



T.C.

ANKARA YILDIRIM BEYAZIT UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

**OBSTACLES OF E-GOVERNMENT DEVELOPMENT IN
YEMEN**

MASTER THESIS

ABDULAZIZ ABDULLAH AHMED AL-MONSEB BAWAZIR

DEPARTMENT OF MANAGEMENT INFORMATION SYSTEMS

Ankara, 2022

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ABSTRACT

OBSTACLES OF E-GOVERNMENT DEVELOPMENT IN YEMEN

The vast growth in technologies in general and ICT, in particular, encourages governments to develop and implement e-government. An e-government initiative could be an indispensable part of the country's sustainable development, and it contributes to improving public sector efficiency through enhancing services offered to citizens, businesses, and the government. During the spread of the COVID-19 pandemic, many countries imposed a curfew to limit the spread of the epidemic. Therefore, countries all around the world recognize the value of e-government initiatives to reduce direct contact between citizens by offering diverse e-government services. However, e-government projects, especially in developing countries, face many barriers that hinder the development of these initiatives. The Yemeni e-government project, as an example of developing countries, does not make real progress in the way it delivers e-services. Although the e-government was launched in 2003, the project still faces a variety of challenges that affect its development. This study aims primarily to explore the challenges that hinder the Yemeni e-government project's development. A qualitative research methodology was used to achieve the aim of this study. To collect the required data and reach the sample size of this study, a snowball technique was employed, and interviews were conducted with twelve participants. The interviewees are public employees from four different ministries who have contributed to the Yemeni e-government initiative. Face-to-face and online semi-structured interviews were conducted. All interviews were held between April and September of 2021. Thematic analysis was employed to analyze the qualitative data using QDA miner software. The study findings revealed that the Yemeni e-government project faces various obstacles, which could be categorized into eight themes. Organizational, social, political, financial, human resources, technological, policy and legal, and development environment challenges are the main obstacles that stand in the way of the e-government project development in Yemen. The study also includes recommendations for addressing the mentioned obstacles. In addition, suggestions were presented for further research.

Keywords: E-government, E-government Development, E-services, E-government Barriers and Challenges, Yemen.

ÖZET

Yemen'de E-devlet Gelişiminin Önündeki engeller

Genel olarak teknolojilerdeki ve özel olarak BİT'teki büyük büyüme, hükümetleri e-devleti geliştirmeye ve uygulamaya teşvik etmiştir. Bir e-devlet girişi, ülkenin sürdürülebilir kalkınmasının vazgeçilmez bir parçasıdır ve vatandaşlara, işletmelere ve hükümete sunulan hizmetleri geliştirerek kamu sektörü verimliliğini artırmaya katkıda bulunmaktadır. KOVID-19 salgını sırasında birçok ülke salgının yayılmasını sınırlamak için sokağa çıkma yasağı uygulamıştır. Bu nedenle, ülkeler, devlet hizmetlerini çevrimiçi ortama taşımış ve e-devlet üzerinden sunarak devlet ve vatandaşlar arasındaki doğrudan teması azaltmaya yönelik önlemler almışlardır. Bu süreçte de e-devlet girişimlerinin ne kadar değerli ve kritik öneme sahip olduğunu anlamışlardır. Ancak, özellikle gelişmekte olan ülkelere e-devlet projeleri, bu girişimlerin gelişmesini engelleyen birçok engelle karşı karşıya kalmaktadır. Gelişmekte olan ülkelere bir örnek olarak Yemen e-devlet projesi verilebilir ve bu ülke e-hizmetleri sunma biçiminde gerçek bir ilerleme kaydetmemektedir. Yemende e-devlet girişimi 2003 yılında başlatılmış olmasına rağmen, proje hala gelişimini etkileyen çeşitli zorluklarla karşı karşıyadır. Bu çalışmanın amacı, Yemen e-devlet projesinin gelişimini engelleyen zorlukları ortaya çıkarmaktır. Bu çalışmanın amacına ulaşmak için nitel araştırma yöntemi kullanılmıştır. Bu çalışmada gerekli verileri toplamak ve örneklem büyüklüğüne ulaşmak için kartopu tekniği kullanılmış ve on iki katılımcı ile görüşmeler yapılmıştır. Görüşülen kişiler, Yemen e-devlet girişimine katkıda bulunan dört farklı bakanlıkta çalışan kamu çalışanlarıdır. Yüz yüze ve çevrimiçi yarı yapılandırılmış görüşmeler yapılmıştır. Tüm görüşmeler 2021 yılının Nisan ve Eylül ayları arasında gerçekleştirilmiştir. Nitel verileri analiz etmek için nitel veri analizi yazılımlarından biri olan QDA Miner kullanılarak tematik analizler gerçekleştirilmiştir. Çalışma bulguları, Yemen e-devlet projesinin sekiz temada kategorize edilebilecek çeşitli engellerle karşı karşıya olduğunu ortaya çıkarmıştır. Yemen'de e-devlet projelerinin geliştirilmesinin önündeki başlıca engeller örgütsel, sosyal, politik, finansal, insan kaynakları, teknolojik, politik ve yasal ve kalkınma ortamı zorlukları olarak sıralanabilir. Çalışma sonucunda bu engellere yönelik öneriler de sunulmuştur.

Anahtar Kelimeler: E-devlet, E-devlet Geliştirme, E-hizmet, E-devlet Engelleri ve Zorlukları, Yemen.

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INDEX OF SYMBOLS AND ABBREVIATIONS

ADSL:	Asymmetric Digital Subscriber Line
AI:	Artificial Intelligence
B2G:	Business-to-Government
C2G:	Citizen-to-Government
CDMA:	Code Division Multiple Access
CSO:	Central Statistical Organization.
DESA:	United Nations Department of Economic and Social Affairs
EGDI:	E-Government Development Index
EPI-WIN:	the Information Network for Epidemics
G2B:	Government-to-Business
G2C:	Government-to-Citizen
G2E:	Government-to-Employee
G2G:	Government-to-Government
G2N:	Government-to-Nonprofit
GPS:	Global Positioning System
GSM:	Global System for Mobile communication
HCI:	Human Capital Index
HES:	Hayat Eve Sığar (Life Fits Home)
HSYS:	The Public Health Management System
ICT:	Information Communications and Technology
ISDN:	Integrated Services Digital Network
ISP:	Internet Service Provider
IT:	Information Technology
IU:	Information Unit
IWS:	Internet World Stats
MPIC:	Ministry of Planning and International Cooperation
MTIT:	Ministry of Telecommunication and Information Technology
N2G:	Nonprofit-to-Government
NIC:	National Information Center
OSI:	Online Service Index
PTC:	Public Telecommunication Corporation
QDA:	Qualitative Data Analysis

TII: Telecommunication Infrastructure Index

UN: United Nations

UN-ASPA: UN and American Society for Public Administration

WHO: The World Health Organization



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Chapter 1 INTRODUCTION

1.1 Overview

During the COVID-19 pandemic, almost all countries realized the value of providing online services to their citizens and businesses to minimize direct contact between people, thus reducing the epidemic's detrimental effects and spread. Therefore, many governments have started to offer more and more online services through their e-government portals. Nevertheless, e-government in developing and least-developed countries encounters numerous obstacles that may vary from country to country, and Yemen is not an exception. However, e-government in Yemen has faced diverse challenges since the beginning of the e-government initiative. Yemeni administrations have made many attempts to revive the e-government project, but these efforts have met with significant setbacks. This study aims to explore the obstacles to the development of the e-government project in Yemen and to explore the factors and elements that contributed to the project's failure.

This chapter will act as a foundation for the study by explaining the research background and context as well as the research problem. Then, it will explain the research aims, objectives, and questions, and lastly, the significance of the research and its limitations.

1.2 Research Background

Nowadays, information and communication technology (ICT) is improving at an unprecedented rate. The revolution in the ICT sector has led to innumerable inventions that facilitate and simplify people's lives around the world. Snead and Wright (2014) stated that ICT is one of the innovations that have been seen in a large field of life. It is used in many fields, such as oil discovery and development, health, education, industry, the workforce, and various services. O. A. Ibrahim and Zakaria (2013) reported that technological revolutions have pushed governments worldwide to embrace technology and find a simple way to provide services to citizens. However, society has switched from the industrial era to the information era, with unparalleled depth in the area of information technology. In economics, concepts like e-commerce, e-business, and e-currency have arisen. In the world of government, e-government has appeared (Almarabeh and Abuali, 2010).

Many countries, especially developed countries, have ambitious strategies and have launched different promising ICT projects to deliver high-quality services to residents and companies. Hussein and Pusatli (2017) mentioned that there has been a significant change in ICT in the last fifteen years, through the distribution of cell phones, the use of email, and the comprehensive dissemination of information on the internet. For example, this move has led to applications being established for e-government, e-learning, business and health.

The majority of developed countries have employed the potential of the internet and ICT technologies via the use of many apps and diverse systems. While some countries have effectively developed and embraced e-government to offer simple and efficient access to public services, developing countries are lagging behind (Stoltzfus, 2005). Additionally, most Arab countries are still struggling with the acceptance of technology (Al-Mamary et al., 2015). Al-Nashmi and Amer (2015) claimed that Yemeni technology industry is facing a number of difficulties. The ICT infrastructure in the Yemen is not yet well-developed. There are no stable power sources; blackouts have been expected every day. The country's telecommunication network is very small, and many residents do not have their own phone lines. Many rural regions (about 70% of the citizens) have no network access. This adds to the huge lack of technological knowledge, which means information technology is not available to a significant portion of the residents (Al-Tuhaifi, 2017).

A downside to the Yemeni technological backwardness is the discouraging IT sector. Most businesses in Yemen do not recognize the value of computerizing their processes and how much efficiency might improve. They have also shown little interest in information technology products or services. Since there is a shortage of existing technology suppliers, companies that want to computerize their processes would most definitely opt for an international technology provider. If we do not smartly use technology, it has a negative effect on the whole economy (Al-Nashmi and Amer, 2015).

1.2.1 E-government

E-government employs ICT to share information, provide services, and interact with individuals, companies, and other government agencies (Al-Wazir and Zheng, 2012). Thus, it is a dynamic link between government services and residents via ICT (AL-Shehry et al., 2006).

Further, e-government is the latest direction in public administration that relates to the increasingly evolving global phenomena of ICT use. The development of e-government seeks to improve public service delivery as well as public administration governance, transparency, and accountability. Projects for electronic government development often include a wide range of stakeholders, including foreign donors, private-sector ICT suppliers, and investors in the area of ICT (Chatfield and Alhujran, 2009). In addition, e-government is quickly becoming one of the most significant and rapidly growing ICT applications (Ismail, 2008). Implementing e-government increases the quality of government services given to residents, workers, companies, and institutions (Carter and Bélanger, 2005; Jaeger and Thompson, 2003). Moreover, switching to e-government enables people and companies to seize unprecedented opportunities in the information world. Nevertheless, the transition is not straightforward since e-government is neither simple nor inexpensive; it requires financial resources, political will, and sufficient time (T. E. Ibrahim, 2014).

According to Heeks (2003), there have been about 35% failures of e-government initiatives in developing countries, 50% partial failures (main objectives have not been met and/or undesired consequences have occurred), and just 15% of e-government projects have been implemented successfully. In Yemen, the e-government initiative was announced in 2003. This initiative was a complete failure, with no perceivable outcomes. In 2008, a second e-government initiative was launched. During that time, some government agencies have been offering electronic services to the public via the internet (Al-Eryani, 2009).

1.2.2 Yemen background

Yemen is a country in South-West Asia on the Arab Peninsula in the Middle East. It is surrounded by the Arab Sea and the Aden Gulf in the south and the Red Sea in the west. In the north is Saudi Arabia, and in the northeast is Oman. The Yemeni total land area is 528 076 km², including the isolated Socotra Island, around 350 km (217 mi) to the south of the East African coast (Internet World Stats (IWS), 2020).



Figure 1.1. The geographic map of Yemen (Internet World Stats (IWS), 2020)

1.2.3 Yemen internet statistics

Here are some basic Internet statistics about Yemen according to Internet World Stats (IWS) (2021b). There were 7 903 772 Internet users in June 2021, representing 25.9% penetration (25.9% of the population). The internet penetration rate in Yemen is quite small compared to other countries. In addition, in June 2021, there were 3 507 700 Facebook subscribers, representing 11.5% penetration.

1.2.4 E-government in Yemen

E-government implementation is comprised of two phases: one is the distribution of information (cataloging), and the other is the transaction (Castellano et al., 2005). Yemen is still in the first phase. At the start of 2000, few government entities attempted to develop their websites and improve their IT departments. Even though these government agencies have only made a few changes, their work was appreciated by realizing the lack of funding and IT professionals (Almutawkkil et al., 2016). Nonetheless, Yemen has prepared the way toward a digital society as a first move toward e-government. This was achieved by setting up an e-government project in 2003 by introducing online services across many companies and providing computer training to staff and students (A. Y. Aleryani, 2010).

The e-government initiative, which began in late 2008, shows no signs of success or failure. Well-cooperation and effective management seem to be the most critical aspects. E-readiness is also totally ignored (A. Y. Aleryani, 2010). In Yemen, there is still a lack of computer-related infrastructure. Electricity outages are a regular occurrence due to the absence of stable power sources. Another problem is that there is no phone line coverage in most of the country. Consequently, there is widespread computer illiteracy and a lack of access to information technology for broad segments of the population (Al-Nashmi and Amer, 2015).

1.3 Research Problem

As Heeks (2003) stated, the major challenge preventing e-government initiatives in developing countries is a mismatch between the design and reality in terms of knowledge, technologies, processes, goals and values, personnel and expertise, management systems, and some other resources such as money and time. In Yemen, e-government project is not coordinated centrally, but rather each government agency leads its own efforts (Al-Wazir and Zheng, 2012). As far as the researcher knows, there is insufficient study about e-government in Yemen in general, and almost no research has thoroughly identified the challenges to the e-government project in Yemen.

Consequently, the existing studies are inadequate to investigate the reasons that led to the failure of the Yemeni e-government initiative. Most studies focus on e-readiness, awareness, assessment, and evaluation of e-government projects. A. Aleryani (2020) revealed that the number of published studies from 2007 to 2020 that were carried out using the title AND/OR keywords of two words (e-government + Yemen) had produced 17 findings. There are also three Ph.D. dissertations and two master's theses. These findings indicate that there is not enough research about e-government in Yemen. Additionally, there is a lack of interest among researchers and students in studying this field. Therefore, there is an ultimate requirement to explore the e-government initiative in Yemen from different angles and to outline the challenges and failure factors of the project in particular.

1.4 Research Aims, Objectives, and Questions

1.4.1 Research aims

Given the lack of research on e-government projects in developing countries, this research aims to explore the obstacles that face the development of the e-government project in Yemen.

1.4.2 Research objectives

The following objectives have been considered to fulfill the study's overall aim:

RO1: To identify the organizational challenges to the Yemeni e-government project's development.

RO2: To investigate the social barriers that hinder the Yemeni e-government project's development.

RO3: To determine the political obstacles that influence the Yemeni e-government project's development.

RO4: To find out the financial difficulties that face the Yemeni e-government project's development.

RO5: To discover the technological challenges that affect the Yemeni e-government project's development.

RO6: To explore the policy and legal difficulties that might affect the Yemeni e-government project's development.

RO7: To investigate any other obstacles that affect the Yemeni e-government project's development.

1.4.3 Research questions

To accomplish the aforementioned aims and objectives, this research investigated the following key questions:

RQ1: What organizational challenges have been encountered during the development of the Yemeni e-government project?

RQ2: What are the social barriers that have faced the Yemeni e-government project's development?

RQ3: What is the nature of the political obstacles that influence the Yemeni e-government project's development?

RQ4: What are the essential financial difficulties encountering the Yemeni e-government project's development?

RQ5: What are the common challenges to the e-government project's development in Yemen related to technology?

RQ6: What policy and legal difficulties have affected the development of the e-government project in Yemen?

RQ7: What other obstacles have been encountered during the development of the e-government project in Yemen?

1.5 Research Significance

Although the Yemeni e-government initiative dates back to 2003, it is still in its beginning stages. This should motivate researchers to make more efforts to discover the Yemeni e-government initiative from different angles to increase the awareness of this national project. However, researchers have not thoroughly investigated the e-government initiative in Yemen. Only a few studies about e-government initiatives in Yemen have been conducted. Accordingly, the significance of this research might be regarded as the first research that studies in-depth the difficulties facing the e-government project in Yemen.

This research advances our understanding of the challenges of e-government development in Yemen. Thus, the research will aid the researchers in recognizing the challenges surrounding the e-government program that contributed to the project's partial failure. Likewise, the Yemeni government will have a better understanding of these barriers.

Additionally, the study will also aid in enhancing decision-makers' awareness of the importance of e-government. It is anticipated that the outcomes will be important in supporting decision-makers by providing worthwhile information and recommendations for decision-making. Another reason this research is important for policymakers is that it will assist them in improving the way they make decisions, enhancing e-government development procedures, promoting ICT infrastructure, and lessening the resistance to change in government organizations.

To sum up, this research will assist in addressing the current shortage of studies about e-government projects in Yemen. Additionally, the results of this research can be contributed to future studies in related fields. More specifically, this research will make a substantial addition to the body of literature on e-government projects in developing countries, of which Yemen is an example. Furthermore, the research will also make policymakers more aware of the Yemeni e-government initiative and highlight the necessity of reviving it.

1.6 Research Outline

This research includes seven chapters and is structured as follows:

In Chapter One, an overview of the thesis has been introduced. This includes defining the research background and the research problem. Moreover, the research aims, objectives, and questions have been identified. The importance and limitations of the study have also been argued.

In Chapter Two, the background of e-government has been presented. In addition, the ICT and telecommunication sectors in Yemen and the Yemeni e-government initiatives have been introduced.

In Chapter Three, the relevant existing literature on e-government has been studied to identify the most important e-government project challenges in developing countries.

In Chapter Four, the research methodology of the study has been discussed. This includes the research design, the study sample, data collection methods, and data analysis that were applied in this research.

In Chapter Five, the results and findings of the research have been presented. The findings of the study answered the main research question and made the research meet its aims and objectives.

In Chapter Six, the discussion, which outlines the research results in relation to the literature review, has been discussed. It also helped answer the research questions.

In Chapter Seven, the conclusion and suggestions have been presented. This chapter concentrated on the research contributions and research limitations and offers relevant recommendations for overcoming barriers that challenge the Yemeni e-government project. This chapter also offered some suggestions for future research.



Chapter 2 GENERAL INFORMATION

A thorough understanding of e-government involves close discussion of its implementation. E-government includes a multidimensional strategy that incorporates the analysis of different aspects (organizational, cultural, social, etc.) and the key stages of e-government (Ziemba et al., 2013). E-government implementation is an ongoing process, and most frequently, the progress is viewed in terms of stages (Almarabeh and Abuali, 2010). Dada (2006a) said that e-government is the new path for the government sector to go forward.

This chapter has been organized into five main sections. The ICT in Yemen, including the telecommunication infrastructure, is presented in the first section. In section two, an overview of e-government is included. The e-government categories are shown in section three. The fourth section deals with the advantages and disadvantages of e-government. Finally, the fifth section is focused on the role of e-government in combating COVID-19.

2.1 ICT Sector in Yemen

Yemen is connected to the world through a network infrastructure that consists of four land-based and three sea-based cables. Nonetheless, due to the current war, Yemen relies on three operational connections. The rest of the Yemeni internet links are inoperable (Al-Bashiri, 2021). However, internet services in Yemen were launched in 1996 by TeleYemen (Al-Bashiri, 2021; Garad et al., 2017).

The main efforts made by Yemen to create an information society can be listed as follows (ESCWA, 2007):

- The National Information Center (NIC) was founded in 1995 to develop policies in the information sector (Al-Aghbari et al., 2015; Farhan, 2007). It is responsible for gathering data on the information society and conducting required research to improve the country's information technology (Farhan, 2007). By 2000, NIC began to take substantial steps towards the advancement of information infrastructure. It

has also released important data and knowledge to residents and organizations (Al-Aghbari et al., 2015).

- The Ministry of Telecommunication and Information Technology (MTIT) was founded in 2003. MTIT has several IT-related units, including Telecommunications and IT City, and an electronic library.
- The Central Statistics Organization (CSO) has implemented a national policy for statistical work. CSO is in charge of gathering, analyzing, disseminating, and publishing data and statistical studies (Farhan, 2007).

2.1.1 Telecommunication infrastructure in Yemen

In Yemen, the MTIT's duty is to regulate both telecommunications and IT (Farhan, 2007). The telecommunications budget is approximately 2.8% of the Yemeni total budget. This budget is one of the lowest allocations made by the Yemeni government in comparison to other Middle Eastern countries (Al-Mamary et al., 2015). Nevertheless, the total number of mobile phone subscriptions increased from 15.7 million in 2014 to 18.6 million by the end of 2019 (CSO, 2017).

There are four cell phone providers: Yemen Mobile, MTN, Sabafon, and Y (Al-Mamary et al., 2015; Al-Wazir and Zheng, 2012; Farhan, 2007). Moreover, there are currently two Internet Service Providers operated by the Yemeni government that offer internet service: PTC and TeleYemen (Al-Tuhaifi, 2017; Al-Wazir and Zheng, 2012; Farhan, 2007).

Table 2.1. Telecommunication companies in Yemen (NIC, 2014)

Company	Ownership	Company Activity
PTC	Government	It runs the landline communications, automatic call service, the internet, data transmission, and other services.
TeleYemen	Government	It offers international telecommunication services, analogue mobile phones, and the internet.
Yemen Mobile	Government	It offers CDMA mobile services.
MTN Yemen	Private	It offers GSM mobile services.
Sabafon	Private	It offers GSM mobile services.
Y	Private	It offers GSM mobile services.

As seen in Table 2.1, six companies are working in the telecommunication sector in Yemen. Farhan (2007) explained that Public Telecommunications Co. (PTC) is the

national telecommunications operator responsible for Yemeni telecommunications networks and Internet services. The local mobile telephone networks use two wireless transmission technologies. Yemen Mobile, which is mainly state-owned, offers its services using CDMA, whilst the other carriers use GSM.. However, the coverage is unsatisfactory (Al-Bashiri, 2021). According to research comparing mobile data costs in 2020 across the globe, Yemen has the most costly mobile data in the Arab World, with 1 GB of data costing an average of 15.98 USD (Worldwide Mobile Data, 2021).

