the E-Government Development Index (Almuraqab, 2017; Saberi & Hamdan, 2019).

E-Government Ranking

Figure 3 presents the e-government rankings of the ten countries studied. The United Arab Emirates has held first place for the past five years. Various factors support the year-on-year improvement in the UAE's e-government ranking. The UAE government demonstrates a solid commitment to adopting e-government through policies and strategies that support innovation and digital technology (Bussines, 2021 ; (Al Sayegh et al., 2023). The robust information and communication technology (ICT) infrastructure has been a significant driver in enhancing the UAE's e-government services. (F. Zhao et al., 2019). Additionally,



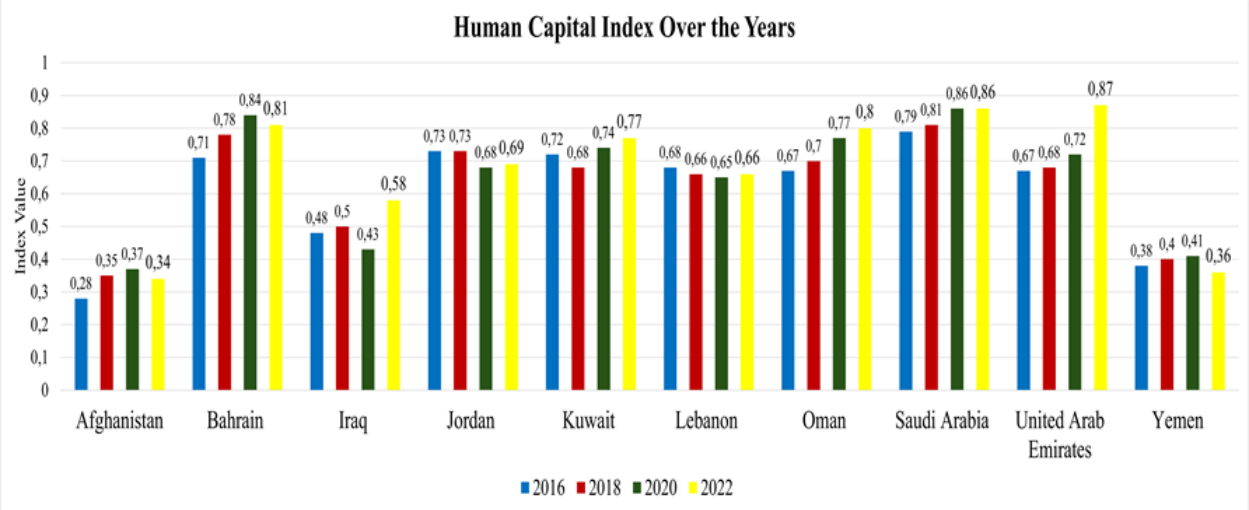
Source: (Knowledgebase, 2023)

Figure 4. OSI Score of Middle Eastern Countries 2016-2022

increased usage and public participation in e -government services indicate that these services are user-friendly and beneficial, contributing to the improvement of e-government rankings (United Arab Emirates Government Portal, 2022). Furthermore, the development of supportive systems and policies, such as e-procurement and change management, has enhanced the efficiency of e-government implementation (Athmay et al., 2016; Camilleri, 2019). In addition, the UAE government's report on the implementation of e-government projects noted an increase in the annual budget for digital projects by 20% annually over the past five years (Minister's Initiatives, 2024). Meanwhile, Afghanistan continues to decline in its e-government ranking each year. Conflicts within the country hinder the development of e-government, and the lack of both foreign and domestic investment to fund e-government initiatives is caused by political instability and ongoing conflicts. This e-government ranking is influenced by the Online Service Index (OSI), Human Capital Index (HCI), and Telecommunication Infrastructure Index (TII). (Ismail et al., 2022).