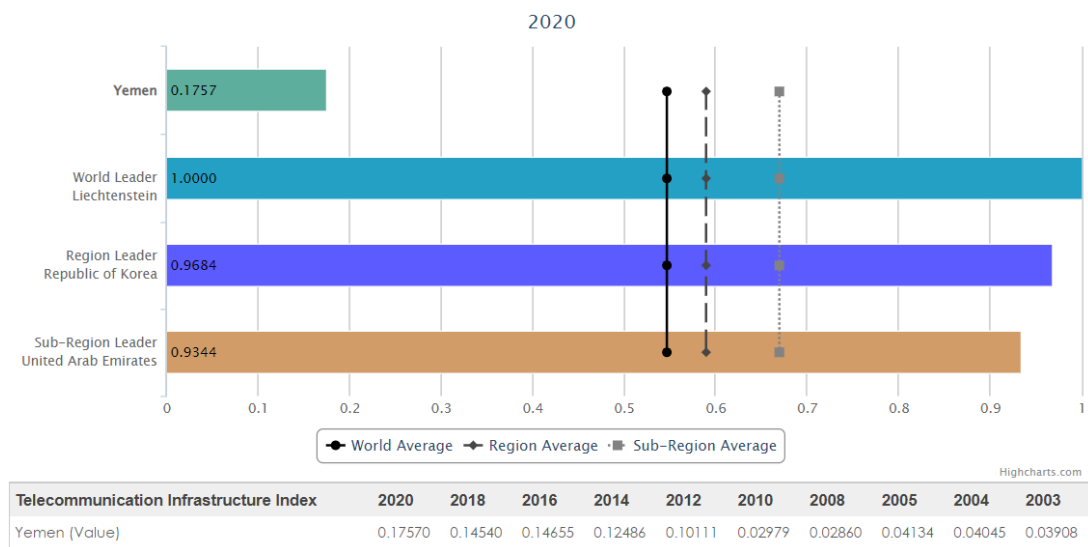


Figure 2.1. Yemen telecommunication infrastructure index (United Nations, 2020)

As shown in Figure 2.1, Yemen has a lower telecommunication infrastructure index (TII) value, which is less than the world average, regional average, and sub-regional average. This indicates that the Yemeni telecommunication infrastructure is not satisfactory and requires huge investment to upgrade the telecommunication network and cover more regions in the country, specifically the rural areas.

2.1.2 Internet usage in Yemen

The Integrated Services Digital Network (ISDN) was implemented in 2001 at a speed of 64 Kb/s, followed by 128 Kb/s. Afterward, the Asymmetric Digital Subscriber Line (ADSL) service was introduced in 2005 at speeds of 512 Kb/s (ESCWA, 2007, 2009). However, the telecommunications and information technology industries in Yemen rose between 2000 and 2005. Also, there was a growing demand for fast internet connectivity in Yemen, which led to two ISPs (TeleYemen and YemenNet) establishing ADSL and ISDN digital

subscriber lines. However, Yemen has one of the lowest internet penetration rates among Arab countries (Garad et al., 2017).

While internet usage has been recognized as a major necessity worldwide, Yemen still lags behind other countries in this sector, and its internet application rate is poor. Moreover, the internet penetration in Yemen remains low relative to its Arab neighbors, including Bahrain (97.7%), Jordan (84.7%), Kuwait (98.3%), Lebanon (81.9%), Oman (76.8%), Palestine (64.8%), Qatar (104.3%), Saudi Arabia (90.1%), and the UAE (103.3%). The global average for internet penetration was 65.6%, while the Yemeni rate was 25.9% (Internet World Stats (IWS), 2021a). According to Oyedemi (2012), the low internet penetration influences the growth rate of the country's economy, social, and political development. However, Internet users in Yemen have increased significantly over the last several years, reaching 7.2 million by the end of 2019, up from 3.2 million in 2014 (Al-Bashiri, 2021).

Table 2.2. Internet usage and population statistics (2000-2020) (Internet World Stats (IWS), 2020)

Year	Number of Users	Population	% Penetration
2000	15	17 900 000	0.1 %
2001	100	19 600 009	0.5 %
2005	220	20 764 630	1.1 %
2009	370	22 858 238	1.6 %
2010	420	23 495 361	1.8 %
2012	3 691 000	24 771 809	14.9 %
2016	6 773 228	27 392 779	24.7 %
2018	7 031 784	28 915 284	24.3 %
2020	7 903 772	29 825 964	26.5 %

2.2 Overview of E-government

Over the past decade, e-government programs have been published by governments at all levels. These initiatives aim to provide residents, companies, or other levels of government with an e-service depending on the form of service (Al-Sharafi, 2014). E-government offers online government content and services through the internet (West, 2004).

Therefore, e-government requires using ICT to deliver services electronically; this increases transparency, accountability, and connectivity for the public as well as for companies and other stakeholders. However, the majority of Middle Eastern and North African countries do not rank first in the e-government assessments (Hussein and Pusatli, 2017).

Principally, e-government necessitates opening up to the public, which would increase accountability, credibility, and economic policy support (Al-wali, 2015). Moreover, e-government increases government success by increasing productivity and efficacy. Furthermore, e-government contributes to improved government transparency and productivity. Thus, e-government assists people and business owners to compete in the modern economy, which is built on information technology and cutting-edge apps. In addition, e-government offers the opportunity for both individuals and civil society to have direct contact and engagement with the government, thereby promoting a better understanding of their requirements (T. E. Ibrahim, 2014).

2.2.1 E-government

The term “e-government” appeared in the late 1990s (E. Abu-Shanab and Bataineh, 2014; Grönlund and Horan, 2005), while Abdallah (2012) mentioned that the e-government phenomenon began in the early 1990s. E. Abu-Shanab and Bataineh (2014) stated that before the late 1990s, scientists and specialists in public administration had not properly established the term e-government. Therefore, in terms of its meaning, it is still vague (Al-Busaidy, 2011). However, e-government has no generally accepted definition, and multiple meanings include parts of it but not the entire term. E-government uses ICT to improve public services offered to residents, organizations, companies, and agencies (Abdallah, 2012; Al-Aghbari et al., 2015; Heeks, 2003). In general, government services can be spread amongst multiple public organizations. Organizational adaptations are needed to implement ICT and inter-departmental cooperation (Nograšek, 2011).

Table 2.3. E-government Definitions

E-government	References
E-government is a way for governments to use cutting-edge ICT, especially web applications, to better serve people and companies.	(Fang, 2002)
E-government services can also be defined as the efficient and coordinated use of all ICTs for facilitating and speeding up transactions between government entities (G2G), governmental agencies and citizens (G2C), and between governmental and business organizations (G2B).	(Eyob, 2004)
E-government refers to the use of ICT, which is the overarching concept that encompasses any communication app or device such as computers, hardware, software, networks, radio, TV, mobile phones, satellite systems, and even many other related facilities and technologies such as video conferencing and distance learning. ICT provides further sustainable growth prospects and plays an important part in foreign competitiveness.	(Alraimi, 2009)
E-government implies the use of ICT, especially on the WWW, as a means of delivering public knowledge and services to citizens.	(Al-Hujran, 2012)
The practice of using ICT to offer services to employees (G2E), citizens (G2C), businesses (G2B), and government organizations (G2G) is called e-government.	(Thakur and Singh, 2012)
It involves internet and other digital technologies to enhance and affect government partnerships with businesses, citizens, and government bodies.	(Fatile, 2012)
E-government uses the internet to provide information and services to the public. It may involve ICT technologies including databases, multimedia, and information systems.	(Magro, 2012)
In its most basic form, e-government may refer to the utilization of ICT resources to provide services to individuals.	(Al-Shboul et al., 2014)

Table 2.3. summarizes the main e-government definitions. These definitions are critical for understanding e-government initiatives. Based on the aforementioned definitions, we could infer that e-government uses ICT technologies to offer public services to citizens.

2.2.2 E-government framework

The e-government framework addresses the following key layers (Hitham et al., 2017):

Infrastructure Layer

According to Kaur (2006), the infrastructure consists of a network, backup, redundancy, and storage. Mundy and Musa (2010) stated that the e-government framework involves infrastructure like networks, IT training, and IT management. As mentioned by Ebrahim and Irani (2005) and Sharma and Gupta (2003), the infrastructure is composed of servers, LANs, the internet, and an extranet.

E-government Layer

The e-government framework contains an e-government layer. In this layer, data from multiple organizations are integrated into a government web portal (Ebrahim and Irani, 2005; Harijadi and Satriya, 2000; Kaur, 2006; Sharma and Gupta, 2003).

Data Layer

The e-government system requires a data layer (Ebrahim and Irani, 2005; Kaur, 2006; Sharma and Gupta, 2003). This layer connects databases from different government agencies to facilitate decision-making (Hitham et al., 2017).

Application and Information Layer

E-government comprises an application and an information layer (Ebrahim and Irani, 2005; Kaur, 2006). This layer includes e-government applications such as ERP and information sharing among organizations (Hitham et al., 2017).

Table 2.4. E-government framework

Layer	Details	References
Infrastructure layer	Network, backup, and storage.	(Kaur, 2006)
	Network, IT training, and IT management.	(Mundy and Musa, 2010)
	Server, LAN, internet, and extranet.	(Sharma and Gupta, 2003)
E-government layer	Data from multiple organizations are being integrated into a government web portal.	(Hitham et al., 2017)
Data layer	It provides an integration of databases with multiple government agencies used to facilitate decision-making.	(Ebrahim and Irani, 2005; Kaur, 2006; Sharma and Gupta, 2003)
Application and information layer	It includes e-government applications like ERP and information sharing among organizations.	(Hitham et al., 2017)

2.2.3 E-government project stages

Moving from conventional to electronic governance is a complex process that will require a number of structural, organizational, and strategic changes, as well as regulating the way residents interact with government (Layne and Lee, 2001). The five stages of e-government proposed by the UN and American Society for Public Administration (UN-ASPA) are emerging, enhanced, interactive, transactional, seamless, or fully integrated (The World Bank, 2002). However, Moon (2002) has defined a model that has five stages: information, two-way communication, transaction, integration, and finally participation. This model is quite similar to the Hiller and Bélanger (2001) model since they both have the same phases in their models. Hanafiah and Goodwin (2014) considered these models to be significant indicators of e-government maturity. These e-government stages may be summed up as follows:

Simple Information Dissemination (One-way Communication)

It makes fundamental use of electronic government by disseminating information via the internet (Moon, 2002). The first step aims to release government information such as laws and regulations on a static platform, in which the interactions between people and the government are passive-to-passive (no interconnection between public agencies and residents) (Alzahrani, 2014).

Two-way Communication (Request and Response)

At this stage, residents are able to interact with the government (Moon, 2002). Thus, government applications move one step further by allowing interactions, bringing them closer to online services. The interaction takes place mostly on the demand side (people and businesses), while the government remains inactive. So, people can download forms and software from the state website and use them in other transactions. The government might be active through email in certain circumstances. Both of these two stages are necessary to get people used to using e-government websites and to win their trust (Alzahrani, 2014).

Service and Financial Transactions

Transactions occur between individuals and e-government, such as applying for a visa, and between companies and e-government, such as requesting a company license (Moon, 2002). When the country is able to offer all its facilities electronically, it will switch to the third phase, in which transactions are completed by residents and other consumers online. This leads people to become more involved, as well as causes the government to become more active. This is the most essential step of an e-government project. All project parties would obtain further benefits from ICTs to promote transfers and reduce their workloads (Alzahrani, 2014).

Vertical and Horizontal Integration

This stage does not define the sequence of integration determined by the government (Moon, 2002). Also, this phase is the most challenging since it involves persuading all government entities to work together. It begins with vertical integration, which involves integrating disparate systems at various levels for the same purpose and government entity. T. E. Ibrahim (2014) defined horizontal integration as the process of putting different systems together on the same level to provide citizens with one point of contact.

Political Participation

The fifth phase of e-government is participation, in which e-government has a voting system (Hiller and Bélanger, 2001). This stage encourages citizens to get involved in politics through e-voting and opinion surveys (Moon, 2002).

However, the DESA defines five phases for connected government, which is similar to some extent to the previous models. These phases are emerging, enhanced, interactive,

transactional, and connected (OECD, 2011). T. E. Ibrahim (2014) summarized them as follows:

Emerging Presence

It includes one-way interaction, information dissemination, and documentation for residents, but has no connection to the citizens.

Enhanced

The user can get more data effectively and quickly because of the multiplicity of communication channels. However, users do not personally deal with government entities.

Interactive

The use of smartphone apps and multimedia might be noticeable where it uses digital services to provide people with knowledge and warnings to give individuals greater convenience.

Transactional

It includes the two-way relationship between residents and the government, which allows citizens to get assistance with a variety of services such as billing, documents, and requests for various services 24 hours a day, as well as the emergence of modern uses for the Web, text messaging, voicemail, and WAP-equipped mobile phones.

Connected

In this phase, it is noted the presence of horizontal and vertical integration among governmental institutions and coordination with non-governmental agencies to provide better services to citizens. Furthermore, making citizens partners in the political process by engaging them in decision-making.

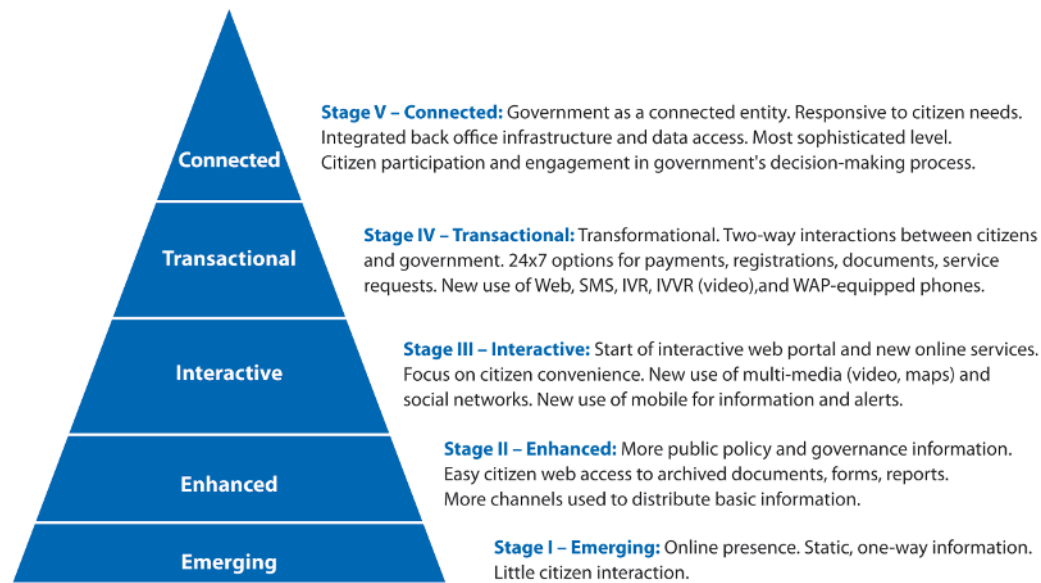


Figure 2.2. Stages of connected government (OECD, 2011)

2.3 E-government Categories

Almarabeh and Abuali (2010) and Alraimi (2009) mentioned that there are three categories in the concept of e-government: citizens, businesses, and government agencies. Backus (2001) pointed out that the G2C and G2B classifications refer to the government's outward contacts with stakeholders, whereas the G2G and G2E classifications refer to the government's internal relationships. The following sections outline the various e-government categories.

2.3.1 Government-to-Citizen (G2C)

It provides individuals with information and resources, either digitally or via some other electronic medium (Al-Sharafi, 2014). G2C involves online communication between a government and its citizens. Government services are mostly focused on making it easier for people to get information and services whenever and from wherever they need them (Layne and Lee, 2001). These services allow people to engage directly with the government, allowing them to access government information, make requests or questions to government departments, and complete transactions. Direct communication with the government agency may be established at an advanced level of this service (T. E. Ibrahim, 2014). It makes it possible for residents to obtain all the public services they need from birth until they pass away (Evans and Yen, 2006). Also, it improves government services

(O. A. Ibrahim and Zakaria, 2013) and communication between citizens and the government (Ndou, 2004). Through accessing the database and locating the necessary data from anywhere at any moment, it facilitates free contact between government agencies and residents to offer various services (Omari, 2013). It also decreases the time spent in queues to get physical services (Evans and Yen, 2006). Furthermore, G2C entails programs aimed at promoting contact between individuals and public institutions as users of public services. This includes public service delivery, consultation, and decision-making (United Nations, 2021a).

2.3.2 Government-to-Business (G2B)

This is the relationship between government authorities and the business sectors of manufacturing, corporations, and commerce (Evans and Yen, 2006). It helps the holder of the company to issue, renew, pass, and revoke licenses; pay taxes electronically; collect data; and obtain forms (Wescott, 2001). It helps corporations receive the details requested by the government and complete contracts with government agencies (Richard, 2014). The government's goal of delivering quality services to the private sector would minimize the expense of the transaction and improve the procedures (Fang, 2002), such as the submission of bids (Ndou, 2004). Additionally, to strengthen relations between companies and industries, the government offers this category of services (O. A. Ibrahim and Zakaria, 2013). The government offers certain services for companies, including tax and licensing, and also services for small, medium, and large-sized businesses, including e-signatures, GPS, and data needed to operate businesses (T. E. Ibrahim, 2014). In addition, G2B includes business transactions (e.g., payments, selling, and procurement of products and services) and the availability of business-based services online (United Nations, 2021a).

2.3.3 Government-to-Government (G2G)

It refers to data sharing and electronic communication among government actors. Exchanges occur between agencies as well as at the national, provincial, and municipal levels (United Nations, 2021a). G2G is focused on building new partnerships across government levels. This collaboration would promote cooperation between government levels and enable governments and local authorities to provide more efficient services to citizens (The World Bank, 2002). In addition, information and resources are shared between government entities (Al-Sharafi, 2014). Government departments and branches

function as one entity when using G2G services. This communication may be vertical (between government organizations) or horizontal (between central and local authorities). The government may offer security services such as law enforcement and emergency management (T. E. Ibrahim, 2014). According to Ndou (2004), this is the way employees and local departments communicate with one another, as well as with other organizations. Stoltzfus (2005) claimed that this is the connection between government entities. So, G2G is the exchanging of knowledge across government departments through communication (Alateyah et al., 2012).

2.3.4 Government-to-Employee (G2E)

It is the online communications between governmental departments and personnel that are used to provide employees access to information about compensation and civil rights, training and education opportunities, etc. It gives an efficient way to offer e-learning to employees, and it brings them together and encourages information sharing (Gupta and Jana, 2003). Accordingly, it is the interactions between staff and their organizations (Al-Busaidy, 2011; Richard, 2014) that will maximize the benefits (Ebrahim and Irani, 2005). Moreover, it is an internal service provided by the entity to its workers to simplify and retrieve needed employee information (Ndou, 2004), such as recruitment, personal information, vacation, and education (Heeks, 2003; Riley, 2000). According to Baležentis and Paražinskaitė (2012), G2E explains how government agencies and staff communicate to speed up the retrieval of the necessary information. However, government personnel require ongoing training and knowledge to guarantee that their job is completed effectively. They also need to improve their access to a central database, which will help them to retrieve the information they require (T. E. Ibrahim, 2014).

2.3.5 Government-to-Nonprofit Organization (G2N)

This category of services is given to non-profit organizations (Yanqing, 2010). The government assists non-profit organizations with information and communication (Al-Sharafi, 2014).

2.3.6 Citizen-to-Government (C2G)

It offers a web form inside the e-government platform for citizens to provide opinions on the government's services through electronic voting, acquire ideas from citizens, or deliver

services requested by people. This might be the primary goal of the e-government initiative since its survival relies on citizens' ideas and support (T. E. Ibrahim, 2014).

2.3.7 Business-to-Government (B2G)

It refers to the fact that government institutions' businesses may use the e-government website to share information and execute transactions more effectively than traditional approaches, such as accessing financial statements and making financial payments. Also, meetings might be conducted over the internet to finalize contracts or agreements; this can serve as a virtual workspace where government agencies and businesses can schedule meetings to discuss the status of projects and evaluate plans (Layne and Lee, 2001).

2.4 E-government Advantages and Disadvantages

One of the primary goals of e-government is to build a government that prioritizes the demands of its citizens. This includes e-voting, licenses, student financial assistance, tax payments, and online licensing (Al-Aghbari et al., 2015). Therefore, the most essential aims of e-government are to provide safe, simple, quick, and low-cost services; publicly disclose all government rules and laws; create an investment environment that attracts investors and technology firms by removing barriers; improve government performance; and be ready for worldwide integration to stay up with current information systems (Al Khouri, 2011; P. Kumar et al., 2014).

2.4.1 E-government advantages

There are multiple advantages to implementing e-government. The following are some advantages of implementing e-government services.

Availability of e-Services

E-government programs are frequently introduced with the aim of enhancing the ability to provide government services, the transparency and accountability of public administration (Al-Hujran, 2012). According to A. Y. Al-Eryani (2009), the e-government objectives include providing online services all the time; improving quality access to service information; contributing to the efficient integration of services with other organizations; building a relationship of trust with residents; and providing more transparency in the

policy-making process. Similarly, Thakur and Singh (2012) affirmed that e-government improves service offerings to residents and enhances the productivity of government activities.

Performance and efficiency

The world's governments use e-government to enhance government efficiency by providing better services to investors and beneficiaries (Al-Sharafi, 2014). Wang and Rubin (2004) stated that e-government allows the government to improve its performance and provide better public service. Ndou (2004) added that e-government initiatives minimize bureaucracy and provide constant access to online services, improving service quality by allowing people to actively engage in decision-making and submit recommendations and ideas in forums and social networks. Citizens may also access information and services at anytime from anywhere. In general, e-government aims to make the public sector more effective and efficient at all three levels: national, regional, and local (Alshehri et al., 2012; Debenedictis et al., 2002). Al-Hagery (2010) also claimed that e-government increases the efficiency of ministries and government entities, as well as improving the quality and accuracy of the programs and helping to build greater prospects for complementary success amongst different units and government entities via business restructuring. In addition, many governments are using ICT and adopting e-government to increase their effectiveness and consistency. By simplifying and reengineering operational procedures, e-government adoption lowers the cost and complexity of organizational activities (Seifert, 2003). Consequently, the public service can be more efficient through e-government (Al-Wazir and Zheng, 2012).

Reduction of Corruption

One of the advantages of e-government is the reduction of corruption (T. B. Andersen, 2009). Additional benefits include lower manufacturing costs, better services, administrative advantages, political advantages, supply of useful data, a better understanding of government services, an effective way to communicate, and answers to questions about government services (Weerakkody et al., 2015).

Recent ICT studies and researchers have provided the idea that emerging innovations in the context of e-government programs can be used as a method to fight corruption in the government agencies (T. B. Andersen, 2009; Bhatnagar, 2003; Kim et al., 2009; Shim and Eom, 2008). By decreasing corruption, e-government would make government operations

more accountable as everyone would be dealt with like others. In addition, e-government can offer data and services more simply and quickly. Another gain of e-government is the expense savings and development of profits. Moreover, e-government has several benefits, such as utilizing criteria to assess the consistency of the service and administrative performance, having a clear strategy, and building trust between residents and their government (Almarabeh and Abuali, 2010). Alhammadi (2018) inferred that e-government is crucial in the battle against administrative corruption in the Yemeni public sector. However, according to the 2020 Corruption Rank issued by Transparency International, Yemen is the 178th least corrupt country out of 180 countries, as shown in Figure 2.3.

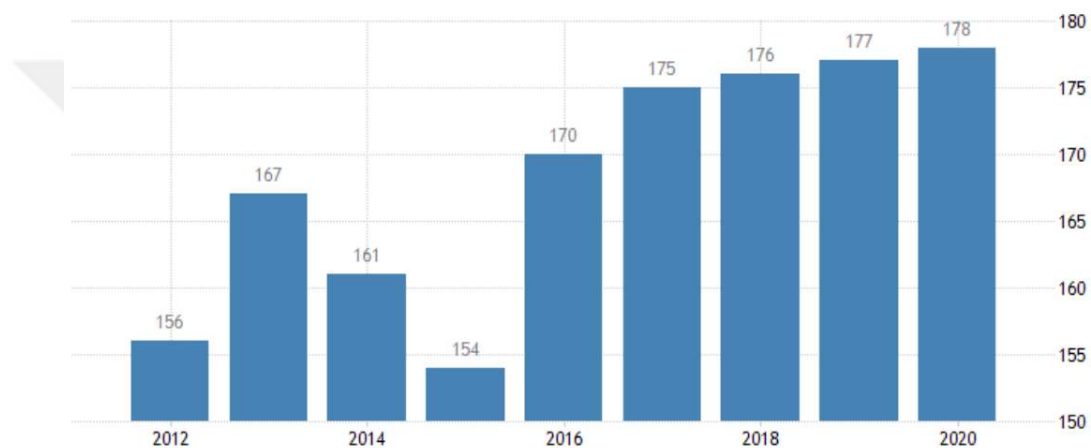


Figure 2.3. Yemen corruption rank (Trading Economics, 2021)

Transparency

E-government systems should be used to enable citizens to share their opinions and give policymakers an additional opportunity to hear citizens' voices (Ndou, 2004; United Nations, 2010). Empirical evidence has shown that enhancing the readiness of e-government is empirically linked to increased transparency, anti-corruption, and the promotion of human rights (E. A. Abu-Shanab and Harb, 2013).

Financial Advantages

E-government facilitates the flow of funds between the government and residents or companies (Dawood, 2012). Both citizens and the government benefit from online services. Government agencies realize their benefits through cost reduction and efficiency improvement. Citizens will receive more responsive and informed government services quickly and conveniently (Al-hashmi and Suresha, 2013). Governments find that providing

services online is much less expensive (Almutawkkil et al., 2016). E-government reduces the government's expenses. It promotes cooperation and strengthens the collaboration of government entities at various levels. Additionally, e-government increases the speed and effectiveness of government operations by simplifying processes, decreasing expenses, improving research capabilities, and strengthening reporting and maintaining records (United Nations, 2008).

Management Advantages

The adoption of electronic management systems at work improves the exchange of data, lowers the number of errors, and helps eliminate business routines. This promotes transparency and the eradication of bribery and corruption. Moreover, using electronic management encourages employees to work together to complete tasks, thus reinforcing the concept of working as a team inside government organizations (Dawood, 2012).

Mohammad et al. (2009) summarized the general objectives of e-government as follows:

1. Enhancing the quality and efficiency of internal processes by minimizing the time spent on tasks and acquiring knowledge of optimal practices in the performance of work via experience.
2. Reduce government expenses by improving and developing business procedures, making business easier and more transparent, reducing redundant processes, and encouraging data integration and sharing.
3. Raising consumer satisfaction with government services by making government services easier to use, speeding up citizens' access to services, and providing reliable data on time as needed.
4. Contributing to economic development initiatives by facilitating transactions between government and private sectors, reducing coordination and follow-up expenses, and creating more job opportunities; improving the profitability of government business sectors; and promoting infrastructure development and the distribution of technical knowledge.

2.4.2 E-government disadvantages

Although e-government has numerous benefits, it also has some drawbacks. However, these disadvantages do not outweigh the advantages of e-government. Here are some potential disadvantages of implementing e-government:

Unemployment

The e-government initiative will provide the residents with new work opportunities, but this does not imply that the project would prevent the rising unemployment rate since it will provide positions for qualified labor or others who can be educated and rehabilitated in the rest of the sector of society (T. E. Ibrahim, 2014).

Lack of Privacy and Trust

Transferring data from paper into a database, especially personal data, makes it available to hackers and pirates. Thus, data has become susceptible and has an adverse impact on the privacy of residents, as they tend to keep such details secret (T. E. Ibrahim, 2014). To put it another way, personal information may be compromised, and there is less confidence in how the information is protected and who has access to it (Joseph, 2015).

Transparency and Accountability

Those who oppose e-government argue that since it is managed by governments, online government transparency is untrustworthy. It is possible to add or remove information from public view (Joseph, 2015).

2.5 The Role of E-government in Combating COVID-19

A global outbreak of COVID-19 was declared by the World Health Organization (WHO) on January 30, 2020 as the sixth international public health emergency. Since its inception in Wuhan, China, it has affected over 209 countries (Waris et al., 2020). However, COVID-19 was announced as a global pandemic on March 11, 2020 (Hua and Shaw, 2020).

Following the classification of COVID-19 as a global public health emergency, WHO created the Information Network for Epidemics (EPI-WIN). The new information platform was created with the sole purpose of sharing customized data with interested focus groups

(Zarocostas, 2020). Within three months, COVID-19 had spread widely. Social distance, self-isolation, 14-day quarantine, chain breakup, community spreading mitigation, and lock-downs have become the strategies for slowing the spread (Ullah et al., 2021). Social distancing and self-isolation are the only solutions to avoid the infection from COVID-19 spreading. This practice involved the combination of e-government, the creative usage of new and current technology, and citizen participation in addressing the long-term effects of the disease (Shaw et al., 2020). However, a robust public e-health infrastructure is required to deal with this worldwide pandemic and any others that might happen in the future (De Ceukelaire and Bodini, 2020). E-health is one of the e-government services offered to citizens (Alguliyev and Yusifov, 2017). According to Chen (2020), Hua and Shaw (2020), and Huaxia (2020), the government in China developed a special health barcode system to identify infected citizens. The health barcode might be used to create online maps of affected people to assist others in avoiding clusters. Whenever a user is close to a COVID-19 patient, the application alerts health authorities and recommends self-quarantine.

In Turkey, the e-government platform has supported residents by offering a wide variety of e-services during the COVID-19 pandemic. The battle against the COVID-19 infection continues to make effective use of digital services (Bostanci et al., 2022). The Public Health Management System (HSYS) has been used to keep track of all patients and potential cases throughout the pandemic (Koca, 2020). Accordingly, the Turkish Presidency Office of Digital Transformation and the Ministry of Health collaborated to produce an app named “Life Fits Home” (Hayat Eve Sığar, HES) to make more use of AI (Artificial Intelligence) and digital technologies in the management of the pandemic (Koca, 2020) and to minimize the spread of COVID-19 (ITÜ, 2021). The software is regularly updated, allowing users to track their families, request face masks, and monitor the danger level of their neighborhoods. A recent update included the capability for app users to apply for and get a HES code (unique identification) in order to book flights. Therefore, it will be necessary to keep track of individuals who travel together, and if a case of COVID-19 is found, the health of everyone in the group will be monitored. E-government and e-Pulse are only two examples of currently used programs that are regularly updated. In accordance with the demands of the residents during the pandemic, additional features have been added to these apps, including the free distribution of face masks, COVID-19 test results, applications for pandemic social assistance, travel permits, etc (Koca, 2020).

Chapter 3 LITERATURE REVIEW

This chapter gives an overview of the e-government initiatives in Yemen. Additionally, prior studies related to the obstacles that have been encountered in e-government initiatives are presented to obtain a thorough understanding of e-government projects' challenges. Finally, a general review of the costs of e-government projects' failure is shown.

3.1 E-government Initiatives in Yemen

The Yemeni government has taken many initiatives in the past to adopt e-government and to move from manual to automated procedures. In contrast, Yemen continues to fall behind in terms of information technology use (Almutawkkil et al., 2016). How e-government is implemented determines its success. This can be measured by how good programs are provided, how convenient access is to government sites, and how often the rate of access to government sites is improved (T. E. Ibrahim, 2014). Accordingly, the effective diffusion of internet technology is essential for e-government success (Alraimi, 2009). The Yemeni e-government is still in its infancy and requires significant government investment to mature (Garad et al., 2017). E-services are still at the beginning phase of the dissemination of information. The country's economy, high illiteracy, especially in rural areas, distrust between government departments and residents in utilizing online services, and the lack of adequate laws and regulations are some of the factors that have led to this status. Rural regions need to focus on education (raising literacy) and improving people's lives before expecting any acceptable computer and internet use, which leads to the expansion of online services (Almutawkkil et al., 2016). However, there is a website for each ministry that is not connected to the government portal. Therefore, Yemen obtained low ratings in the online service index.

3.1.1 Yemeni government efforts

To include IT, the name of the Ministry of Telecommunication was changed in 2003 to the Ministry of Telecommunications and IT (MTIT) (Al-Aghbari et al., 2015). In addition, the MTIT has established a five-year strategic plan (2001–2005) (MPIC, 2005). MTIT also has a plan till 2025. The key goals of the plan are the development of the software industry;

improving the facilities; participating in the economic improvement of the government's performance; the regulations of ICT; enhancing security; and developing and reorganizing the postal sector to improve its efficiency as an economic and investment entity (Almutawkkil et al., 2016). However, each ministry is attempting to implement its own IT strategy without coordinating with other ministries or agencies. After the year 2000, most government entities attempted to establish information units (IUs) (Almutawkkil et al., 2016). With the assistance of the Yemeni President, MTIT launched the digital literacy project, which began in 2002. It was a successful beginning. The project's primary objective was to increase government employees' access to computers by providing them with low-cost computers that could be paid for with one upfront payment and simple monthly installments. This project reveals that one explanation for the poor use of online services is the low income in Yemen. Notwithstanding all the actions taken, it is the government's duty to make laws to boost cooperation between agencies, increase citizens' confidence in agencies, and improve citizens' income and IT awareness. Yemen must provide special services for rural and low-income populations (Almutawkkil et al., 2016).

3.1.2 Earlier e-government initiatives

Yemen began a 10-year initiative on e-government in 2002. It was called the National Project for IT. This project is aimed at providing services to residents, expanding financial transfers, and increasing the availability of telecommunications services. The National Project for IT has developed only a website that provides links to various government departments, but these links are broken (Al-Wazir and Zheng, 2012; Amer, 2011). The first e-government attempt was started in 2003 (Al-Eryani, 2009; Atef and Al Mutawkkil, 2019; Nations, 2007). Because the majority of institutions and agencies were lagging behind in terms of implementing and utilizing digital systems and applications, the project was abandoned. (ESCWA, 2007). The failure of the first e-government initiative was caused by a hazy understanding of the philosophy surrounding e-government (Al-Eryani, 2009). Furthermore, most accessible information structures lack consistency with technology and updated information (NIC, 2005; Yahia, 2007).

However, Yemen completed its national ICT policy in 2007-2008. In 2011, it was officially approved, but political instability and unrest impeded its adoption (ESCWA, 2016). Nonetheless, e-services in Yemen are in their early stages. At the same moment, government attempts to support G2C are limited and slow (Almutawkkil et al., 2016).

Consequently, Yemen struggles to implement online services in government agencies and to develop programs as the first step to promoting e-government, which includes the Yemeni e-government project (Amer, 2011). Nonetheless, Yemen lacks rules to regulate and protect electronic transfers, and the government lacks a program to address the abuse of information and communication technologies (ESCWA, 2007). As basic and simple methods of data and information protection predominate, information security standards and procedures are declining. (NIC, 2005). In Yemen, most government agencies and ministries have their own IT services. As a consequence, accomplishments are dispersed and uncoordinated, and no government agency is responsible for application standards and quality control (Al-Eryani, 2009).

In September 2008, a new e-government initiative was launched, beginning with a simple and well-prepared strategy. The primary objective of the first stage is to create electronic information content for all government institutions and to consider daily updates. E-government websites will help citizens in two ways at this point. The first way is to gather information through the Internet. The second way is to send an e-mail asking about the services. The second stage of the new e-government strategy explores the idea of one-way interaction between e-government and people. This stage's goal is to gather information and submit it by filling out an application for certain services. The third stage of this strategy focuses on electronic payments. This level will focus entirely on bidirectional interaction. At this point, all transactions may be done entirely via the internet (Al-Eryani, 2009). The Yemeni government planned to reestablish e-government by 2014–2015. However, numerous obstacles remain (Al-Aghbari et al., 2015).

3.2 E-Government Development Index (EGDI)

The EGDI demonstrates the progress made by United Nations member countries in e-government. The EGDI is a composite metric that takes into account three main components of e-government: Online Service Index (OSI), Telecommunication Infrastructure Index (TII), and Human Capital Index (HCI) (United Nations, 2021b).

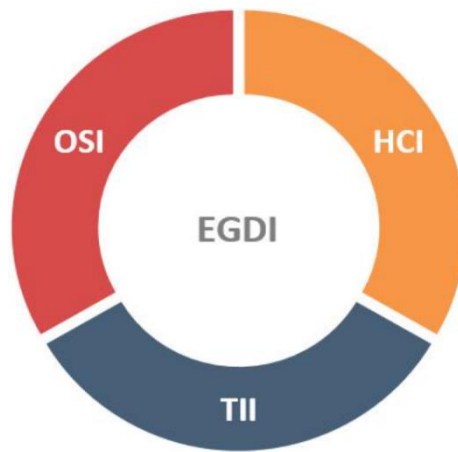


Figure 3.1. EGDI components (United Nations, 2021b)

Figure 3.1 depicts the components of the e-government development index. As illustrated in Figure 3.1, EGDI consists of the OSI, TII, and HCI.

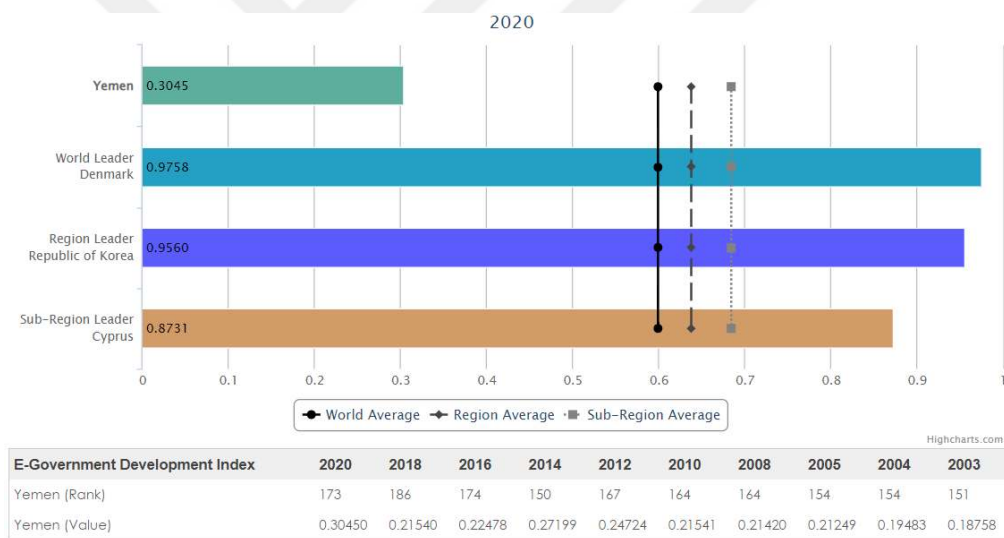


Figure 3.2. EGDI of Yemen (United Nations, 2020)

According to Figure 3.2, Yemen's EGDI was ranked 173rd out of 193 countries. Figure 3.2 also shows that Yemen's EGDI value is lower than the world average.

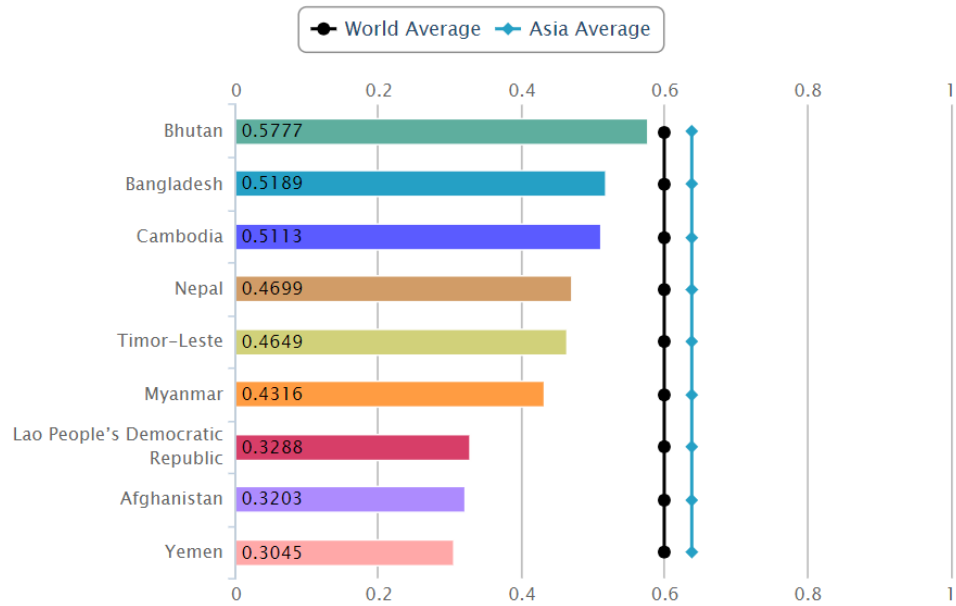


Figure 3.3. EGDI of least developed countries in Asia, in 2020 (United Nations, 2020)

According to the latest EGDI in 2020, the world EGDI average is 0.5988, Asia's EGDI average is 0.6373, and Africa's EGDI average is 0.3914 (United Nations, 2020). As seen in Figure 3.3, Yemen has the lowest EGDI value of all the least developed countries in Asia. Additionally, the EGDI value of Yemen is lower than the EGDI average of the world, Asia, and Africa.

3.3 E-government Awareness

An evaluation of residents' awareness of online services is needed to ensure the successful application of e-governance and allow citizens to enjoy its benefits. It is known as a primary measure of the success of e-government (Al-hashmi and Suresha, 2013). Mitrovic and Bytheway (2009) agreed that public acceptance of the current adaptation of government services relies on their awareness of online services. The advantages of using e-government must be promoted to residents. To accomplish this task, the government should play a key role (Al-Sharafi, 2014).

3.4 Barriers to e-Government Development

The literature shows that several e-government programs have failed, particularly in developing countries where e-government initiatives have a high failure rate. (Dada,

2006b; Heeks, 2002). 60%-80% of e-government initiatives fail in developing countries. (Heeks, 2003). Despite the fact that both developed and developing countries face specific challenges, the severity of each difficulty may vary. (Al-Sebie and Irani, 2005). Because of inadequacy in many aspects of their environment, the complexity of these challenges is higher in developing countries. (Abdallah, 2012). However, Heeks (2003) argued that the main cause of these failures is the gap between current realities and the new potential system. Heeks (2003) also emphasized the importance of bridging this gap for e-government success. In addition, there is no “one size fits all” approach to the solutions provided by e-government. (Al-Eryani, 2009). Failure in e-government can be defined as an inability to accomplish its objectives (Dada, 2006a). According to Heeks (2003), there are three main types of failure. A complete failure: the project was either never implemented or just abandoned. A partial failure means the main program objectives have not been reached and/or there are unwanted results. Success: stakeholder groups achieved their main objectives with few negative consequences. Furuholt and Wahid (2008) studied e-government initiatives and concluded that these initiatives face significant problems which seem to be divided into three groups: management, infrastructure, and human factors.

In light of the high failure rate of e-government initiatives, many studies have been conducted to determine the variables that affect their success or failure (Heeks, 2003). Considerable e-government initiatives fail due to the common misconception that e-government is all about technology. Therefore, government agencies simply build websites for existing offices without reengineering internal operations, procedures, or processes (Al-wali, 2015). The success of e-government can be hindered by several obstacles, including legal and regulatory, financial, technological, and digital divide obstacles (OECD, 2003). The factors are grouped by Al-Sharafi (2014) into four categories: organization, technical, social, and governing. Al-Wazir and Zheng (2012) affirmed that the e-government project’s failure to move ahead is due to three major obstacles: the lack of funds; the fact that the project is low on the list of priorities; and the lack of trained personnel. To get greater results, it is essential to consider the challenges they encounter and figure out how to solve them (Almarabeh and Abuali, 2010). The following are the primary difficulties encountered by e-government initiatives, particularly in developing and least-developed countries.

3.4.1 Organizational challenges

E-government will need significant changes in organizational culture, structure, and management in order to allow an e-government transition (Al-Solbi and Mayhew, 2005; Eynon and Dutton, 2007). Employees often fear and oppose these changes, which may significantly slow down the implementation of e-government (Abdallah, 2012).

Communication

Almutawkkil et al. (2016) mentioned that it is necessary to establish a solid channel of communication among public agencies and between public organizations and residents to strengthen the ties of confidence between government and citizens.

Lack of Cooperation and Coordination

Organizations cannot work in isolation, so there is a need for coordination to maintain interoperability and prevent duplication of services (Mohammad et al., 2009). Barriers appear when agencies cannot coordinate with each other and government departments make conflicting decisions. This challenge can be overcome by the use of inter-agency working groups with specific competence to monitor and implement e-government policies and guidelines (Mohammad et al., 2009). In addition, Ciborra and Navarra (2005) revealed that cooperation among various funding agencies and consulting firms is one of the primary difficulties facing the Jordan e-government project.

Lack of Partnership

An effective partnership among the government, residents, and the private sector is essential for the success of e-government (Farelo and Morris, 2006). Accordingly, any effort to provide a quick and convenient service will be impeded if governmental agencies do not work together effectively. Additionally, cooperation toward a clear implementation plan and business process reengineering attempts will fail if public agencies oppose such programs (Almarabeh and Abuali, 2010; Bhatnagar, 2009; Jaeger and Thompson, 2003).

Leadership and Management Support

Top management is an individual or group of people who oversee and monitor the organization at its top level (Altameem, 2007). Top management includes all managers who can set and enforce rules and standards (Cavaness and Manoochchhri, 1993). E-government success requires effective management. This management should be

comprised of dedicated government staff members. The government must provide financial and human resources to this team throughout the e-government initiative (T. E. Ibrahim, 2014). Moreover, leadership skills like strategic thinking, awareness, and dedication to the e-government program are essential (Ojo et al., 2007). Also, powerful leadership speeds up the implementation of e-government (OECD, 2003). Caldwell (2001) affirmed that successful e-government requires strong leadership. Thus, decision-makers should have both the required skills for ICT and the ability to make decisions (Al-Shuaili et al., 2019). Furthermore, willing and devoted leadership is a prerequisite for the successful development of e-government, and a change from the agency-central to the citizen-central mode of service is a required condition for successful e-government (Alraimi, 2009). The leader might assist workers to overcome problems during project design or after the project is placed in the environment. Leaders can also reduce risks, inspire employees, solve problems, etc. (Al-Sharafi, 2014). Furthermore, strong leadership will contribute to building trust in e-government initiatives (Almarabeh and Abuali, 2010). Nevertheless, Eynon and Dutton (2007) stated that insufficient leadership will contribute to sluggish and inconsistent e-government progress. As mentioned by Luk (2009), there are four main theories of leadership. These theories were categorized based on their variable types. These include trait, behavioral, contingent, and integration theories. According to the same authors, strong leadership would accelerate the adoption of e-government. Also, a study by Al-Kaabi (2010) showed that leadership is a substantial success factor for e-government efforts. Luk (2009) asserted that to substantially increase service quality, agency leaders must collaborate beyond conventional boundaries.