Online Services Index

Figure 4 shows data for the "Online Services Index (OSI)" of the ten countries studied for 2016, 2018, 2020, and 2022. OSI measures the quality and accessibility of electronic government services available to its citizens online. The United Arab Emirates has made significant progress in the digital sphere with the aim of strengthening online service. The UAE's adoption of new technologies, such as Regulatory Technology (RegTech) and mobile technology, has helped enhance the efficiency of its online services (United Arab Emirates Government Portal, 2024). Implementing these technologies enables real-time data monitoring and improved data security, which boosts public trust in online services. The adoption of m-government services in the UAE is strongly supported by factors such as compatibility, ease of use, social influence, and trust in technology. This study found that users are more likely to utilize government services through mobile applications due to these factors (Almuraqab, 2017; Muzammil & Vihari, 2020). Additionally, in the tourism sector, the adoption of information and communication technology (ICT) by travel agencies in Dubai has demonstrated that using the Internet for various business purposes has enhanced competitiveness and operational efficiency. This includes tailoring services, improving customer communication, and accessing international markets (Zaidan, 2016). A report from the UAE Ministry of Digital Development shows that investment in the development of online services reached USD 1 billion in 2021, with an annual increase of 15% (Ministry of Cabinet Affairs, 2024). Technological innovation and enhancements in digital infrastructure drive the rise in the



Source: (Knowledgebase, 2023)

Figure 5. Middle East Countries HCI Score 2016-2022

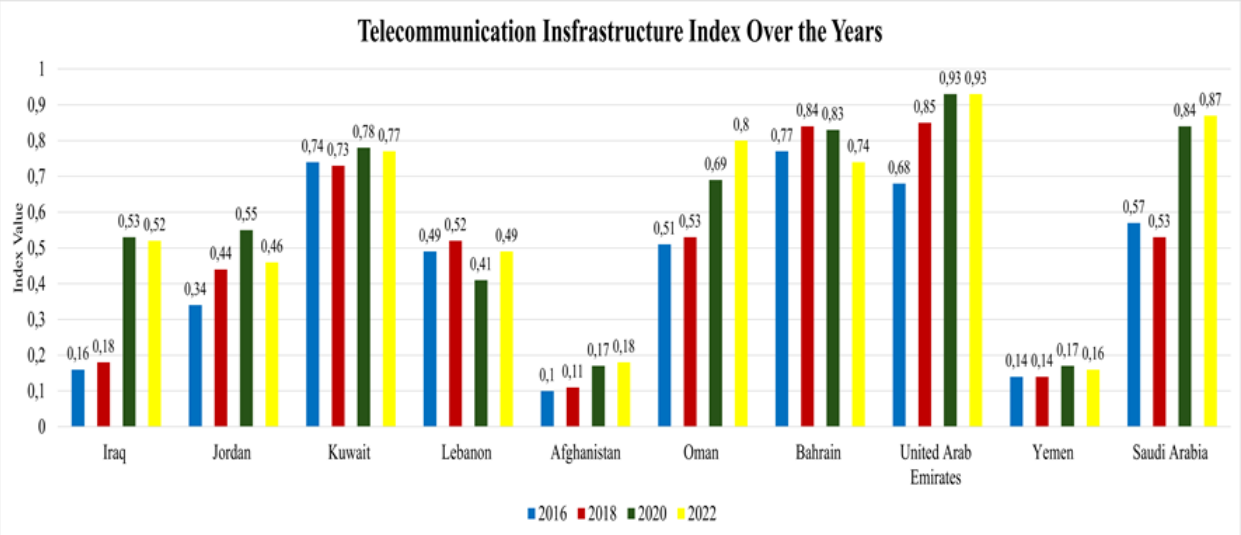
UAE's online service index. The adoption of new technologies, mobile services, and improved user satisfaction with digital government services have significantly contributed to the rise in the UAE's online service index (Alsaadi & Miniaoui, 2018; Balawi, 2021).

In contrast, Afghanistan, although it experienced an increase in 2020 and 2022, experienced a significant decline due to conflict, limited access to reliable electricity, connectivity, and other communication technologies, and limited government resources became obstacles for Afghanistan to improve the index of online services. (Gollob & O'Hanlon, 2020 ; Parray et al., 2021).

Human Capital Index (HCI)

The Human Capital Index is a measurement instrument that highlights how effectively a country's citizens can use and interact with online services provided by its government. This indicator is built on four key elements, including adult literacy rates and enrollment percentages in primary, secondary, and higher education institutions. In Table 4, we can see a detailed overview of the Human Capital Index (HCI). In addition, the table also displays each country's HCI score, which changes each year and is recorded in separate columns to provide a comprehensive view of developments in each country.