Resistance to Change

Government staff may oppose e-government projects for several reasons, such as fear of job loss due to technology, fear of change, unfamiliarity with the technology, and the fact that technology would reduce corruption and end their power. Consequently, e-government project leaders must determine the causes of resistance and come up with a strategy to overcome them (T. E. Ibrahim, 2014). The opposition might come from citizens or staff. The government can overcome this barrier via personnel training and citizen awareness (Bhatnagar, 2009). Nonetheless, in some government agencies, opposition to change comes from the upper levels of management (Alzahrani, 2014). Moreover, Dent and Goldberg (1999) contended that people oppose change because they fear losing position, money, or comfort.

However, it is natural that some employees may oppose e-government since it involves change. Wargin and Dobiéy (2001) discussed various factors underlying reluctance to change, such as the lack of expertise required to use modern technologies, changes in corporate structure, and redistribution of authority. Also, Luke (1982) has tried to understand resistance to change. Individuals are shown to avoid anything that may hinder their jobs or disturb their routine. Moreover, there is an unwillingness to take time to learn anything new, especially if the skills and application of new equipment are not well understood (Abdallah, 2012). In contrast, Ho and Ni (2004) stated that companies with employees who have the intellectual ability to grasp an innovation's vision and are willing to convince and encourage others to accept it are more likely to be creative.

3.4.2 Social challenges

Information Sharing and Accessing Data

Some related organizations exercise caution while disseminating their information to the e-government project in Yemen (Al-Eryani, 2009).

Political Leaders and Government Entities' Awareness

A. Y. Al-Eryani (2009) showed that the employees, even senior management, are not e-ready for the e-government project in Yemen. Almutawkkil et al. (2016) also claimed that e-government awareness should be increased among leaders of most organizations. The failure of the first e-government initiative in Yemen was due to a lack of awareness and experience among the workers and the people (Al-Eryani, 2009). Thus, Aldrich et al. (2002) asserted that top management skills must be present at all levels of e-government growth. Effective leadership is essential at the beginning of a project to clarify ideas and increase enthusiasm and awareness. It is necessary to manage change and provide support throughout the initiative. In the project's last phase, leadership can make sure that all of the necessary stability and adaptability have been achieved.

3.4.3 Political challenges

Political Instability

The Yemeni national ICT project was finished in 2007-2008. Although it was officially authorized in 2011, its implementation was hindered by political instability and unrest (ESCWA, 2016). E-government implementation is complicated and expensive,

necessitating a robust technological infrastructure, a stable political environment, a regulatory structure, and professionally qualified employees (Stoltzfus, 2005).

Government Support and Political Will

The first reason the e-government initiative failed was the lack of support from the top political leaders (Al-wali, 2015). If policymakers have the desire and ability to force change on the existing system, IT changes can be implemented. There are lessons that developing country leaders may learn from the EU's strong political will to develop a knowledge-based society and economy (Seifert, 2003). Government leadership is often driven by political parties, private sector groups, or IT firms (Ahn, 2011). Politicians, ministers, and managers must all show political will to ensure the success of e-government. Leaders with a vision and managers are required to encourage the development and address any obstacles on the route. Additionally, use all available financial, human, and technical resources and continue to promote the initiative (T. E. Ibrahim, 2014). Ndou (2004) states that a history of dictatorship, political unrest, or massive corruption causes people to lose confidence in their governments. Additionally, various political issues constrain the advantages of e-government.

Lack of Government Priority

Al-Wazir and Zheng (2012) assessed the Yemeni e-government. They found that e-government has a number of difficulties. One of these difficulties is a lack of government priority for managing and implementing the project.

Corruption and Poor Governance

Corruption is one of the most severe obstacles to the progress of e-government. While there is corruption in all countries, the severity varies between countries. Unfortunately, in third-world countries, it is more popular. Similarly, T. Andersen and Rand (2006) claimed that ICT could be useful in the battle against corruption.

Vision

Countries need to identify their e-government vision as a first step. This vision should concentrate on the country as a whole rather than on short-sighted goals for projects or regions. All stakeholders should also share this strong vision of e-government (citizens, businesses, governments, NGOs, and others). It would be helpful if both participants (government and non-government) engaged in identifying the vision and motivating them

to share their opinions, desires, expectations, and engagement (UNESCO, 2005). E-government plans that are either too technological, overly ambitious, or misaligned with the local context and requirements are doomed to failure. Foreign experts may provide knowledge, but the e-government must be developed by residents (Al-wali, 2015). E-government includes a variety of areas. As a result, e-government must have a well-defined vision. A clear vision must be established with all stakeholders, including citizens, companies, and civil society, in order for the government to collaborate with them. The community's major objectives must be taken into account while developing this vision. The e-government vision requires both public and private sector contributions. Moreover, the vision ought to be understood and shared with all residents (T. E. Ibrahim, 2014). A lack of a strategic vision, a lack of direction, and an inability to connect the ends may be the result of constantly changing senior personnel and/or a constantly changing policy and political climate (Al-wali, 2015). Some of the obstacles that were encountered with the first e-government project in Yemen in 2003 were that there was no unifying vision for e-government and a discrepancy between the project's vision and reality (Al-Eryani, 2009). Also, the vague view of the philosophical surroundings of e-government affected the e-government project (Al-Eryani, 2009).

3.4.4 Human resources challenges

Lack of Qualified Human Resources

Most developing countries lack skilled personnel and adequate training courses. E-government requires new human capabilities in technical, management, and commercial domains to develop, build, maintain, and operate ICT infrastructure. Another vital skill is managing online operations, services, and interactions with residents (Ndou, 2004). Consequently, success in implementing an e-government initiative requires that the employees be well educated. Therefore, the failure of the e-government initiative was due to a lack of fundamental IT expertise and skills among personnel, officials, and citizens, as well as a lack of advanced IT skills among programmers, developers, and operators (Al-wali, 2015). In addition, the lack of staff skills is one cause of the e-government failure. (Heeks, 2003; UNDESA, 2001). An insufficient level of technical expertise is a challenge that faces e-government projects (Al-Eryani, 2009). To illustrate, the Cambodian public sector has significant turnover rates among IT personnel owing to poorer compensation and working conditions compared to the private sector. Due to this, there is a scarcity of

government sector skills and trained workers, which are essential for successful e-government (Sang et al., 2009).

Training Courses

IT expertise should be established by well-prepared training, and e-government awareness should be increased among leaders of most organizations. Additionally, IT specialists should be prepared to carry on the various roles of e-government departments. This could include convenient and pleasant links to numerous resources (Almutawkkil et al., 2016).

3.4.5 Financial challenges

Financial problems often contribute to the failure of e-government projects. This barrier is mentioned in plenty of studies (Al-Shboul et al., 2014; Al-Tourki et al., 2012; Alqahtani, 2016; M. Alshehri and Drew, 2010; Aneke et al., 2019; Bagde, 2020; Glyptis et al., 2020; Heeks, 2003; M. Mohammed and Hakizimana, 2019; Müller and Skau, 2015; Sang et al., 2009; Sinawong, 2008; Ziemba et al., 2013). Heeks (2003) claimed that a lack of financial resources was related to the failure of e-government projects. For example, Alkhaleefah et al. (2010) said that ICT and IT infrastructure are costly, and Jordan has limited financial resources. It appears that providing high-tech equipment to the public sector is unachievable. Also, Al-Hujran (2012) claimed that Jordan's e-government transformation is being delayed by plenty of difficulties. One of these challenges is financial support. External organizations such as the International Monetary Fund (IMF) are the primary source of funding for Jordan's e-government initiatives. Ciborra and Navarra (2005) declared e-government projects required foreign support. Mohammad et al. (2009) suggested that there should be pilot projects which can be scaled up on a demand basis and that the government should encourage strategic collaborations with foreign specialist suppliers for investment in e-government.

3.4.6 Technological challenges

ICT Infrastructure and Lack of e-Readiness

ICT infrastructure refers to all reusable and shareable resources that serve as the basis for all applications (Esteves and Joseph, 2008). Technology is regarded as a key driving force in the e-government transition (Al-Solbi and Mayhew, 2005). However, ICT technology has numerous components and features that may be categorized by implementation level.

E-government, for example, is closely linked to the ICT infrastructure and the telecommunications infrastructure (Basu, 2004). Complexity and challenges in using e-government technologies may also have a detrimental effect on the interaction between public organizations, individuals, and companies (Eynon and Dutton, 2007; Gil-García and Pardo, 2005). Governments face external obstacles in e-government project development as technical advances are rapid. Other challenges are for individuals who do not have computers or the internet, and for people who use web resources that require privacy and protection assurances that the information given is not misused (Mohammad et al., 2009). Numerous countries have struggled with technical problems (such as software, hardware, and ICT infrastructure), which are critical to the implementation and dissemination of e-government. Hardware comprises networks, servers, laptops, and desktops. Programs, applications, information systems, and databases all fall under the software component. Governments and agencies may use this infrastructure to share resources, reduce staff workload, collaborate, exchange information, and communicate with each other (Esteves and Joseph, 2008).

Security

Another technical issue that e-government projects face is digital security and privacy. E-government's introduction is being influenced by citizens' concerns about the integrity of their records and transactions. Governments should ensure that all citizens' regular operating transactions and personal details are protected and maintained in a special database (Al-Tourki et al., 2012). Governments have to participate in the implementation of public policies and collaborate with businesses, organizations, and people to ensure the safe usage of the program. This challenge can be addressed by increasing stakeholder awareness, enhancing transparency, and improving change management (Mohammad et al., 2009). Security is expensive and must be considered early in the design phase to maintain public confidence. Trust is a crucial element of e-government initiatives for people to utilize internet services that request for personal information (Almarabeh and Abuali, 2010). Accordingly, governments should provide a legal framework to secure electronic activities. According to Basu (2004), the legal framework should protect fundamental public policy and delegate responsibilities for data ownership and rights. Additionally, it has to offer a framework for enforcing legal obligations.

Privacy

Governments must be accountable for managing the large volumes of knowledge they have about individuals. It is critical to protect the privacy of residents' personal information while still making efficient use of the data (Almarabeh and Abuali, 2010). It is important that government employees be properly educated on the significance of privacy and how to develop effective software with privacy protections. Adopting "fair information practices" to reduce the acquisition of personal information and restrict access to personal data unless it is required to carry out the job (Al-Sharafi, 2014).

Complexity

As stated by Gao and Gunawong (2014), many e-government initiatives are very complicated, requiring numerous tasks such as the construction of a large-scale ICT infrastructure and the reorganization of governmental operations. Due to these difficulties, e-government initiatives often end up with unintended goals. The complexities associated with the e-government implementation were due to the rapid advancements in technology that pushed countries to replace and update their legacy systems continuously. A huge investment in infrastructure is required to deal with this issue (Almarabeh and Abuali, 2010). The complexity of e-government apps is a problem for e-government developers and designers (Purao and Desouza, 2011).

System Integration

Using different databases between ministries and organizations poses a barrier to data sharing and convergence of services (Hitham et al., 2017). Furthermore, using a variety of computer systems and platforms by different departments is another challenge (Mohammad et al., 2009).

3.4.7 Policy and regulatory challenges

Legal Framework

Successful e-government programs and operations require an appropriate legal framework (Basu, 2004). Ndou (2004) stated that engaging with e-government is like signing a contract. It is necessary to recognize the contract's policies, legislation, and laws. These include digital signatures, electronic archiving, data security, cybercrime, intellectual property rights, and copyright challenges. Without a legislative foundation, e-government activities and electronic transactions lacked a legal basis under which they could be

conducted properly. Basu (2004) considered that it was critical to build a regulatory system to successfully implement e-government in the government sector. In Yemen, the e-government lacks relevant laws and regulations, which should be regarded and implemented properly (Almutawkkil et al., 2016). Thus, the regulatory framework that supports the implementation of e-government projects is critical to their success (Basu, 2004). The legal structure and policies are the engines that drive e-government initiatives. It is critical for governments to provide a solid regulatory system as well as effective rules for electronic transactions (Almarabeh and Abuali, 2010). Consequently, the legal framework is a vital prerequisite for developing countries to recognize legal challenges and identify the necessary legalization for their requirements. These requirements are essential for confidentiality, data protection, and authentication. A whole legal system should be developed to deal with new problems associated with ICT and e-government programs (Abdallah, 2012). Additionally, Mohammad et al. (2009) declared that the performance of the e-government system relies on the regulatory basis for its activities, such as legal approval of digital signatures for submitting e-forms. Also, Almarabeh and Abuali (2010) affirmed that policymakers must take into account that e-government should have a comprehensive framework that incorporates e-service, e-citizen, and e-government concerns. However, ICT applications could face legal barriers. Legislatures have to ensure that electronic records and transactions are up-to-date because they are essential success elements in e-government initiatives (Mohammad et al., 2009). Numerous methods exist for keeping legislation updated, including the following: inviting participants to consider how current laws might hinder achieving desired goals; simplifying regulations to allow electronic filing with public entities; and reorganizing processes via the simplification of rules and procedures (Almarabeh and Abuali, 2010).

Documentation

A. Y. Al-Eryani (2009) declared that reporting and documenting all project stages, including difficulties, should also be emphasized. This may save money, time, and effort by avoiding repeating mistakes.

3.5 Costs of E-Government Projects Failure

The failure rate of e-government initiatives is significant in developing countries (Dada, 2006b). Heeks (2003) outlines the potential costs of a failed e-government initiative as follows:

1. Direct financial costs: funds spent on supplies, contractors, modern facilities, educational programs, and so on.
2. Indirect financial costs: money spent on public employees' time and efforts.
3. Opportunity cost: If the money had not been wasted on the e-government failure, it might have been spent on something more worthwhile.
4. Political costs include the loss of reputations of people, organizations, and nations participating in failure.
5. Beneficiary costs include the lack of advantages brought on by a competitive e-government initiative.
6. Future cost: a failed e-government initiative raises future e-government project obstacles.

3.6 Literature Review Conclusion

The introduction of e-government is expensive and has many requirements: a robust technological infrastructure, a stable political environment, a regulatory framework, and highly qualified staff (Stoltzfus, 2005). According to Heeks (2003), the degree of change between where we stand and where we need to go is the major factor in e-government's success or failure. The progress or failure of e-government, therefore, depends on the scale of the gap between the existing reality and the design of the e-government project. Various barriers could obstruct the development and adoption of e-government initiatives. The difficulties are listed in seven primary categories. The obstacles could be categorized as organizational, social, political, financial, human resources, technical, and policy and regulatory challenges.

Chapter 4 RESEARCH METHODOLOGY

The research methodology of this study is outlined in this chapter. It presents the research design, research methods, population and sample, research instrument, and data collection process. Validity and reliability, data analysis, and ethical considerations are also included in this chapter.

4.1 Research Design

This research depends on the interpretivism philosophy since this study is generating an understanding of the obstacles to developing the e-government project in Yemen. In addition, the research type of this study is inductive and based on an exploratory design. Humans, according to interpretivism, are distinct from physical phenomena because they generate meaning (Saunders et al., 2016). However, research designs are types of inquiry that provide precise guidance for procedures in a research project, and they can be found in qualitative, quantitative, and mixed methodology approaches (Creswell and Creswell, 2018). Also, Creswell (2012) clarified the research designs as the steps to collect, analyze, and interpret data by using quantitative and qualitative research. In almost the same way, Bryman (2012) defined the research design as a guide for data collection and analysis. A research design decision reflects considerations regarding the importance of various aspects of the research process. These include describing causal links between variables, generalizing to bigger groups of individuals than those investigated, understanding behavior and the significance of behavior in its specific social context, and appreciating social phenomena and their interconnections temporally (through time) (Bryman, 2012). A research design is a set of procedures followed by the researcher to answer questions in a legitimate, objective, accurate, and cost-effective manner (R. Kumar, 2011). R. Kumar (2011) stated that exploratory research is conducted with the intent of either exploring an area with limited knowledge or investigating the possibility of doing a particular research topic. Therefore, the nature of this research is an exploratory design because there are few studies on e-government in Yemen in general, and almost no study has adequately identified the barriers to the country's e-government initiative. Accordingly, this study explores the factors and obstacles that face the e-government project in Yemen.

4.2 Research Method

To obtain answers to the research questions listed in Chapter 1, this study used a qualitative method. (Creswell and Creswell, 2018) defined research methods as the methods researchers use to acquire, analyze, and interpret data. So, a research method is just a way of gathering data. For example, this might entail using a predetermined instrument, such as a questionnaire or a structured interview, or it could involve participant observation (Bryman, 2012). Qualitative research is best suited to addressing research problems for which the variables are unknown and must be explored. The literature might include minimal information regarding the topic under investigation, and the researcher might need to elicit additional information from participants through exploration (Creswell, 2012).

A qualitative research method was used for this study because of its exploratory nature. This method is suitable to explore the obstacles of the e-government project's development in Yemen and to acquire a better understanding of the current state of the e-government project. The qualitative method is flexible enough to fit the aims of this research. The respondents in this study were managers and staff of the Yemeni e-government project. Semi-structured interviews were employed to acquire qualitative, open-ended data and to comprehend participant thoughts, feelings, and beliefs.

4.3 Population and Sample

4.3.1 Population

It is the whole set of units from which the sample is drawn. The term “units” is used since the researcher might want to sample from a universe of countries, cities, regions, enterprises, etc. (Bryman, 2012). Creswell (2012) defined a population as a collection of individuals who share a common characteristic. Given that this research is primarily concerned with the challenges and barriers to the development of the e-government project in Yemen, the study's population includes all managers and employees involved in this national initiative. In Yemen, e-government project development is largely the responsibility of two government organizations: the Council of Ministers and the Ministry of Telecommunications and Information Technology. Other ministries contribute indirectly by providing the essential data relating to their ministries to ease the work of the e-

government project team. As a result, the population consists of all managers and employees who were elected by their organizations to work and contribute to the development process of the Yemeni e-government initiative.

4.3.2 Sample

It is a subgroup of the population that is chosen for study (Bhattacharjee, 2012; Bryman, 2012; Creswell, 2012; R. Kumar, 2011). So, a sample consists of a small number of people from whom researchers gather the necessary information. It saves time, money, and resources (R. Kumar, 2011). Another important term is the sample size. R. Kumar (2011) stated that sample size refers to the number of people from whom researchers acquire the necessary data. In this study, it is not easy to access all the individuals who work on the Yemeni e-government project. Therefore, it is challenging to obtain the essential research data from the entire population because of time and financial constraints. Furthermore, the ongoing conflict and the political instability in Yemen make it difficult to increase the sample size and meet most individuals in all Yemeni ministries. However, the sample size of this study was 12 employees from four different ministries in Yemen. The sample size of this research represents the whole population very well. Even though the sample size of this study seemed small, data saturation was achieved. There was no new information as the same information was repeated, so the redundancy was reached through the research's sample size.

Table 4.1. Sample size for non-probability (Saunders et al., 2016)

Study's Nature	Minimum Sample size
Semi-structured interviews	5–25
Ethnographic	35–36
Grounded theory	20–35
Considering a homogeneous population	4–12
Considering a heterogeneous population	12–30

Saunders et al. (2016) specified the minimum non-probability sample size as shown in Table 4.1.

Sampling techniques are broadly classified as random (probability) sampling and non-probability sampling (Bhattacharjee, 2012). In random sampling, a sample is drawn via random selection, ensuring that each unit in the population has an equal probability of being chosen (Bhattacharjee, 2012; Bryman, 2012; R. Kumar, 2011). Whereas in non-probability sampling techniques, some units of the population have no chance of being selected (Bhattacharjee, 2012). Therefore, certain units in the population have a better chance of being chosen than others (Bryman, 2012). Purposive sampling is a kind of sampling that is not based on probability. The researcher is not interested in drawing random samples from the population (Bryman, 2012). Snowball sampling is a kind of purposive sampling and is a sampling strategy. In this approach, the researcher initially selects a small sample of individuals who are relevant to the study questions. Then, those sampled participants recommend more participants who have the appropriate experience (Bryman, 2012; Creswell, 2012).

In this research, a purposive sampling technique, including snowballing, has been used to select a diverse set of personnel participating in the Yemeni e-government project as research participants. The purposive sampling technique was used because it is suitable for qualitative research methods. Furthermore, this research aims to find participants who are capable of providing in-depth and extensive information on the research topic. Participants are identified using snowball sampling techniques since only one employee in the e-government project is known by the researcher to participate in the research. Then, the researcher relied on the first employee to find another participant. After that, every participant directed the researcher to another new participant.

4.4 Research Instrument

Semi-structured interviews are the most prevalent kind of interview in qualitative social research (Dawson, 2007). In semi-structured interviews, the researcher prepares questions in advance, but they are open-ended and flow with the participant's answers (Sheppard, 2020). In this study, interviews, particularly semi-structured interviews, were used as a research instrument, as this qualitative research required gathering detailed information about the challenges of the e-government project's development in Yemen. Moreover, interviews have the flexibility to ask follow-up questions when some points are not obvious. Semi-structured interviews are the most suitable interview type for this study

since the intent of this study is to collect qualitative data. Furthermore, this research requires a better understanding of participants' thoughts and opinions about the research topic. The predefined questions in the semi-structured interviews are essential to guide the interviews and stay on the research topic.

Prior studies about e-government projects in general and the challenges e-government initiatives in particular encounter were examined to obtain a thorough understanding of e-government projects and their challenges. Then, the researcher starts writing the first draft of the interview questions. Then, the supervisor and experts reviewed the researcher's interview form to verify that the sections and questions included therein were accurate, easy to comprehend, and appropriate for the research objectives. Table 4.2 lists the experts who provided feedback on the research instrument.

Table 4.2. Experts' demographic information

Expert	Age	Education Level	Major	Institution	Occupation	Working Time
1	45	PhD	Network Engineering	University	Lecturer	5
2	37	PhD	Information Technology	State Agency	Manager	13
3	35	Master	Software Engineer	State Agency	Programmer	17
4	38	Master	Software Engineer	State Agency	System analyst	21
5	43	PhD	Financial Analyst	University	Lecturer	7
6	41	Master	Business Administration	State Agency	Manager	13
7	47	Master	Information Science	State Agency	Administrator	8
8	55	Master	Business Administration	State Agency	Manager	14
9	40	Master	Telecommunication Engineering	State Agency	Engineer	15
10	45	PhD	Economy	Bank	Manager	4

In the initial draft of interview questions, there are 21 sections with 126 questions. The research supervisor and the experts eliminate a great number of questions. Additionally, they added two new questions. Therefore, the final draft consists of 8 sections with a total of 32 questions. Moreover, they provide the researcher with assistance in reorganizing the

interview questions so that they are more closely aligned with the goals of the study. The interview form is included in Appendix-2.

However, the interview form is divided into two parts. The first part includes demographic questions such as participants' age, education level, occupation, and years of experience. The second part consists of eight sections. These sections address issues related to the project, the government, ICT, human resources, users, policy and regulation, consequences, and the impact of COVID-19. The first section consists of questions regarding the e-government project, including project development, management, financial resources, integration, workplace environment, and project evaluation. The second section addresses concerns about government support and political will, corruption and poor governance, as well as partnership and cooperation among government institutions. The third section is dedicated to ICT infrastructure, security, and privacy. The fourth section contains questions about human resources, communication among members of the e-government project, and political leaders' awareness. The fifth section focuses mostly on e-readiness. The sixth part handles policies and regulations. The seventh section includes questions about consequences and a discussion of the most difficult obstacles facing the e-government project's development. The last section contains questions about COVID-19's impact on the e-government project.

4.5 Data Collection Process

Semi-structured interviews were used in this study to acquire thorough information regarding the research questions outlined in chapter one. The predefined questions, which were open-ended, served as guidelines and directions for conducting the actual interviews. However, the researcher reached the interviewees using the snowball sampling technique. The respondents are from four government institutions. The majority of the data collection occurred in the capital city of Yemen, Sana'a. All interviews were carried out between March 27, 2021, and September 23, 2021. Eight of the interviews were held face-to-face. Six of the in-person interviews were conducted at the offices of the government organizations, while the other two took place in cafes in Sana'a city. On the other hand, there were four online interviews, which were conducted through the Zoom Meeting application due to the interviewee's location. However, one participant had agreed to be interviewed, but at the time of scheduling the meeting, the potential interviewee was

unable to participate due to health problems. However, interviews lasted between one and two hours on average.

Before conducting interviews, all necessary permissions were obtained to conduct the interviews and access the workplaces. Furthermore, the research topic, aims, and objectives were pre-introduced to the interviewees to let them have a broad understanding of the research issue. At the beginning of all interviews, the interviewees were thanked for their willingness to volunteer and participate in the research. Additionally, the purpose and scope of the research were explained to the participants. Moreover, all participants were informed that they had the right to decline to answer any questions at any time. Also, the researcher requested permission from participants to record their interviews on a digital device. However, most of the interviewees do not accept the idea of recording their interviews electronically. Therefore, handwritten notes were used. Regardless of whether the interview was recorded or not, the researcher took notes. During interviews, open-ended questions were asked, and then properly probing questions were used to go further into the responses that were relevant to the research topic. At the end of the interviews, the researcher thanked the interviewees once again for their time, cooperation, efforts, and the valuable information they had shared. After conducting interviews, the transcribing process and rewriting of notes have begun. Then, transcriptions of the interviews and participants' answers are sent to all interviewees to comprehend any nuances that might have been overlooked throughout the interviews and to ensure their accuracy and validity. All participants accepted their answers and approved them.

4.6 Validity and Reliability

4.6.1 Validity

The researcher has taken several steps to ensure the validity of the study. The research supervisor, experts, and other researchers reviewed and revised the interview questions to ensure that they adequately addressed the primary research question and were consistent with the study's objectives. Furthermore, interviews were conducted with employees from four different government agencies. In addition, almost all interviews were performed face-to-face, with the exception of four online interviews. The procedures, which were followed by the researcher, were critical in order to have diverse perspectives on the

research questions, which contributed to the validity of the study. Moreover, all collected data was provided to participants to address factual or interpretation issues, since respondent validation or member checking is critical in qualitative research.

4.6.2 Reliability

The researcher was trying to pay more attention to the reliability of this study despite the long debates on reliability in qualitative research methods, which are found in many research methods books. However, the researcher took care of the research processes to improve the reliability of the study. As previously stated in this chapter, strict data gathering procedures were applied. Interview questions were reviewed many times by the researcher. Moreover, experts' opinions were taken to verify that there were no ambiguities in the wording of the questions. Furthermore, transcripts were double-checked to ensure that they were free of transcription errors. Additionally, throughout the coding process, data was checked against the codes regularly to ensure that the meaning of the codes did not change. Additionally, the findings of the study were in line with the original data that was collected.

4.7 Data Analysis

In this study, the thematic analysis technique was employed to analyze the data collected from the participants. Thematic analysis is a technique for finding, analyzing, and reporting patterns (themes) in data (Braun and Clarke, 2006). Vaismoradi et al. (2016) pointed out that qualitative analysis is a cyclical procedure that requires researchers to return to data and the coding process frequently during the analysis process. Braun and Clarke (2006) noted that searching through a data set for patterns of meaning is the objective of thematic analysis. However, two steps of analysis were used to create and enhance a codebook. The first step was an inductive technique that involved thematic analysis to create a codebook from six transcripts. In the next step, the codebook was used to revise the codes and meanings in the remainder of the transcripts (Ando et al., 2014).

Table 4.3. Thematic analysis phases (Braun and Clarke, 2006)

Phase	Process description
Becoming familiar with your data	Transcribing data, reading and re-reading data, writing first thoughts.
Creating the first set of code	Systematically coding important data over the whole dataset and compiling data that is relevant to each code.
Finding themes	Codes are organized into themes, and data is collected for each theme.
Reviewing themes	Examining if the themes in connection to the coded extracts (Level1) and the complete data set (Level2), creating a thematic “map”.
Identifying and labeling themes	Continuous analysis improves the theme details and the overall story. As a result, each theme has its own set of meanings and titles.
Creating the report	Writing a scientific report on the final analysis of selected extracts, relevant to the study and prior research.

Table 4.2 Displays the phases of thematic analysis and describes each phase. To analyze the data, this study employed deductive and inductive thematic analysis. Identifying themes is the main goal of thematic analysis to accomplish the objectives of this study. To create a theme, this study has two main stages. The first stage is the deductive approach, in which the literature was reviewed to create the initial coding and themes. This phase is essential to ensure that this research includes all potential themes. The second stage is the inductive approach, in which new codes and themes emerge from the research data. Codes and themes that were created using deductive and inductive approaches were reviewed many times to ensure that they reflected the research data. However, various quality data analysis tools have diverse capabilities. Some QDA software is more powerful than others. Powerful QDA software has numerous features, but it is costly. As a result, in this research, data were analyzed using the free edition of the QDA Miner Lite software since it is free and has the essential features required to achieve the aims and objectives of this study.

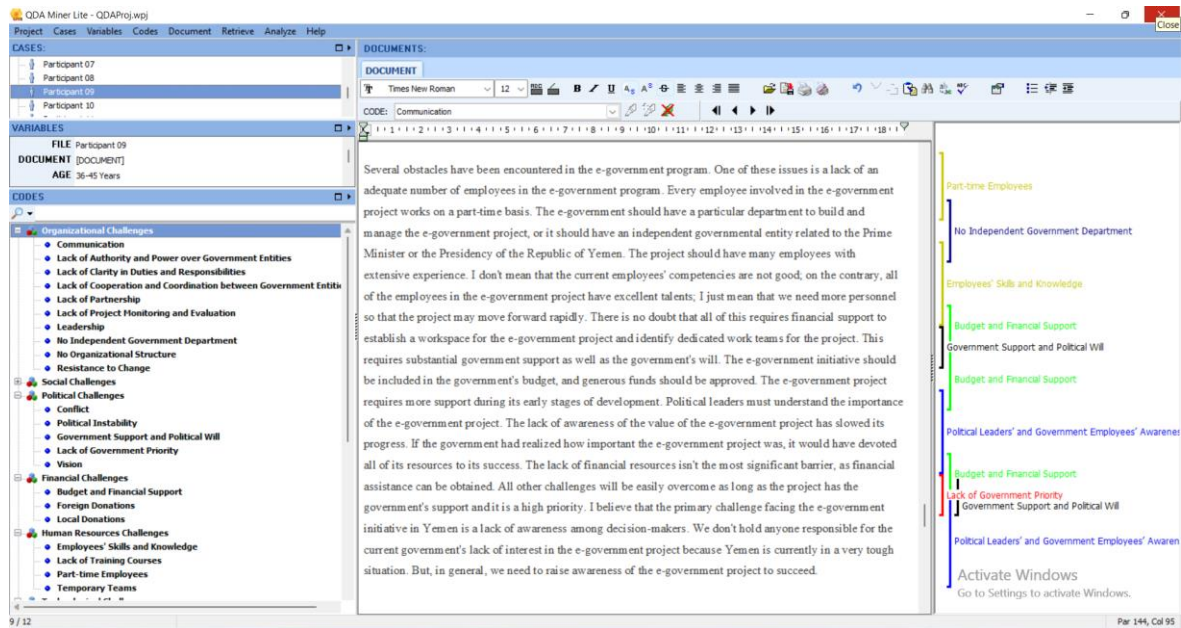


Figure 4.1. A screenshot of the data analysis software (QDA Miner Lite)

A screenshot of the data analysis software that was used in this study to analyze the data is shown in figure 4.1.

4.8 Ethical Considerations

Prior to conducting interviews, all necessary permissions were obtained to conduct the interviews and access the workplaces. The ethics committee approval (08.02.202/02) was acquired from the social and human ethics committee of Ankara Yıldırım Beyazıt University. Appendix-1 contains the relevant ethical approval. The identity of the researcher was revealed to the study's participants in considerable detail. Furthermore, the research topic, aims, and objectives were pre-introduced to the interviewees to let them have a broad understanding of the research issue. The participants were informed that their participation in the study was completely voluntary. They also had the right to not participate in this research or to withdraw from it at any time. They were also informed that the information gathered during these interviews was used only for the purpose of the research. To maintain anonymity and to comply with ethical approval requirements, the participants were coded as Manager 1, Manager 2, Employee 3, and so on, without revealing their identities and without any order of importance. Also, ministries were coded as Ministry 1, Ministry 2, and so forth.

Chapter 5 RESULTS

This study aims to investigate the obstacles that the Yemeni e-government initiative encountered. To achieve the overall aim of this study, this research has a set of objectives as discussed in the introduction chapter. These objectives include gaining an understanding of the current situation of the e-government project and identifying the organizational, social, political, financial, technological, and policy and legal barriers that face the development of the e-government project, as well as investigating any other challenges that face the e-government project's development in Yemen.

This chapter is broken into three sections. The background of the interviewees is covered in the first section. The results and analysis of the conducted interviews are presented in the second, which could be useful in overcoming the obstacles to the development of the e-government project in Yemen. The third section is the conclusion of this chapter.

5.1 Backgrounds of Interviewees

Interviews were conducted with a total of 12 participants in order to address the research questions posed in Chapter One. The research questions were answered by interviewing employees from four government ministries. Eight of the interviews took place in person, while the other four were conducted online. Semi-structured interviews were employed to obtain the required data for the study. Interviews concentrated mostly on the personnel involved in the e-government initiative. The interviewees represented four different Yemeni ministries. It is important to conduct interviews with individuals who have worked on the e-government initiative to gain in-depth information about the real difficulties that the project encountered. To explore barriers to the e-government project's development in Yemen, data were analyzed using the theme analysis approach.

Table 5.1. The number of participants in each ministry

Ministries	Participants No
Ministry 1	5
Ministry 2	3
Ministry 3	3
Ministry 4	1
Total	12

As presented in Table 5.1, there are twelve participants from four different ministries in Yemen. To maintain anonymity and to adhere to ethical approval criteria, participants were coded as Manager 1, Manager 2, Employee 3, Employee 4, and so forth, in no particular order of significance. In addition, ministries were labeled as Ministry 1, Ministry 2, and so on.

Table 5.2. Participant's information

Participant	Participant Label	Age Group	Education	Major	Experience (Years)
1	Employee 1	36-45	Bachelor	Information Technology	7-9
2	Manager 1	46-55	Master	Computer Science	+10
3	Employee 2	36-45	Bachelor	Information Technology	+10
4	Employee 3	36-45	Master	Information Technology	7-9
5	Employee 4	36-45	Bachelor	Business Administration	7-9
6	Employee 5	36-45	Bachelor	Computer Science	7-9
7	Employee 6	36-45	Bachelor	Computer Science	4-6
8	Employee 7	36-45	Bachelor	Computer Science	7-9
9	Manager 2	36-45	Master	Telecommunication Engineering	+10
10	Manager 3	36-45	PhD	Project Management	+10
11	Employee 8	36-45	Master	Management	4-6
12	Employee 9	36-45	Master	International Communication Management	7-9

Table 5.2 describes the characteristics of the sample interviewed. As detailed in Table 5.2, interviewees have varying levels of education, managerial skills, experience, and occupations. Moreover, Table 5.2 shows clearly that almost all participants are in the 36–45 age group. Additionally, interviewees' data reveals that six of the twelve participants had between seven and nine years of experience, four had more than ten years of experience, and two had between four and six years of experience. This demonstrates that the study's participants have extensive expertise and a thorough understanding of the Yemeni e-government project. Furthermore, all the interviewees are males as the e-government project relies on them.

The findings of this research identified the obstacles that must be overcome in order for the Yemeni e-government project to progress properly and successfully. The results of the research are summarized and grouped into eight themes: organizational challenges, social challenges, political challenges, financial challenges, human resources challenges, technological challenges, policy and legal challenges, and development environment challenges. The following section discusses the key findings from the semi-structured interviews.

5.2 Organizational Challenges

Semi-structured interviews reveal ten primary organizational challenges. These challenges are communication, lack of authority and power over government entities, lack of clarity in duties and responsibilities, lack of cooperation and coordination between government entities, lack of partnership, lack of project monitoring and evaluation, leadership, no independent government department, no organizational structure, and resistance to change.

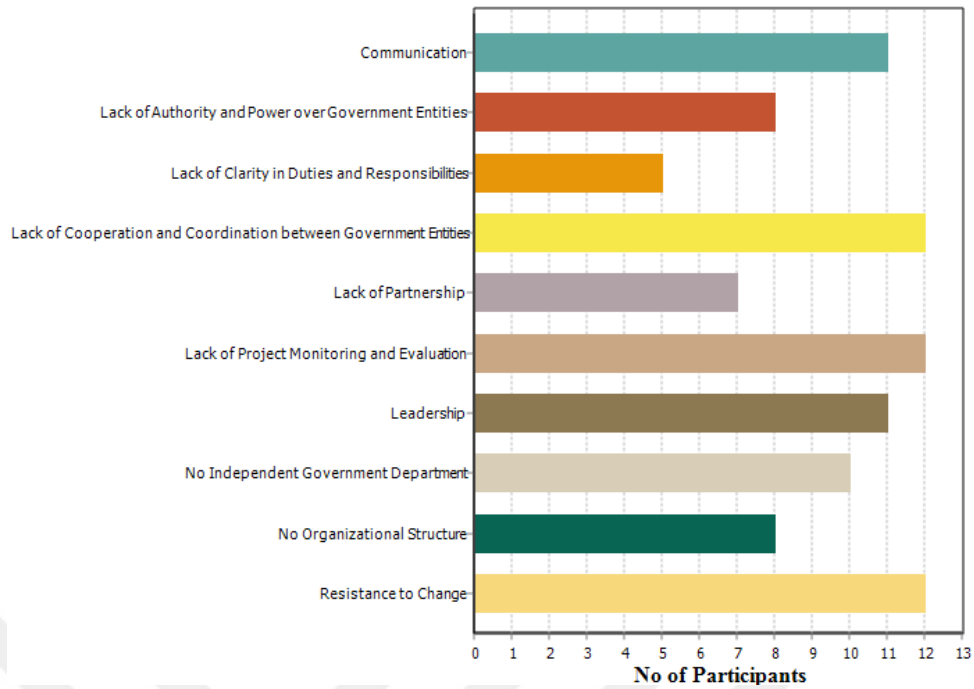


Figure 5.1. The distribution of organizational challenges

The distribution of organizational challenges is shown in Figure 5.1, which is based on the number of participants who highlighted these obstacles.

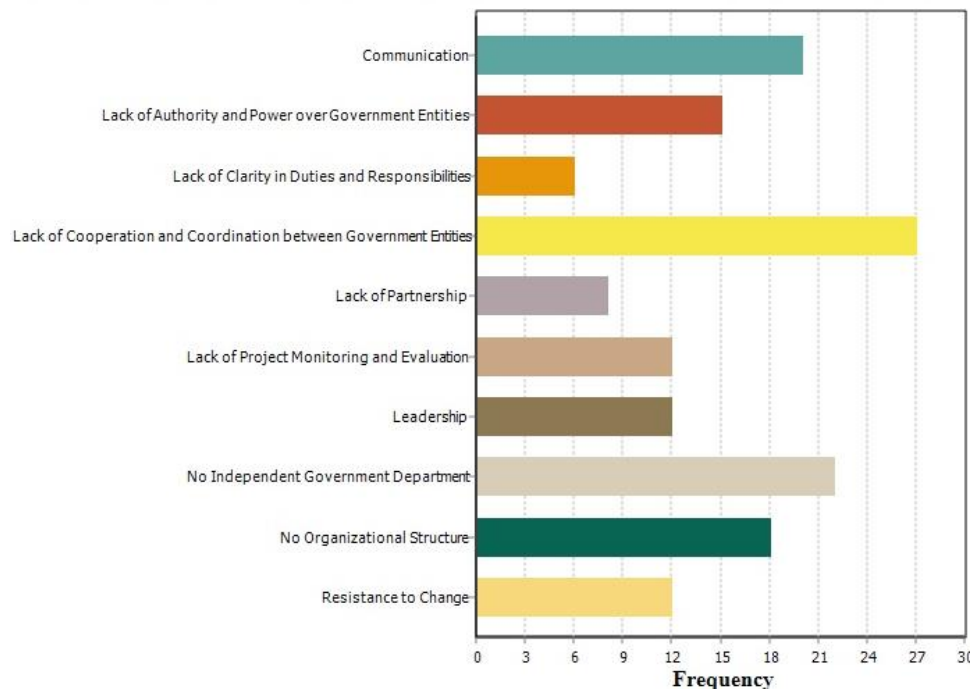


Figure 5.2. The frequency of organizational challenges

The frequency of organizational challenges is illustrated in Figure 5.2. These organizational challenges are presented in the following sections.

5.2.1 Communication

Interviewees indicated that there are some communication barriers amongst members of the e-government project team as well as with other government entities. Manager 1 said that there is contact amongst project teams, but the difficulty is that there is no central location for work, which creates a communication barrier. Employee 3 mentioned that there are few communication barriers between project teams. As specified by Employee 4, *“There is no doubt that e-government project teams have communication challenges. E-government project staff do not work full time for the project. Team members also face problems related to meeting each other to discuss e-services because there is no workplace for the e-government project.”* Moreover, Employee 6 declared that the e-government project had significant communication and coordination challenges with other government entities. Sometimes, certain information or documents were requested, but the employee in charge did not have the right to provide them. This caused a barrier and delayed the work. Employee 8 also noted that the e-government project did not have a workplace, which could be a significant communication barrier. Nevertheless, Employee 7 mentioned that *“Communication between e-government project members is not bad. However, there are still some issues that are beyond the control of the e-government project’s members. One of the biggest challenges is the lack of a dedicated e-government department. Additionally, the project lacks a work environment. Moreover, the e-government project’s workers are not entirely committed to the project. In addition, the roles and responsibilities are not well defined. All of these factors make it difficult to communicate effectively.”* Additionally, Manager 2 asserted that *“The e-government project teams have effective communication. This does not imply that there are not any hurdles to overcome. There are, of course, challenges, but they are manageable.”* Furthermore, Employee 9 claimed that communication was effective and there were no big obstacles. He also added that everyone on the team was well-educated, so there was an understanding among the members of the e-government project teams.

5.2.2 Lack of authority and power over government entities

One of the obstacles to the development of the e-government project in Yemen is the lack of authority and power over government agencies. Employee 1 claimed that there were temporary technical and administrative teams with no authority or power. The employees lack authority. As a result, if someone had a technical issue or encountered an administrative issue, they were unsure which ministry they had to go to. Moreover, Employee 1 mentioned that the primary problem they faced as developers, both technically and administratively, was that they lacked power over other ministries. The e-government initiative is a set of services provided by a variety of ministries. Employees must have the authority or a defined location within each ministry to obtain information, collect data, and even view their steps. He also added that other ministries did not give them the essential information because they had no authority over them and there was no coordination. He also said that they frequently formed teams, but the teams were just temporary and had no control over any of the governmental organizations. Employee 2 reported that *“As the e-government project is shared by numerous parties, there is no authority or department authorized for this project, which causes significant problems for the project, including a lack of the required powers to develop the project.”* Employee 2 also stated that due to a lack of power over all ministries, it was difficult to get the necessary information. Manager 3 said that it was difficult for the project’s employees to know who to contact when something went wrong or who had primary authority over this project because all work was done by periodically formed teams. As specified by employee 8, *“There is no doubt that the e-government project faces a major administrative issue due to a lack of authority. Other administrative issues arise as a result of this, such as managing work teams, setting work plans, and managing all processes.”* Employee 9 also mentioned that the e-government project management team lacks adequate authority and powers.

5.2.3 Lack of clarity in duties and responsibility

Some interviewees noted that the e-government initiative in Yemen faces a challenge due to a lack of clarity in roles and responsibilities. Employee 1 stated that *“There are some challenges, such as a lack of clarity in duties. Among the challenges is that each person does not know exactly what his or her position requires, so you can find an administrator discussing technical issues or a technician discussing administrative issues or doing administrative tasks. These are some of the challenges.”* Furthermore, Employee 2

declared that the roles and responsibilities of the e-government project members were not clear. He also mentioned that this affected the e-government efforts and was one reason for the slow movement of the project. Employee 6 mentioned that the Ministry of Communications and the Council of Ministers shared responsibility for the project. As a result, no government entity was accountable for the entire process of e-government growth. He also added that there were obstacles to communication among the e-government project's members. For instance, duties were frequently improperly organized, resulting in a lack of clarity regarding responsibilities. Employee 7 also said that the roles and responsibilities were not well defined. Furthermore, Manager 2 noted that the duties and responsibilities were ambiguous. He also added that the roles should be defined very well in the e-government project to ensure the success of this initiative.