Figure 5 illustrates the Human Capital Index (HCI) of different countries from 2016 to 2022. HCI is a measure that may evaluate the potential of human capital accessible to a country, referring to adult literacy levels and enrollment percentages in primary, middle, and upper institutions. Afghanistan is the country with the lowest Human Capital Index among the countries studied. Afghanistan is not an industrial economy and is struggling because of policy failures rather than industrialization (Hameed et al., 2023). Most economic activity is concentrated in Kabul, causing overpopulation and pressure on limited resources. Taliban rule has led to a significant expenditure of educated personnel and skilled professionals from the country (Haqbin et al., 2023). The terror caused by the regime's policies made many educated workers choose to leave the country. Widespread poverty, gender inequality, and discrimination against women and girls are severe issues in Afghanistan. The government has one of the highest maternal mortality rates in the world, and many children, especially girls, are not getting an education (Abdelkarim & Shaimaa, 2021). Reports of gender-based violence are also standard. These obstacles seriously disrupt the development of human capital in Afghanistan. Prolonged conflict and instability have undermined trust in the political system and discouraged foreign investment. At the same time, the



Source: (Knowledgebase, 2023)

Figure 6. TII Score of Countries in the Middle East 2016-2022

government has failed to provide essential services to the people, further exacerbating the situation (Maizland, 2021). A report from the Afghan Ministry of Education shows that only 30% of children are enrolled in primary school, and the adult literacy rate reached only 37% in 2020 (Unicef, 2021)

The increase in the Human Capital Index (HCI) in the United Arab Emirates (UAE) can be attributed to various factors that have promoted human capital development in the country. The UAE has significantly increased its investments in education and skill development to support human capital growth. A study conducted by Aljarallah, 2019 Indicates that better education and skill training contribute to enhanced productivity and workforce quality. The UAE has focused on human resource development to establish a knowledge-based model of sustainable economic growth (El-Saharty et al., 2020). The UAE government has implemented measures to improve governance and minimize corruption, which in turn has enhanced the quality of human capital. Additionally, political stability and consistent policy support have played crucial roles in increasing the HCI in the UAE (Kalaitzi, 2018).

Telecommunication Infrastructure Index (TII)

The telecommunications infrastructure index is a benchmark for evaluating the progress of infrastructure that supports E-Government. The index is based on five primary factors, namely the number of personal computers, internet users, telephone lines, mobile subscriptions, and the increase in broadband subscribers and fixed broadband facilities. Each year, these five factors are evaluated, and in Table 5, we can see the representation of Middle Eastern countries in the first column as well as their year-over-year TII score data in the other columns.

The United Arab Emirates holds a leading position among countries in the research. The high Telecommunications Infrastructure Index (TII) in the UAE, compared to other countries in the region, can be explained by several factors. The UAE has made significant investments in developing modern and advanced telecommunications infrastructure. The government's focus on foundational infrastructure as a basis for economic and social development has enabled rapid progress in the telecommunications sector (Arafat et al., 2017). Partnerships between the public and private sectors have also played an essential role in the development of telecommunications infrastructure (AlGeelani et al., 2020; Alteneiji et al., 2020). The UAE has a robust entrepreneurial ecosystem that supports the adoption of new technologies and innovations in telecommunications infrastructure. This has helped the country achieve a high ranking in

the global telecommunications infrastructure index (Balawi, 2021). A report from the UAE Ministry of Telecommunications noted that the budget for telecommunications infrastructure development has increased by 25% annually over the past five years, with a total investment of USD 5 billion in 2022 (Ministry of Telecommunications, 2024). Finally, the UAE continues to adopt and implement the latest technologies in its telecommunications networks, including advanced 5G technology. The use of these technologies enhances the efficiency and capacity of telecommunications networks, contributing to their high infrastructure index (Alghawi, 2019; Shihada et al., 2021)