5.2.4 Lack of cooperation and coordination among government entities

E-government in Yemen has additional difficulties due to a lack of cooperation and coordination among government agencies. Manager 1 mentioned that *"There is a lack of coordination with other government entities. However, there is a collaboration between the Ministry of Telecommunications in terms of the technological aspects of the e-government project and the Council of Ministers in terms of the administrative and supervisory aspects of the project."* Employee 4 stated that the e-government project required partnership and cooperation with all other government agencies for the work team to establish and develop e-services appropriately and efficiently. However, partnership and coordination among the various government agencies were extremely weak. Employee 5 said that cooperation with the team varies depending on the ministry and the institution. As reported by Employee 7, coordination between the various ministries on the development of the e-government initiative was inadequate. This could be one of the challenges that the e-government project encounters. He also added that employees required extensive and effective coordination. Additionally, Employee 8 claimed that the e-government project's partnerships and coordination with other ministries were limited. He also added that coordination between government agencies was an essential part of developing new services. He also said that *"If the coordination is weak, no matter how well-organized the job is, employees will face a major challenge."*

5.2.5 Lack of project monitoring and evaluation

Monitoring and evaluation are critical components of every project to ensure that everything proceeds as planned. All participants, however, acknowledged that the Yemeni e-government initiative lacked monitoring and evaluation processes. Employee 2 stated that there was no committee or team for monitoring and evaluation. Also, Employee 3 noted that there was no team responsible for evaluating the work done. Moreover, Employee 5 said that *“It is critical to have a team to monitor and analyze the e-government project as well as to evaluate e-services. Unfortunately, that is not the case with Yemen’s e-government program.”* Moreover, Employee 6 mentioned that the e-government project’s development involves ongoing monitoring. Nevertheless, Yemen's e-government project lacked a monitoring and evaluation team. Furthermore, Employee 8 regretted that *“there is no team to monitor or evaluate the work. Follow-up and evaluation are vital components of any project, whether technical, economic, or otherwise.”*

5.2.6 Leadership

Interviewees had diverse perspectives regarding the role of leadership in the e-government initiative. Employee 1 noted that a lack of leadership, whether as an entity authorized to manage the e-government initiative or as an individual handling the project, is affecting the development of the e-government project. Employee 2 said that there is a general lack of leadership necessary to efficiently run the project. However, Employee 3 claimed that there was no lack of leadership. Also, Employee 4 argued that the lack of leadership was not one of the challenges facing the e-government project. He also claimed that everyone involved in the e-government project had adequate and scalable skills. Moreover, Employee 7 asserted that *“I do not consider lack of leadership to be one of the challenges confronting the e-government project, which may cause the failure of the e-government project.”* Manager 3 also mentioned that it was difficult to regard a lack of leadership as one of the issues influencing the e-government project because the project did not have an organizational structure or even a work environment. Therefore, the issue of a lack of leadership could not be addressed because the only thing that existed was work teams. As claimed by Employee 9, *“Lack of leadership is not a significant impediment, as there are employees with the necessary skills to manage the project. A team leader is assigned to each e-government project. The team leader is sometimes chosen from the Ministry of*

Telecommunication and Information Technology, and other times from the Council of Ministers.”

5.2.7 No independent government department

All interviewees indicated that the Yemeni e-government initiative lacks an independent government department. Employee 1 stated that “the e-government project is managed by no department. It is merely a project. When they work on the e-government project, they form teams with people who are not even full-time.” He also added that “*Obviously, no government entity is accountable for this project.*” Also, Manager 1 noted that there was no official entity; only committees existed. Manager 1 also said that due to the absence of a government entity for the e-government project, there was no organizational structure to manage the project. Additionally, Employee 2 mentioned that as the e-government project was shared by numerous parties, there was no authority or department authorized for this project, which caused significant problems for the project, including a lack of the required powers to develop the project. He also added that there was no specific department in charge of leading the e-government project. In the same way, Employee 4 stated that no single government entity was entirely accountable for managing all technical and administrative operations. In similar fashion, Manager 2 noted that there was no separate department devoted to this enormous project. This was regarded as one of the most difficult challenges confronting the e-government program. He also said that the e-government project suffered from a lack of a specialized department to administer and develop the project. E-government should have a particular department to build and manage the e-government project.

5.2.8 No organizational structure

Most of the interviewees mentioned that the e-government project in Yemen does not have an organizational structure. Manager 1 stated that there was no organizational structure to manage the project. He also said that a proposal for structuring the e-government project was made, but it was not approved. He also added that the most challenging barriers were the lack of political will, financial resources, and the absence of an organizational structure. Likewise, Employee 4 mentioned that “*There is no organizational structure for this project, which causes massive problems and creates challenges in the development of e-government services. The project faces management problems, mostly due to the lack of*

an organizational structure to govern it.” In particular, Employee 6 claimed that the administrative part of this project was a big obstacle, not because of the staff’s lack of skill, but rather because of the project’s lack of an organizational structure. He also added that a lack of budget was one of the consequences of the e-government project’s lack of an organizational structure, which meant that the project’s obstacles were interrelated, and therefore neglecting one issue would affect other parts of the e-government project. Also, Employee 7 considered that the absence of an organizational structure for the e-government initiative was the most difficult challenge. Similarly, Manager 3 asserted that it was difficult to regard a lack of leadership as one of the issues influencing the e-government project because the project did not have an organizational structure or even a work environment. In like manner, Employee 9 noted that *“There is no organizational structure for the e-government project, and we attempted to create one with the assistance of ESCWA in 2008, 2009, and 2010. We have defined certain qualifications and skills for positions within the e-government project organizational structure.”*

5.2.9 Partnership

Another obstacle facing the Yemeni e-government effort is the partnership with different government agencies. Employee 4 claimed that *“The e-government project requires partnership and cooperation with all other government agencies for the work team to establish and develop e-services appropriately and efficiently. However, partnership and coordination among the various government agencies are extremely weak.”* In a similar way, Employee 5 said that partnerships with various government institutions regarding the e-government initiative varied significantly; for example, the relationship between the Public Telecommunications Corporation and the Council of Ministers was robust, and the two institutions worked closely together. However, collaboration and partnerships with other government departments varied dramatically. In addition, Manager 3 stated that *“Developing the e-government project requires an effective partnership between all government agencies and departments. The partnership between various ministries on the e-government project is somewhat limited. There was a better partnership in the past, but recently there has been no meaningful partnership.”* Furthermore, Employee 8 claimed that the e-government project’s partnerships and coordination with other ministries were limited. He also mentioned that strong and successful partnerships were required so that the team could develop e-services and offer them to citizens in a more efficient manner to

meet people's aspirations and accomplish the goal of e-government. He also added that *"We truly require partnership to ensure that the e-government project accomplishes its objectives."*

5.2.10 Resistance to change

The e-government project faces some resistance to change, which is negatively affecting its progress. Employee 1 noted that resistance to change was an obstacle that you would encounter in any location where people viewed it as dangerous to their interests and positions. In addition, Employee 2 stated that *"There were no efforts made or plans developed to increase awareness among government employees. We require everyone to be supportive of the e-government initiative rather than be a hindrance due to incorrect assumptions that it would result in job or position loss."* However, Employee 3 said that they encountered little resistance to change. Thus, it was not a major issue to consider. Also, Employee 4 mentioned that resistance to change had not been discussed, which was how state employees viewed electronic services and whether they considered electronic services a threat to their jobs and interests or not. Manager 3 asserted that it was assumed that throughout the development of the e-government project, awareness campaigns should be launched to make sure that state staff supported the project and did not oppose it. However, nothing had been done. Employee 8 also said that to establish a successful e-government initiative, it was necessary to raise awareness among state personnel to accept the new change. Unfortunately, no such programs have been launched. As believed by Employee 9, *"Some employees are concerned that the e-government initiative may jeopardize their careers or personal interests. These ideas obstruct and delay the e-government project. The project teams aim to promote awareness of the importance of the e-government project among government employees and officials."*

Table 5.3. Organizational challenges statistics

Organizational Challenges	Frequency	No. Of Participants
Communication	20	11
Lack of Authority and Power over Government Entities	15	8
Lack of Clarity in Duties and Responsibilities	6	5
Lack of Cooperation and Coordination between	27	12
Lack of Partnership	8	7
Lack of Project Monitoring and Evaluation	12	12
Leadership	12	11
No Independent Government Department	22	10
No Organizational Structure	18	8
Resistance to Change	12	12

Table 5.3 summarizes the organizational challenges that were encountered in the development of the e-government project in Yemen. It also illustrated how many times every challenge was mentioned in interviews.

5.3 Social Challenges

Based on the semi-structured interviews, two main categories of social challenges have been identified. These obstacles are information sharing and accessing data, and political leaders' and government employees' awareness.

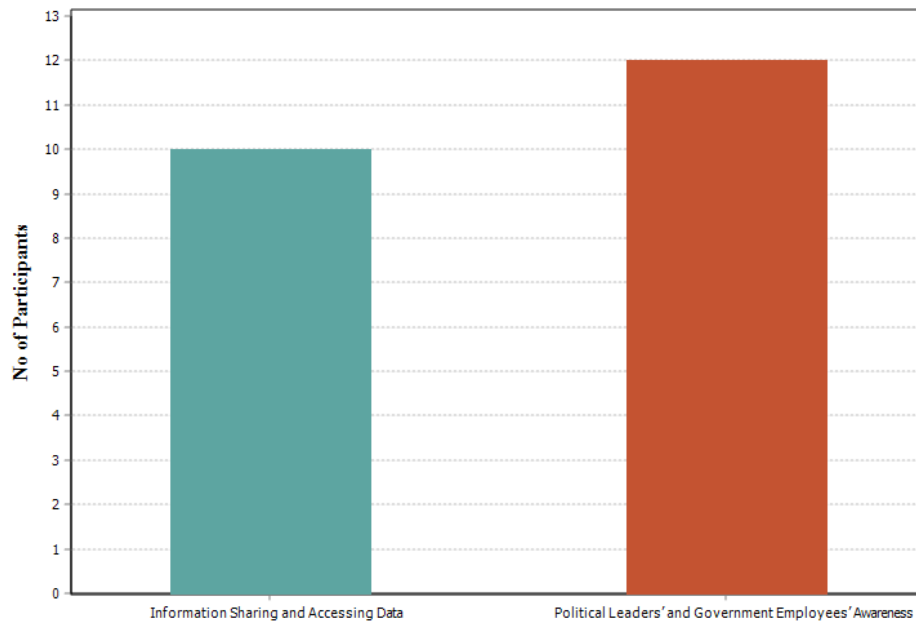


Figure 5.3. The distribution of social challenges

Figure 5.3 illustrates the distribution of the social challenges according to the number of participants who highlighted them.

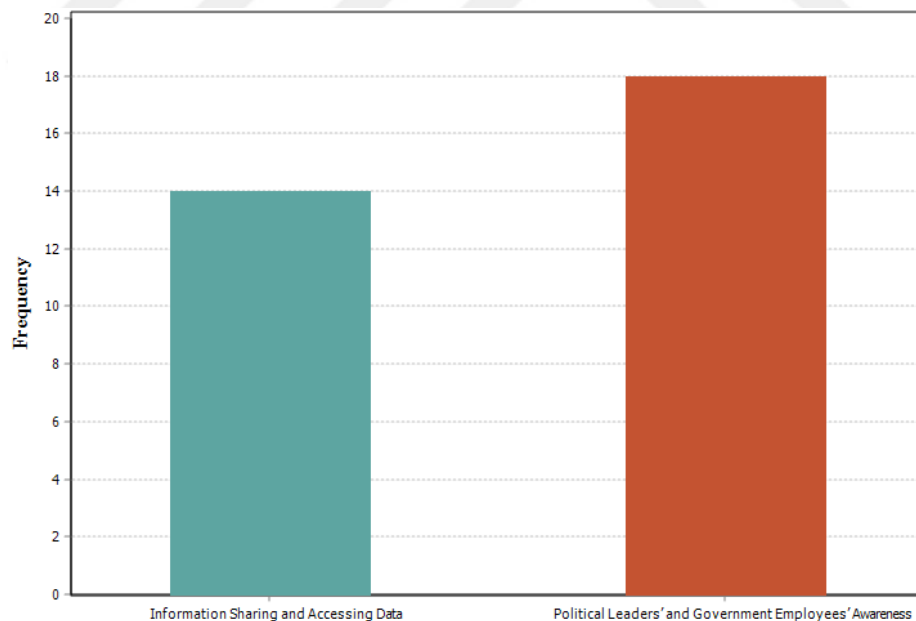


Figure 5.4. The frequency of social challenges

5.3.1 Information sharing and accessing data

Almost all interviewees said that one of the challenges that e-government project teams encountered in obtaining the necessary data was information sharing and accessing data. Employee 1 said that the e-government initiative was a set of services provided by a variety of ministries. Employees must have the authority or a defined location within each ministry to extract information, collect data, and even view their steps. He also added that *“Other ministries do not give us the essential information because we have no authority over them and there is no coordination.”* In the same way, Employee 5 stated that developers occasionally encounter difficulty obtaining the information and data required to establish and develop the e-government system. Furthermore, Employee 7 said that *“One of the most significant issues that e-government developers experience is gaining access to the essential data to build robust systems. At times, data is provided that is irrelevant to the system’s requirements. Sometimes incomplete data is provided, and at other times, the requirements are misunderstood. These issues that developers face cause delays in acquiring fundamental data.”* Similarly, Employee 8 mentioned that the most significant obstacle to obtaining essential information was interacting with other governmental agencies, which frequently show little cooperation. He suggested that to save time searching for information or engaging with other government organizations, the government should develop a workplace for the e-government project that has considerable powers. Also, Manager 2 asserted that the failure to obtain needed information on time was one of the many challenges developers encountered. Conversely, Employee 3 claimed that there were no challenges in accessing information; there was cooperation in this field.

5.3.2 Political leaders’ and government employees’ awareness

All interviewees confirmed that political leaders’ and government employees’ awareness is weak and limited. Employee 1 said that the government had taken the e-government project as a trend. Something that the entire world was talking about, and they wanted the same thing. It makes no difference to them what its significance was or what it involved. Employee 4 claimed that political leaders had demonstrated a lack of awareness of the e-government project. However, in government institutions, awareness was quite good. Significantly, Employee 6 asserted that *“We all know that the e-government project faces many challenges and, in recent years, has stopped entirely. If political leaders and government institutions were aware of the e-government project, Yemen would be in a*

completely different situation. Yemen would have supplied different electronic services and made big improvements, benefiting both residents and the government. It will also facilitate a variety of activities. However, lack of awareness was one of the primary reasons for the e-government project's failure." In similar fashion, Manager 2 noted that what they faced with the e-government initiative was a lack of awareness among political leaders. Government institutions and other ministries had varying levels of awareness. Some ministries had excellent awareness, while others had only intermediate or poor awareness. He also added that political leaders must understand the significance of the e-government project. The lack of awareness of the value of the e-government initiative had slowed the project's progress. If the government had realized how important the e-government project was, it would have devoted all of its resources to its success. He also believed that the primary challenge facing the e-government initiative in Yemen was a lack of awareness among decision-makers. He also said that employees did not hold anyone responsible for the current government's lack of interest in the e-government project because Yemen is currently in a very tough situation. But, in general, employees need to raise awareness of the e-government project to succeed. Additionally, Manager 3 explained that political leaders were not sufficiently aware of the e-government initiative, which had a negative impact on the project's progress.

According to Employee 8, awareness of Yemeni government institutions as well as political leaders regarding the e-government project is weak. He also mentioned that most importantly, the government's awareness of the e-government project's significance and making it a national priority would enable the e-government project team to do their work and tasks more effectively. Likewise, Employee 9 noted that *"Political leaders and government entities have a very limited understanding of the initiative. However, the e-government project management team is attempting to raise their awareness."*

Table 5.4. Social challenges statistics

Social Challenges	Frequency	No. Of Participants
Information Sharing and Accessing Data	14	10
Awareness of Political Leaders and Government Employees	18	12

As Table 5.4 shows, three social challenges face the development of the e-government project in Yemen. Table 5.4 also presents the frequency of occurrence of each challenge and the number of participants who mentioned it.

5.4 Political Challenges

According to the findings of the semi-structured interviews, there are five major categories of political challenges. These categories are conflict, political instability, government support and political will, lack of government priority, and vision.

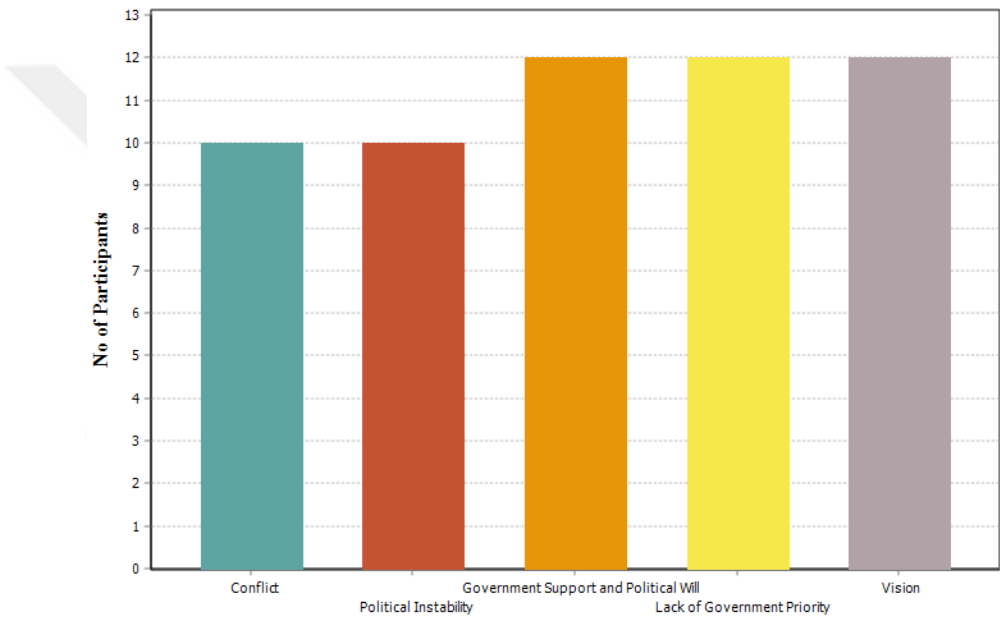


Figure 5.5. The distribution of political challenges

Figure 5.5 illustrates the distribution of political challenges by the number of participants who mentioned them.

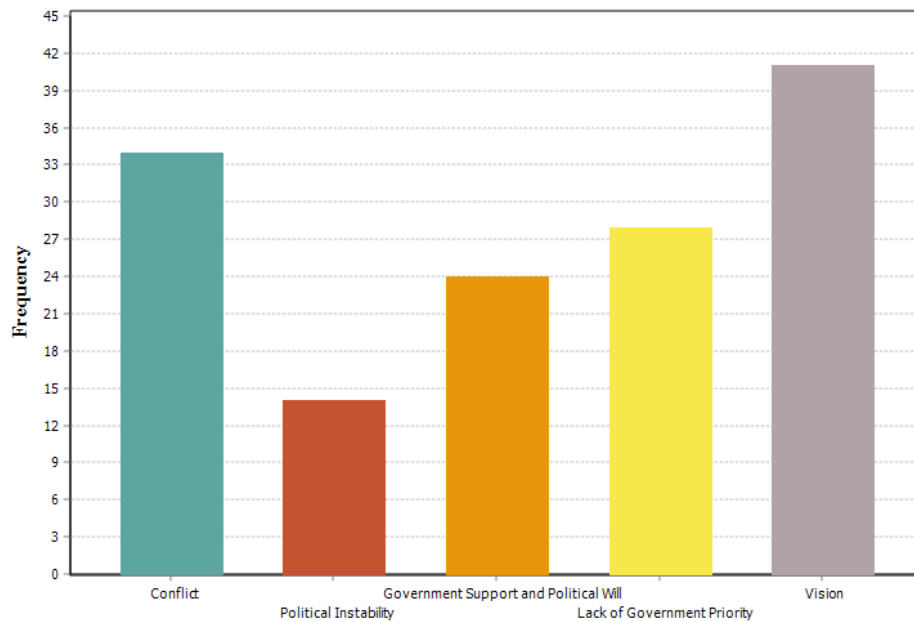


Figure 5.6. The frequency of political challenges

The frequency of political obstacles in the interviews is shown in Figure 5.6.

5.4.1 Conflict

Around ten of the twelve participants discussed the conflict in Yemen and its impact on the development of the e-government project. Employee 1 argued that the current conflict has an impact on the e-government program. The e-government project has faced the greatest challenges since the start of the conflict in 2015. He also added that the e-government project was stopped for many reasons, and the conflict played an important role. Likewise, Employee 2 said that *“The conflict had an impact on numerous aspects and projects, including the e-government project. The conflict led to a scarcity of financial resources and a lack of external initiatives to support the e-government project.”* He also claimed that *“Yemen is currently facing serious barriers, and one of the primary reasons for the suspension of the e-government project is the conflict.”* Most importantly, Manager 3 asserted that *“Since 2015, the Yemeni economic crisis, along with the ongoing conflict, has had a serious impact on the e-government initiative. The war exacerbated an already miserable situation. In short, the conflict had a significant impact on the e-government project, whether financially, administratively, or even in terms of infrastructure. Conflicts all over the world have many tragic sides, whether humanitarian or technological. In Yemen, the e-government project was greatly undermined and completely stopped.”* By the same token, Employee 8 stated that *“The most significant obstacles the e-government*

project encountered occurred in 2015 and beyond. This is because Yemen entered a new phase of the conflict, which resulted in the suspension of all government initiatives. Many projects have been stopped, and the e-government initiative has been severely impacted by the conflict and its repercussions. Thus, the Yemeni economy and politics, as well as ending the conflict, have become top concerns for political leaders in Yemen and even foreign countries. Assistance and cooperation in the field of e-government have become more difficult since the beginning of the conflict in Yemen. This had a detrimental effect on the e-government project, resulting in its suspension.”

5.4.2 Political instability

Another political challenge that the Yemeni e-government initiative faces is political instability. Employee 4 claimed that the aid that had previously been provided was completely cut off because of the political situation in the country. In like manner, Employee 8 mentioned that *“Previously, the project had some assistance from foreign governments but was stopped entirely due to political instability.”* Manager 3 stated that since 2011, the country had found itself in a tough political scenario and the e-government project had been affected. He also added that Yemen was experiencing an extremely difficult political situation, which was why the e-government project was not a top priority for the government. In the same way, Employee 7 said that the e-government project has been fully suspended due to the country’s present situation, political instability, and conflict, all of which have had an impact on this initiative. Critically, Employee 9 asserted that *“The project administration is constantly changing due to political disputes. If a republican decision appointing a new prime minister is issued, the newly appointed prime minister introduces a new staff member to the Council of Ministers”*. He also added that the Yemeni political environment was not supportive of the e-government initiative. Therefore, he did not even think that the coronavirus pandemic would encourage the government to take any steps to revive the e-government project.

5.4.3 Government support and political will

Government support and political will are critical for any initiative to succeed. All participants emphasized the importance of government support and political will. Manager 2 claimed that in Yemen, the government’s support for the e-government project was insufficient. There was a lack of political support. He also mentioned that the most

challenging barriers are a lack of political will, financial resources, and the absence of an organizational structure. Employee 3 stated that the e-government project had gained some government support in 2011, but that support had waned over time. In addition, Employee 5 noted that *“The e-government project did not obtain adequate government support, even though it has numerous benefits for both the government and citizens.”* He also added that *“The lack of political will is a major concern. If the government shows an interest in the e-government project, adequate budgets will be prepared to meet all of the project’s requirements.”* Moreover, Employee 7 regretted that the e-government project did not receive adequate government support. Successive governments in Yemen did not prioritize the e-government project. As a result, it was not surprising that this initiative received insufficient attention. There was some interest, but it was insufficient. It is believed by Manager 2 that the e-government project requires political will and government support to progress further and provide better services. He also insisted that all other challenges would be easily overcome as long as the project had the government’s support and it was a high priority.

5.4.4 Lack of government priority

All the interviewees said that the e-government initiative in Yemen was not a high priority for the Yemeni government. Employee 1 stated that this project did not get adequate government support because it had become a late priority. He also added that the government did not consider it a priority and that it was one of the least important priorities. Also, Manager 1 mentioned that the government does not consider the e-government project a priority. As explained by Employee 2, the e-government initiative is not considered among the priorities of the Yemeni government, especially in light of the ongoing conflict. Moreover, Employee 5 commented that at the beginning of the e-government initiative, the project was among the government’s priorities, but it was not a top priority. Nowadays, it has never been a priority. Additionally, Employee 6 said the following: *“Unfortunately, the e-government project was not one of the government’s top priorities in previous administrations. This priority may fluctuate from one government to the next, but it has received little attention in general. As a result, the lack of political interest in the e-government project cast a shadow over several parts of the project.”* In similar fashion, Manager 2 stated that *“in recent years, because of the Yemeni political situation and the conflict, the government’s priorities have changed, and the e-government*

project has never become a priority. The e-government initiative requires a strong government commitment, and it should be a top priority for the government.” As believed by Manager 3, this large project is not among the political leaders’ top priorities. Employee 9 also declared that the Yemeni government does not regard it as a top priority but rather as a secondary concern.

5.4.5 Vision

The vision of the e-government project is viewed differently by participants. Employee 2 claimed that *“A vision and ambitious strategies were present at the beginning of the e-government project, but they gradually went away, and the initiative lacked a clear direction. Therefore, the e-government project currently has no vision.”* However, Employee 3 mentioned that there was a clear and comprehensive vision. In the same way, Employee 9 asserted that there was a clear vision and the e-government project’s plans were precise and accurate. On the contrary, Employee 6 argued that *“During the early stages of the e-government project, a clear vision was formed by e-government project specialists. However, the vision has faded in recent years. So, it is not surprising that the e-government program has been stopped entirely.”* Manager 2 also stated that *“There is no clear vision for the e-government project, and I am talking about the last few years. The e-government project began with a vision that was periodically updated, and it has evolved through time.”* As mentioned by Manager 3, the e-government initiative has progressed through some stages. In the early stages of launching the Yemeni e-government project, there was a clear vision and detailed plans to be followed. In recent years, the e-government project has had no clear vision or direction because of the instability in Yemen.

Table 5.5. Political challenges statistics

Political Challenges	Frequency	No. Of Participants
Conflict	34	10
Political Instability	14	10
Government Support and Political Will	24	12
Lack of Government Priority	28	12
Vision	41	12

Table 5.5 shows the political challenges that the e-government project development in Yemen has faced. It also illustrates the number of participants who mentioned these challenges and the frequency of these political challenges in the interviews.

5.5 Human Resources Challenges

According to the results of the semi-structured interviews, human resources challenges are categorized into four main categories. These categories are employees' skills and knowledge, lack of training courses, part-time employees, and temporary teams.

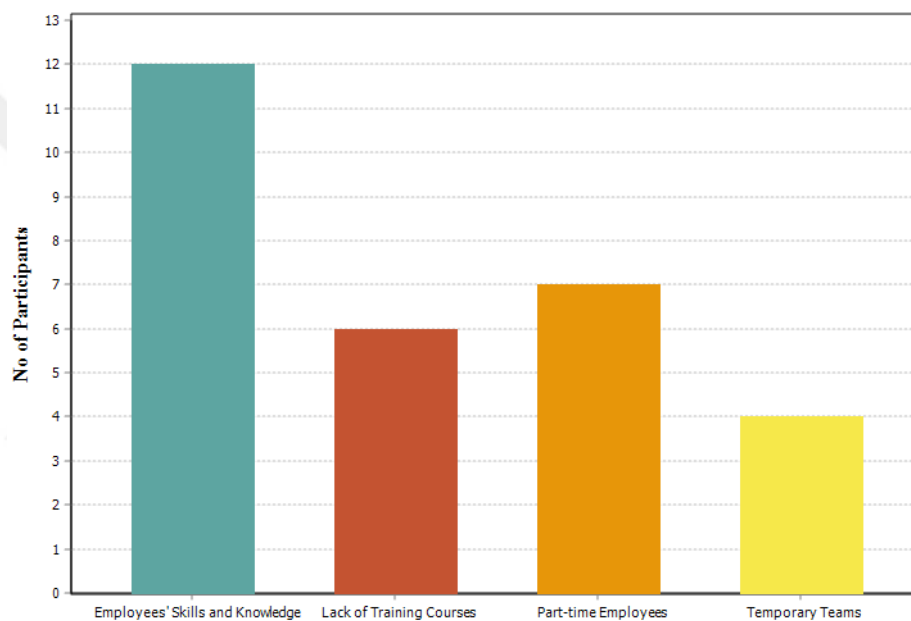


Figure 5.7. The distribution of human resources challenges

Figure 5.7 presents the distribution of human resources challenges based on the number of participants who mentioned them.

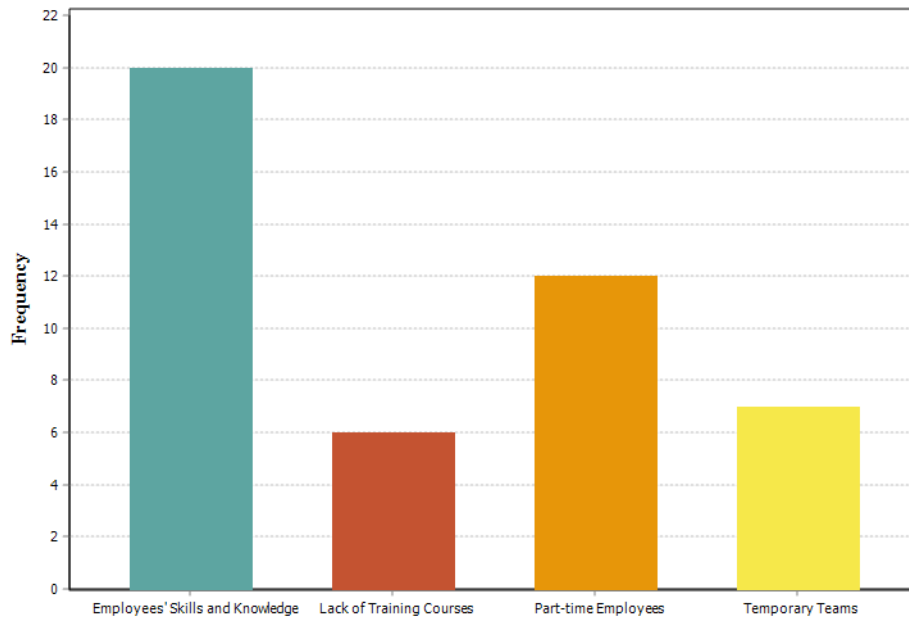


Figure 5.8. The frequency of human resources challenges

Figure 5.8 illustrates the frequency of human resources challenges. These human resources challenges are presented in the following sections.

5.5.1 Employees' skills and knowledge

One of the human resource challenges that the e-government initiative faces is employees' skills and knowledge. Employee 1 noted that there were no employees in the e-government project who were experts in this field. He also added that because the job scope was bigger and not limited, e-government transactions and the e-government program would undoubtedly differ from the competencies of current employees. Similarly, Manager 2 asserted that *"Because technology is developing, the gap between staff abilities and the e-government project will persist. As a result, professionals in the technical industry require ongoing training to stay abreast of technological advancements."* He also suggested that *"the project should have many employees with extensive experience. I did not mean that the current employees' competencies were not good; on the contrary, all of the employees in the e-government project had excellent talents; I just meant that they needed more personnel so that the project could move forward rapidly."* Employee 9 also believed that there was a gap between employees' skills and the e-government project vision, but there were training courses that were coordinated in partnership with ESCWA to reduce this gap. Manager 3 mentioned that the e-government project was moving slowly and had recently

stopped. Therefore, it was difficult to determine whether there was a gap between the employees' skills and the e-government project's vision.

5.5.2 Lack of training courses

According to half of the participants, training courses for e-government project members are essential to success in the development of the e-government project. Employee 2 stated that *"There will certainly be a gap between the employees' skills and the vision of the project. The e-government project is big, and mistakes are unacceptable because this project represents the Yemeni government. Therefore, employees need courses that strengthen their skills according to their specialization."* In similar fashion, Employee 5 explained that there was a gap between the employees' skills and the e-government project's vision. He also asserted that this gap might be bridged by providing specific training courses for the e-government project's staff to improve their qualifications. As claimed by Employee 7, the e-government initiative was a massive and very significant project. The staff had some experience, but there was a skill gap that required training."

5.5.3 Part-time employees

One of the most significant challenges to the development of the e-government project is that the employees who work on the e-government initiative are part-time employees. Employee 1 claimed that *"When we worked on the e-government project, we formed teams with people who were not even full-time."* By the same token, Employee 6 commented that *"Teams are attempting to do something positive for this country. Also, these teams are not exclusively dedicated to the e-government project. They have jobs in the government agencies for which they work. Therefore, they work for the e-government project in addition to their regular duties."* Similarly, Manager 2 regretted that the e-government project had a group of employees who were not dedicated to this project; they had other roles and responsibilities in their main workplace. The development and management of e-government was an extra effort they made. He asserted that this created a serious challenge in the absence of a directly concerned government institution to manage this project. He also added that some employees were busy with other tasks because they had not been dedicated exclusively to working on the e-government project. Most importantly, Manager 2 mentioned that the project lacked an adequate number of employees in the e-government program. Every employee involved in the e-government project works on a part-time basis.

Likewise, Employee 8 noted that the employees of the e-government project had other occupations in the government institutions to which they belong, in addition to their work for the e-government project. He suggested that all e-government staff should focus solely on the e-government initiative and nothing else.

5.5.4 Temporary teams

Another human resources challenge is that the e-government project only has temporary teams that change from time to time. Employee 1 argued that *“They frequently form teams, but the teams are just temporary and have no control over any of the governmental organizations. They build temporary technical and administrative teams with no authority or power.”* He also added that *“When we worked on the e-government project, they formed teams with people who were not even full-time. For example, every period, a team is formed for a year. If the year comes to an end, the team is done. This indicates that it is a self-initiative.”* He also noted that each time they had a project, they formed a team and set a budget for the team, not the project. Similarly, Employee 4 said that because the task was done through work teams that are formed from time to time, the management challenges were enormous. In the same way, Manager 2 claimed that *“All that exists are committees and work teams that are created regularly to carry out specified tasks at specific times.”*

Table 5.6. Human resources challenges statistics

Human Resources Challenges	Frequency	No. Of Participants
Employees’ Skills and Knowledge	20	12
Lack of Training Courses	6	6
Part-time Employees	12	7
Temporary Teams	7	4

Table 5.6 illustrates the human resources challenges and the frequency of each challenge in the interviews. Moreover, the number of participants who mentioned each barrier is shown in Table 5.6.

5.6 Financial Challenges

According to the results of semi-structured interviews, there are three basic categories of financial challenges. These categories are budget and financial support, foreign donations, and local donations.

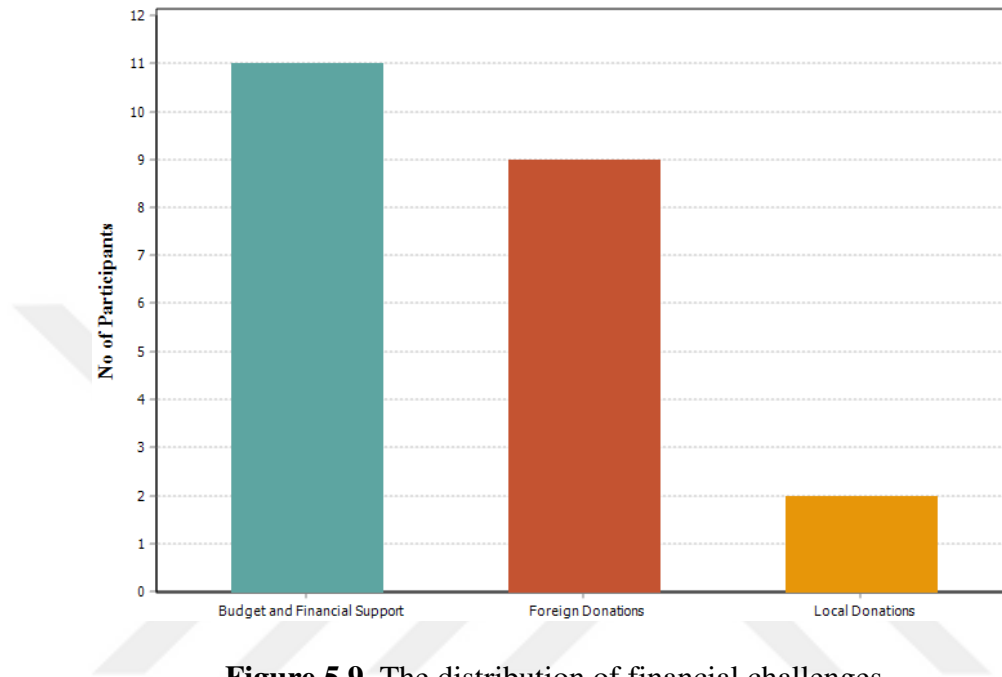


Figure 5.9. The distribution of financial challenges

The distribution of financial challenges is shown in Figure 5.9 according to the number of participants who highlighted them.

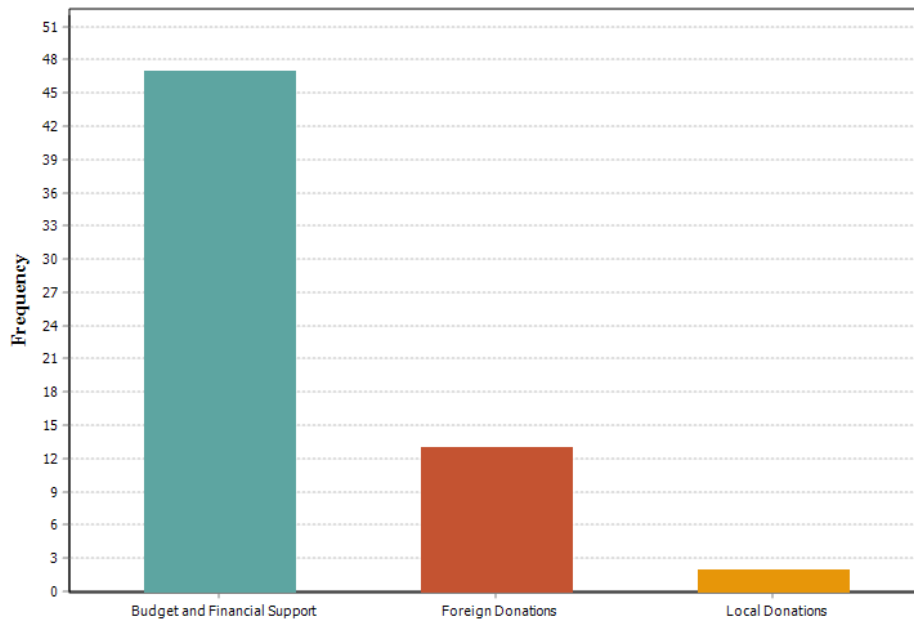


Figure 5.10. The frequency of financial challenges

Figure 5.10 displays the frequency of financial challenges that face the development of the e-government project in Yemen.

5.6.1 Budget and financial support

Budgets and financial support are frequently mentioned by interviewees. Employee 2 noted that the e-government project had run into serious financial difficulties. The e-government initiative had not obtained the necessary financial support to proceed forward and achieve significant success. This was a major obstacle to the e-government project's development in Yemen. He also mentioned that the conflict had led to a scarcity of financial resources and a lack of external initiatives to support the e-government project. In like manner, Employee 5 said that financial resources, regardless of the type of the project, are critical to its success. When it comes to Yemen's e-government project, one of the most critical barriers was a lack of financial support. The project had no approved financial budget. He also explained that all funds obtained were used to reward work teams and were distributed by the department to which the employee belongs. For example, an employee from the Ministry of Telecommunications would earn rewards from the Public Telecommunications Corporation, while an employee from the Council of Ministers would receive a reward from the Council of Ministers' budget. He also asserted that projects encounter many obstacles, with financial difficulties generally coming first. The Yemeni e-government project was experiencing severe financial challenges. This could be one of the most

important reasons for the e-government project's failure. Primarily, Manager 2 argued that *"The e-government initiative should be included in the government's budget and generous funds should be approved. The e-government project requires more support during its early stages of development."* He also claimed that *"The lack of financial resources is not the most significant barrier, as financial assistance can be obtained."* In similar fashion, Employee 8 claimed that the e-government project had encountered significant financial challenges. This project had not received adequate funding. Every government institution rewards its staff.

5.6.2 Foreign donations

Most of the participants mentioned foreign donations as one of the financial resources of the Yemeni e-government project. Participants stated that the e-government project has obtained some international donations in the past. However, due to the conflict in Yemen, these donations have been stopped. Employee 1 stated that *"In 2012 and 2013, there was a donor initiative, and the country was in better political condition. For example, the government of South Korea provided financial assistance and shared its own experience."* In the same way, Employee 2 argued that before the conflict, there was external support, such as that of the South Korean government, which provided financial and technical assistance due to their competence in the field of e-government. Manager 2 asserted that external grants were stopped as a result of the ongoing conflict in Yemen. In a similar manner, Employee 9 said that *"Financial support is essential for the e-government project, but the Yemeni crisis has stopped everything, including the trust and support of the international community. Previously, the initiative was supported by international organizations."*

5.6.3 Local donations

Only two interviewees mentioned local donations as a financial challenge to the development of the e-government project. Employee 1 noted that the data center of the e-government project was funded by a grant from the Ministry of Telecommunications in 2014, which is a local organization. However, Employee 8 claimed that *"Some may think that the biggest obstacle is the financial barrier. However, in my opinion, financial assistance can come from a variety of sources, including foreign donor countries and institutions within Yemen."*

Table 5.7. Financial challenges statistics

Financial Challenges	Frequency	No. of Participants
Budget and Financial Support	47	11
Foreign Donations	13	9
Local Donations	2	2

As observed in Table 5.7, there are three main financial challenges that the Yemeni e-government project encountered.

5.7 Technological Challenges

Based on the analysis of the semi-structured interviews, technological challenges could be broadly divided into four categories. These categories are ICT infrastructure, lack of e-readiness, security and data protection, and system integration.

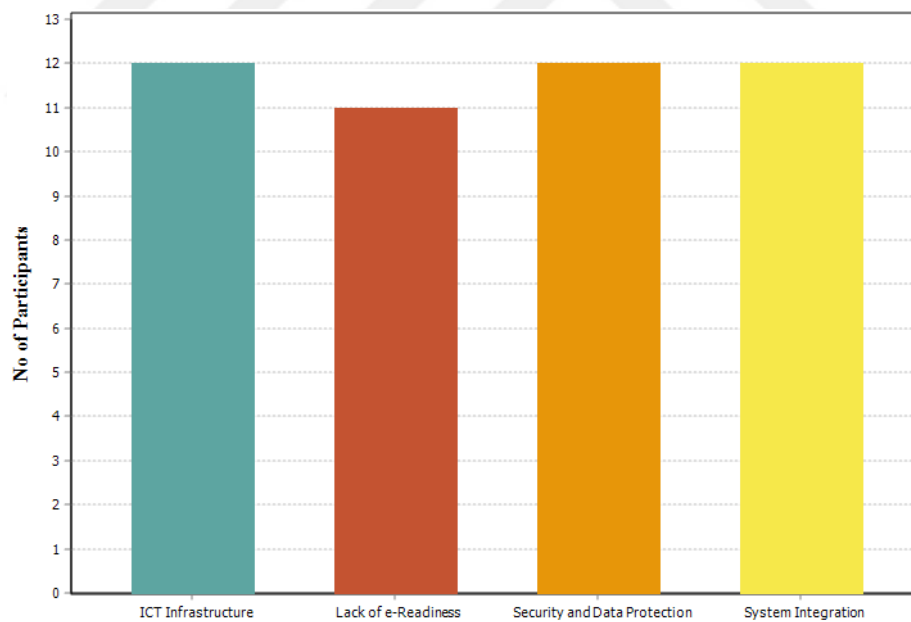


Figure 5.11. The distribution of technological challenges

Figure 5.11 shows the distribution of participants who highlighted technological challenges.

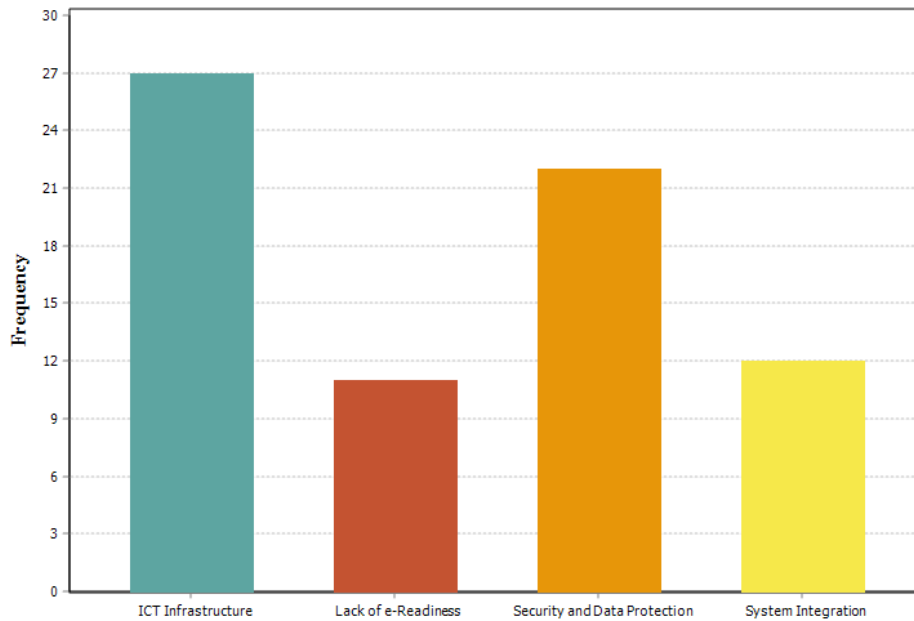


Figure 5.12. The frequency of technological challenges

Figure 5.12 displays the frequency of technological challenges as mentioned by interviewees.