Afghanistan's low score on the Telecommunications Infrastructure Index (TII) can be attributed to the various challenges the country is facing. Some of the critical issues affecting Afghanistan's economic prospects, including the development of its infrastructure, include poor connectivity, limited access to energy supplies, low agricultural productivity, and security concerns (F. et al., 2020). Focused infrastructure development will help Afghanistan's long-term growth and address these issues. However, Afghanistan has only limited access to safe drinking water sources, electricity connections, and adequate road infrastructure. Road density in Afghanistan is also considered low compared to its neighboring countries (Shafiei & Puttanna, 2021). In addition, infrastructure development in Afghanistan needs to be improved by limited domestic fiscal resources and insufficient support from development partners for existing investment needs. In addition to support from the Asian Development Bank (ADB), the country needs a coordinated approach from the government for the implementation of ongoing construction projects as well as capacity building in the planning, execution, and monitoring of investment projects. Success in infrastructure development also depends on the government's ability to address skills shortages and stimulate private -sector investment in infrastructure development (Esmatullah, 2021).

Discussions

Data analysis indicates that countries with substantial infrastructure investments, such as the United Arab Emirates, have shown significant progress in the e-Government Development Index. These investments include not only expanding network capacity and providing broadband services but also investing in education and training related to information technology. These findings support the hypothesis that robust technological infrastructure is a critical foundation for successful e-government development. This aligns with the study (Muzammil & Vihari, 2020), which demonstrates that infrastructure readiness is a crucial factor in the success of electronic government services. Political stability has also proven to play a vital role in the effective implementation and adoption of e-government. In this context, the UAE illustrates how political stability supports the sustainability of e-government projects and initiatives. Conversely, Afghanistan faces more significant challenges in developing e-government, attributable to prolonged conflicts that impact the government's ability to implement and maintain technological projects. This situation underscores the importance of a stable political environment for the development of e-government, aligning with the findings of (ElMassah & Mohieldin, 2020), which emphasizes the significance of political and economic stability for the adoption of government technology. In this study, resource limitations were identified as a significant barrier to the development of e-government in several countries. In Afghanistan, the impact of resource constraints is more pronounced, given the severe infrastructure issues caused by ongoing conflicts. Addressing these challenges requires increased international support and regional cooperation, as well as investment in cost-efficiency-focused technologies.

The analysis conducted showed that the United Arab Emirates (UAE) was the best performer in the development of e-government, while Afghanistan was identified as the worst. This distinction is characterized by significant differences in e-Government Development Index (EGDI) scores achieved by each country during the study period. Several important factors contribute to this disparity. Firstly, the UAE

has made massive investments in ICT infrastructure, including the development of extensive broadband networks and the adoption of cloud technologies, providing a solid foundation for efficient and reliable e-government services. Secondly, political stability in the UAE offers a conducive environment for long-term investment and consistent implementation of e-government policies. In contrast, the prolonged conflict in Afghanistan has resulted in political instability that undermines e-government development efforts. Lastly, the success of the UAE is also influenced by the availability of financial resources to support e-government projects. In contrast, Afghanistan faces significant resource limitations, hindering its ability to allocate sufficient funds for government initiatives.

The UAE is a successful example, with significant investments in technology infrastructure and stable policies, while Afghanistan faces substantial challenges, including political instability and lack of resources. This contrast provides an opportunity to identify the key factors that influence the success and failure of e-government more clearly. The UAE and Afghanistan have significant strategic relevance in the Middle East region. The UAE is often considered a model for other countries when it comes to technology adoption and digital innovation. In contrast, studies usually focus on Afghanistan to understand barriers to technology implementation in challenging environments. Although the other eight countries are also in the Middle East region, the variability in e-government development between them is less clear than between the UAE and Afghanistan. Most of these countries may be in the middle of the spectrum in terms of infrastructure and political stability, thus providing less contrast in the analysis. By limiting the scope to two countries, the study can convey more precise and more targeted conclusions. The results and recommendations of this study will be easier to implement if the focus is manageable.

LIMITATIONS OF RESEARCH

To ensure that the research is specific and focuses on essential issues in the context of e-government development, several limitations have been established. Firstly, this study explicitly explores the development of e-government only in Middle Eastern countries. As a result, the findings cannot be considered representative of conditions in other regions with different social, economic, and political dynamics. Secondly, the analysis is limited to data from the E-Government Development Index issued by the United Nations, which constrains the study's ability to capture policy changes or recent developments not covered by this data. Thirdly, the study needs to delve deeper into the technical aspects of e-government implementation, such as data security, system interoperability, or technological innovations that could impact the effectiveness of e-government development.

Furthermore, the research needs to exhaustively explore internal factors within countries that can influence the development of e-government, including changes in domestic policies, internal political dynamics, and government transitions. Additionally, the study does not provide a detailed analysis of the impact of global economic factors, international crises, or natural disasters that may affect progress or setbacks in the development of e-government. Lastly, the study does not address the influence of social and cultural factors that may play a role in the public's acceptance and adoption of e-government. These limitations are set to ensure that the research can be carried out effectively and produce findings that are relevant and focused on the problem under study.

CONCLUSION

This study aims to identify and analyze factors such as technological infrastructure, political stability, and resource investment that contribute to the success or failure of e-government implementation in these countries.

The study provides a comprehensive analysis of the progress of e-government in the Middle East with a focus on ten countries from 2016 to 2022 and a primary focus on the United Arab Emirates and Afghanistan. Key findings show that There are significant differences in the level of e-government development in different

Middle Eastern countries. The United Arab Emirates (UAE) is showing tremendous progress, while Afghanistan faces many challenges; factors such as significant investments in technological infrastructure, education, political stability, and the availability of resources have proven critical in supporting the development of e-government. The UAE, for example, has made significant progress thanks to heavy investments in technology and education, as well as solid political stability. In contrast, countries like Afghanistan face substantial obstacles in developing e-government due to prolonged conflicts, political instability, and limited resources.

The UAE has shown remarkable progress in the development of e-government through significant investments in technology, education, and strong political stability. To continue improving e-government services, the UAE needs to continue investing in the latest technologies, strengthen public-private collaboration, and develop digital skills training programs for the public and civil servants. In addition, inclusive policies that ensure accessibility for all levels of society and socialization campaigns to increase public awareness of the benefits of e-government are essential.

In contrast, Afghanistan faces many challenges in the development of e-government due to prolonged conflict and political instability. Basic infrastructure such as electricity and communication technology is minimal, and low digital literacy and lack of digital skills training hinder the development and acceptance of e-government. To overcome these obstacles, Afghanistan needs to prioritize political and security stabilization, increase investment in basic infrastructure, and expand international cooperation for technical and financial assistance. Digital skills training programs and technology-based education must also be improved to improve digital literacy in the community. By implementing these policies, both the UAE and Afghanistan can accelerate the development of their e-government and significantly improve public services. The UAE can continue to leverage its stability and resources, while Afghanistan needs to focus on stabilization and essential infrastructure development to begin progress in e-government.

Recommendations

Based on the findings of the study on the development of e-government in Middle Eastern countries, here are some recommendations or policy implications that can be addressed to various stakeholders:

For e-government Practitioners, it is essential to shift the focus of investment to improving digital infrastructure, such as expanding broadband networks and ensuring the security of cloud technology, to support e-government projects. In addition, training programs to enhance digital literacy skills among civil servants and the general public also need to be implemented so that they can more easily use the e-government system. For policymakers, policies that strengthen the inclusivity and accessibility of e-government services need to be formulated so that all elements of society, including those in remote areas and marginalized groups, can access these services. In addition, collaboration with international entities is essential to obtain technical and financial assistance to build infrastructure and increase e-government capacity. For researchers, it is necessary to conduct further research to evaluate the impact of new policies and technologies on the success of e-government, as well as assess the social and economic effects of their implementation. In addition, a deeper exploration of how contextual factors such as local culture, politics, and economics affect the implementation and success of e-government is also needed. For the Community, the dissemination of information and education about the benefits and use of e-government is essential to increase public participation. The public must also be encouraged to provide feedback on existing e-government services so that the government can continue to improve and adjust services according to user needs.

The implications of this policy are designed to ensure that the development of e-government not only focuses on technical aspects but also takes into account the social and economic needs of the communities that target these services.

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