5.7.1 ICT infrastructure

Interviewees mentioned the ICT infrastructure as an obstacle to the development and implementation of the Yemeni e-government project. Employee 5 claimed that the Yemeni information and communication technology infrastructure was insufficient. To enhance the Yemeni communications sector, massive ICT infrastructure investments were required. By the same token, Manager 3 argued that inadequate ICT infrastructure might be the key factor. In Yemen, there are telecommunications companies, but the infrastructure in this sector is still quite poor in comparison to other developing countries. Most importantly, Manager 2 explained that *“The Yemeni telecommunications sector is constantly striving to keep up with worldwide advances in the field of telecommunications. In recent years, the telecommunications sector has faced significant challenges as a result of the current situation. However, this critical sector has attempted to carry out its duties. In general, the Yemeni ICT infrastructure services are regarded as unsatisfactory.”* Likewise, Employee 8 asserted that *“It is easy to declare that the Yemeni ICT infrastructure is excellent, but the reality is that the ICT infrastructure is weak.”* He also added that *“The public would not be able to use various electronic services if there was no good internet service. Citizens lack internet access for a variety of reasons, particularly in rural areas. Large infrastructure*

projects are required to have internet access everywhere. Internet connectivity and information technology services should not be restricted to densely populated cities and areas.”

5.7.2 Lack of e-readiness

Almost all the interviewees highlighted Yemeni e-readiness for the e-government initiative. Employee 1 claimed that *“Technical readiness is not difficult to achieve. There are resources available in all agencies and ministries, such as infrastructure and information technology, which are good if we wish to revive the initiative.”* Similarly, Employee 3 stated that *“The Yemeni government appears to be partially ready for an e-government initiative. However, ICT infrastructure is insufficient.”* In similar fashion, Manager 3 noted that *“The Yemeni e-government project has a very low level of e-readiness.”* Primarily, Employee 8 said that the Yemeni government’s readiness for the e-government initiative was low due to the lack of a foundation for electronic services. The public would not be able to use various electronic services if there was no good internet service. Citizens lack internet access for a variety of reasons, particularly in rural areas. Likewise, Employee 9 mentioned that *“In general, the Yemeni government’s e-readiness is poor, particularly the infrastructure of communications and information technology.”*

5.7.3 Security and data protection

Another technological obstacle challenging Yemeni e-government efforts is security and data protection. Employee 1 regretted that security and data protection issues have not been addressed. He also claimed that each employee made an effort to strengthen security in his area of responsibility. For instance, network engineers sought to increase the system’s security against breaches, while server administrators worked to improve server security. As a result, no concrete plans have been developed to address system breaches. By the same token, Manager 3 claimed that *“The Yemeni e-government project has no strategies or visions for data security and protection. Consequently, the issue of security and data protection is addressed in the e-government initiative in a very limited way. The e-government project in its advanced phases will include this as one of its main priorities.”* He also remarked that *“E-government system breaches are handled by personnel based on their skills. Software developers, for example, make every effort to guarantee that the systems they build do not have any security holes. In addition, the same procedure is*

carried out on both the server and the computer network.” However, Employee 6 believed that data security and protection were one of the project’s advanced topics. They had not been addressed in the Yemeni e-government program. He also mentioned that the breach of e-government systems unquestionably destroys citizens’ trust in the project. He also added that they had not yet reached the point of delivering huge financial services that required them to prioritize the issue of system security against breaches and attacks. Nevertheless, system security should not be ignored. On the other hand, Employee 9 argued that *“A comprehensive study on information security and protection was conducted. It was intended to acquire the aid and cooperation of the best international companies in this industry.”*

5.7.4 System integration

System integration is another technological challenge that faces the development of the e-government project in Yemen. Manager 3 stated that *“One of the challenges to the development of e-services in Yemen is system integration. The challenge of integration between diverse systems is critical. If this problem is not addressed early on, the Yemen e-services program may fail prematurely. Of course, there are a variety of barriers to the Yemeni e-government initiative, and the significance of each obstacle is different. However, we should not consider system integration to be a straightforward problem. On the contrary, it is a critical obstacle that should be studied as early as possible. We do not want to construct systems and then spend additional money and resources on issues that could have been avoided.”* Also, Employee 6 noted that one of the challenges to the development of electronic services was system integration. Various systems might use different operating systems, databases, or even design methods. A problem arises when different systems are integrated. Developers must link all of the e-services they have already developed into the e-government project, and some changes might be made to ensure their compatibility with the other systems. However, Employee 9 mentioned that *“System integration is not regarded as a major obstacle to the e-government project because it is included in the project’s vision and plans. There are specialists from the National Information Center and professors from Sana’a University working on a strategy to ensure that all systems utilized across all ministries are licensed and unified. It is not regarded as a barrier to the e-government project.”*

Table 5.8. Technological challenges statistics

Technological Challenges	Frequency	No. of Participants
ICT Infrastructure	27	12
Lack of e-Readiness	11	11
Security and Data Protection	22	12
System Integration	12	12

Technological difficulties that faced the e-government project development in Yemen are listed in Table 5.8. Furthermore, Table 5.8 summarized the frequency and number of interviewees who noted these challenges.

5.8 Policy and Legal Challenges

Three broad categories of policy and legal challenges emerge from the analysis of semi-structured interviews. These categories are lack of legal framework, lack of guidelines and best practices, and lack of documentation.

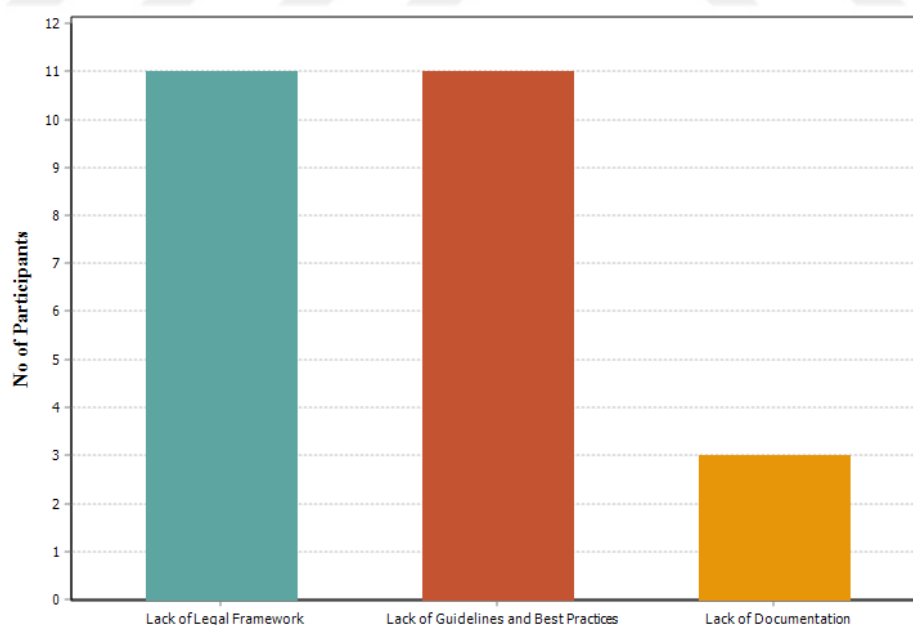


Figure 5.13. The distribution of policy and legal challenges

The distribution of policy and legal challenges is shown in Figure 5.13 based on the number of participants who indicated these difficulties.

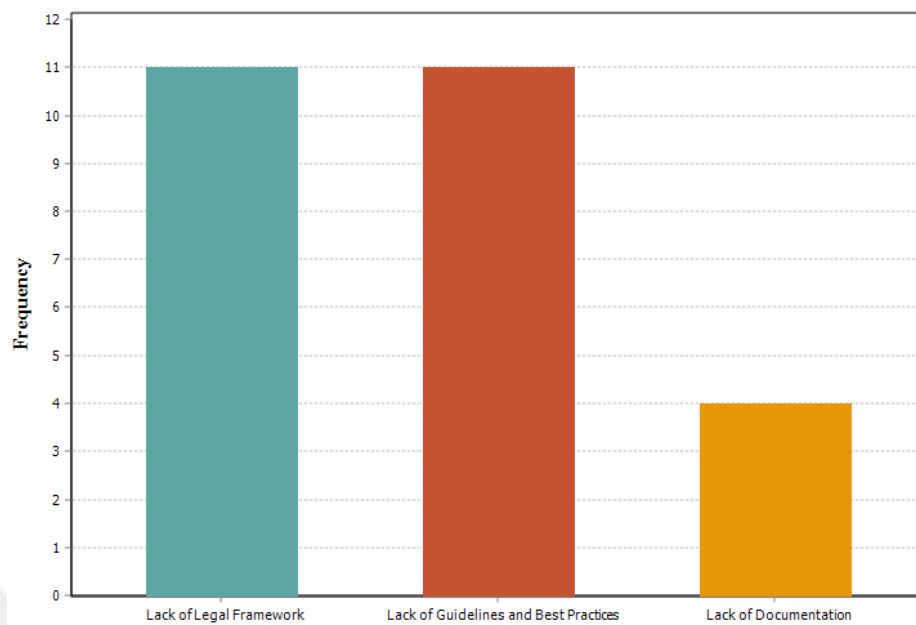


Figure 5.14. The frequency of policy and legal challenges

The frequency of policy and legal challenges is shown in Figure 5.14. These obstacles are presented in the following sections.

5.8.1 Lack of legal framework

According to interviewees, the lack of a legal framework is a barrier to the development and implementation of the Yemeni e-government initiative. Employee 1 stated that there was no legal framework for the e-government project. Also, Employee 3 noted that “*E-government has no legal framework. Nevertheless, there is a project to draft laws that go along with the e-government project.*” In similar fashion, Employee 8 claimed that the e-government project lacked a legal or regulatory framework. If there was any legal or regulatory basis, it was very limited. However, Employee 5 mentioned that “*There had been little attention paid to the e-government project, particularly in terms of its legal and regulatory aspects.*” However, Employee 9 said that the Ministry of Legal Affairs was working on a project to set up the legal framework for the e-government initiative.

5.8.2 Lack of guidelines and best practices

Guidelines and best practices are critical components of every project. Participants mentioned a lack of guidelines and best practices as an obstacle to the development of the

e-government project in Yemen. Manager 1 said that *“There are not enough guidelines to regulate e-government programs. Of course, some successful projects have been seen, such as the e-government project for South Korea.”* Employee 3 also claimed that there were a few basic rules to follow. In like manner, Employee 7 asserted that *“Guidelines do not exist comprehensively or systematically, but rather in a very simplified form.”* Likewise, Manager 2 said, *“I regret to inform you that there are no best practices or recommendations for e-government programs.”* In the same way, Manager 3 stated that there were no guidelines or best practices in the development of the e-government project.

5.8.3 Lack of documentation

A few interviewees noted that one of the challenges with the Yemeni e-government project is the absence of documentation. Employee 1 asserted that *“There is not even any documentation for the project. It is thought that we have documentation; for example, I want to know what difficulties occurred two or three years ago, what hurdles occurred, but there is no archive for papers such as recommendations, plans, or projects.”* He also added that *“even the records that are intended to be archived so that they can be cited are missing.”* Similarly, Employee 2 believed that *“This project does not have any type of documentation. The documentation is very important to know what has been done and what obstacles we have faced in the past.”* By the same token, Employee 7 regretted that there was no documentation for the e-government initiative. He also noted that this massive project should be developed systematically, with strategies in place. Every phase of the e-government initiative should be carefully documented.

Table 5.9. Policy and legal challenges statistics

Policy and Legal Challenges	Frequency	No. of Participants
Lack of Legal Framework	11	11
Lack of Guidelines and Best Practices	11	11
Lack of Documentation	4	3

Policy and legal challenges are reported in Table 5.9. Also, the number of participants who mentioned these obstacles is displayed on the same table.

5.9 Development Environment Challenges

Semi-structured interview analysis reveals three major categories of development environment obstacles. These categories are no workplace or office, lack of project management tools, and simple development environment.

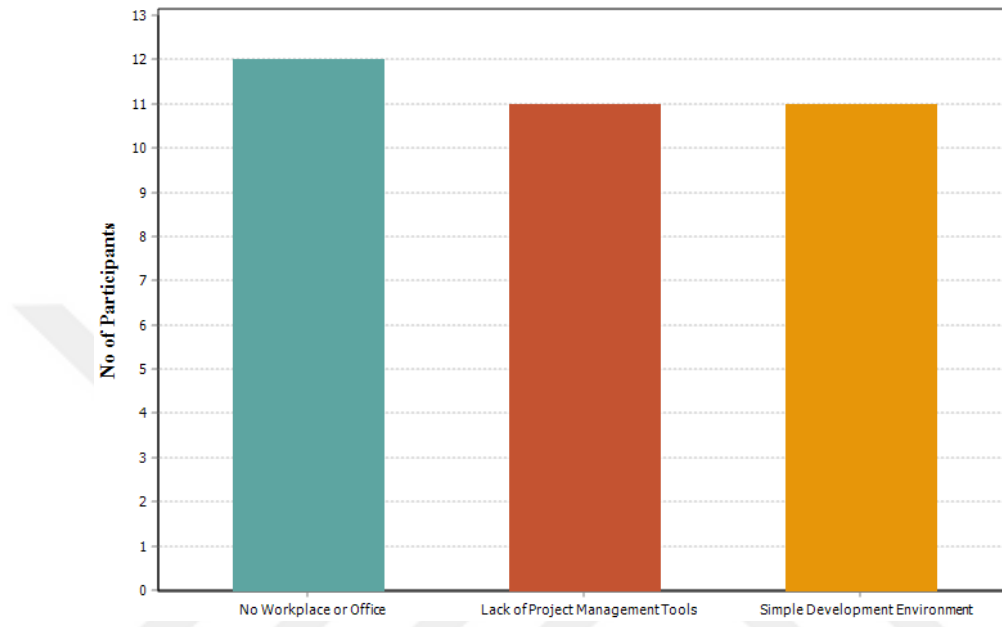


Figure 5.15. The distribution of development environment challenges

Figure 5.15 illustrates the distribution of development environment challenges based on the number of participants who mentioned these difficulties.

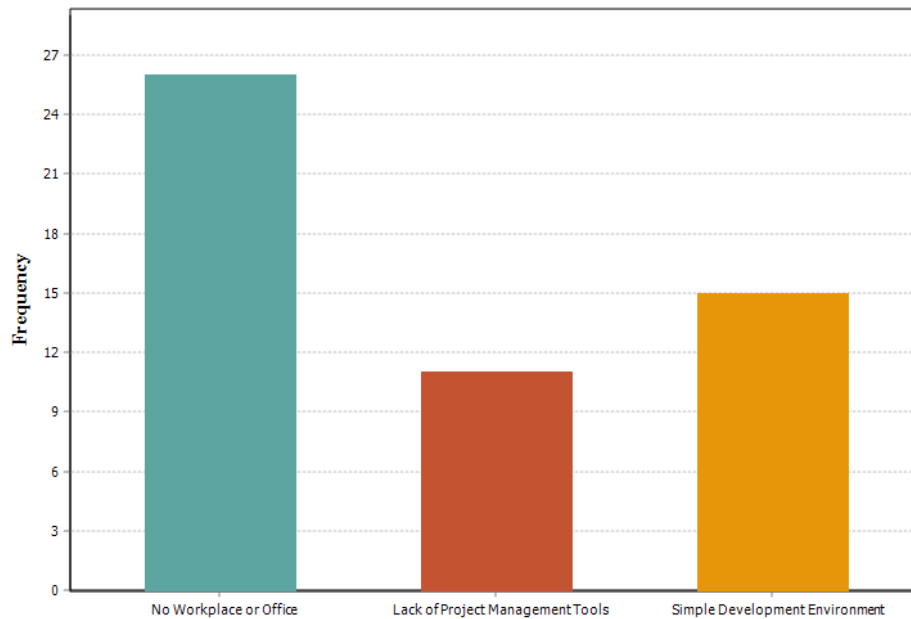


Figure 5.16. The frequency of development environment challenges

Figure 5.16 demonstrates the frequency of development environment challenges facing the e-government project development in Yemen.

5.9.1 No workplace or office

All the interviewees stated that the Yemeni e-government project does not have a workplace. Employee 2 regretted that there was no dedicated office or building for the development of e-government services, which posed a major challenge to the e-government project team. Manager 2 stated that *“Aside from financial and administrative difficulties, not having a workplace would undoubtedly have a significant impact on the progress of the project. How do project teams get together to complete their assigned tasks? How work plans are discussed, as well as how performance is tracked and evaluated. We are talking about a large project, so instead of meeting in different locations, which has several drawbacks, there should be a dedicated workspace for the project.”* As determined by Employee 8, *“The e-government project does not have its own workplace. Thus, it is not surprising that this project occasionally stumbles, fails, or slows down, as there is no workplace or offices for it. It is a problem that needs to be addressed whenever this project is revived.”* Critically, Manager 3 asserted that *“the lack of a workspace for the e-government project implies that there is no solid foundation for this project. In addition to the existing financial and management concerns, the unavailability of a workplace will cause additional complications.”*

5.9.2 Lack of project management tools

Almost all the interviewees stated that the Yemeni e-government project lacked project management tools, which are essential to manage and follow-up the project. Employee 2 noted that they had not managed the project using specialized tools because the e-government program had not obtained sufficient support in all fields. In like manner, Employee 6 regretted that electronic project management solutions were not being employed. Manager 2 also said that *“project management tools are essential in the development and construction of large projects such as the e-government project. However, no project management tools were used in the Yemeni e-government project.”* In addition, Manager 3 stated that *“Project management software assists in managing all project operations, including resource management, resource distribution, information exchange, risk mitigation, productivity enhancement, and workflow monitoring. These tools will result in a significant improvement in the project’s long-term sustainability. However, they have not been employed in the Yemeni e-government project.”* Likewise, Employee 8 mentioned that no project management tools were used, which were essential for monitoring workflow and managing financial, human, and other activities associated with building projects.

5.9.3 Simple development environment

All the interviewees stated that the Yemeni e-government project has a simple development environment. Employee 1 claimed that they had a simple development environment. He also added that they had an experimental environment for publishing information, adding a service, or even trying out new tools. but it was a simple environment. Also, Employee 6 said that there were some tools and facilities for development teams, but they were basic and inadequate for such a huge project. E-services were evaluated and assessed using simple techniques as there was no dedicated laboratory. He also mentioned that *“To some extent, the e-government project’s development environment is unsuitable.”* In similar fashion, Employee 7 explained that *“The development tools are basic. Regardless of how simple the tools are, developers attempt to take advantage of them. There ought to be a specific laboratory equipped with the most advanced technological tools to evaluate electronic services, but there are no labs to evaluate e-services in the e-government project.”* Likewise, Employee 8 claimed that

“There are some tools and facilities available to developers of the e-government project, but they are quite basic. Also, there is no laboratory dedicated to evaluating e-services.”

Table 5.10. Development environment challenges

Development Environment Challenges	Frequency	No. Of Participants
No Workplace or Office	26	12
Lack of Project Management Tools	11	11
Simple Development Environment	15	11

The development environment challenges that the e-government project development in Yemen encountered are listed in Table 5.10. Furthermore, the frequency of the challenges' occurrence during the interview and the number of participants who highlighted them are shown in Table 5.10.

5.10 Conclusion

The development of the e-government project in Yemen faced various difficulties that had detrimental effects on the Yemeni e-government project. The analysis of the semi-structured interviews shows eight categories of obstacles that have been encountered in the development of the e-government project in Yemen. These obstacles are organizational challenges, social challenges, political challenges, financial challenges, human resources challenges, technological challenges, policy and legal challenges, and finally, development environment challenges.

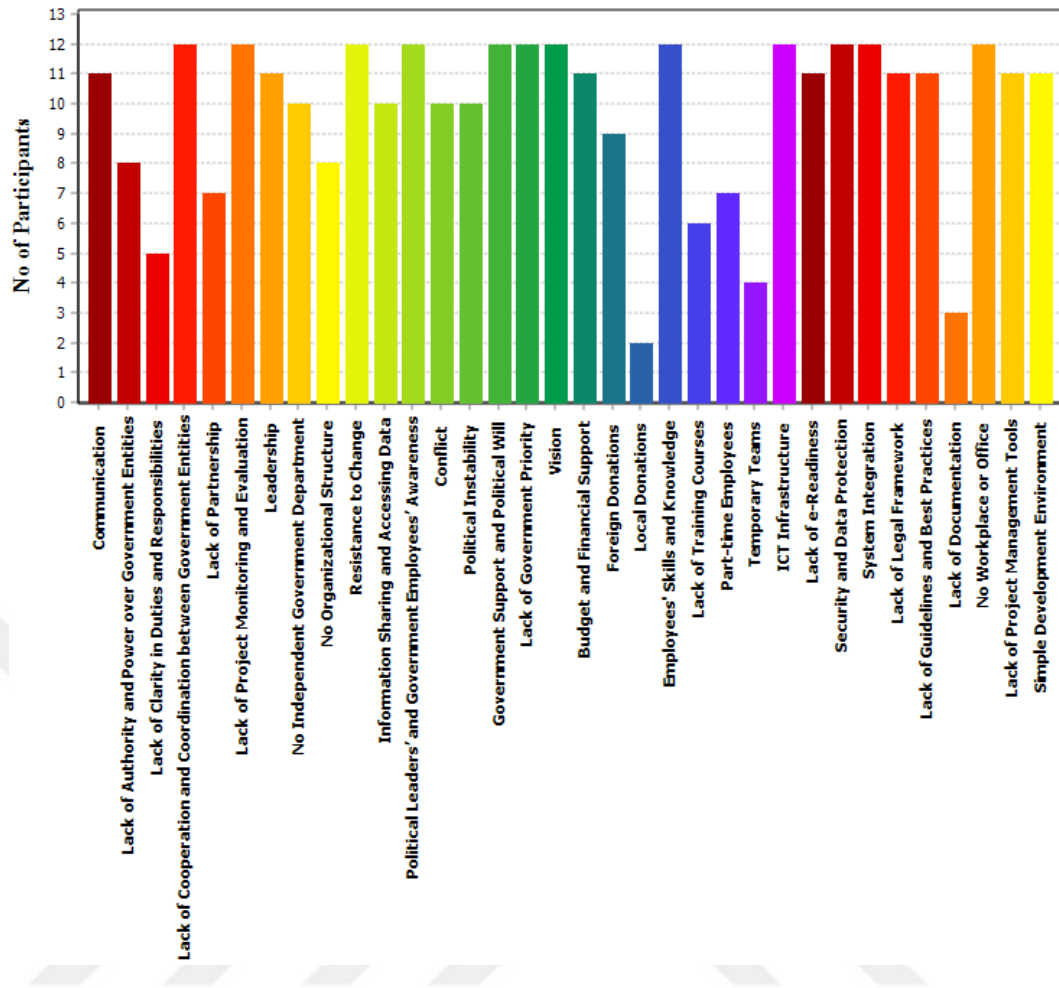


Figure 5.17. The distribution of obstacles facing the e-government project's development in Yemen

Figure 5.17 shows the distribution of all difficulties and challenges that were encountered in the development of the Yemeni e-government project, according to the number of interviewees who mentioned them.

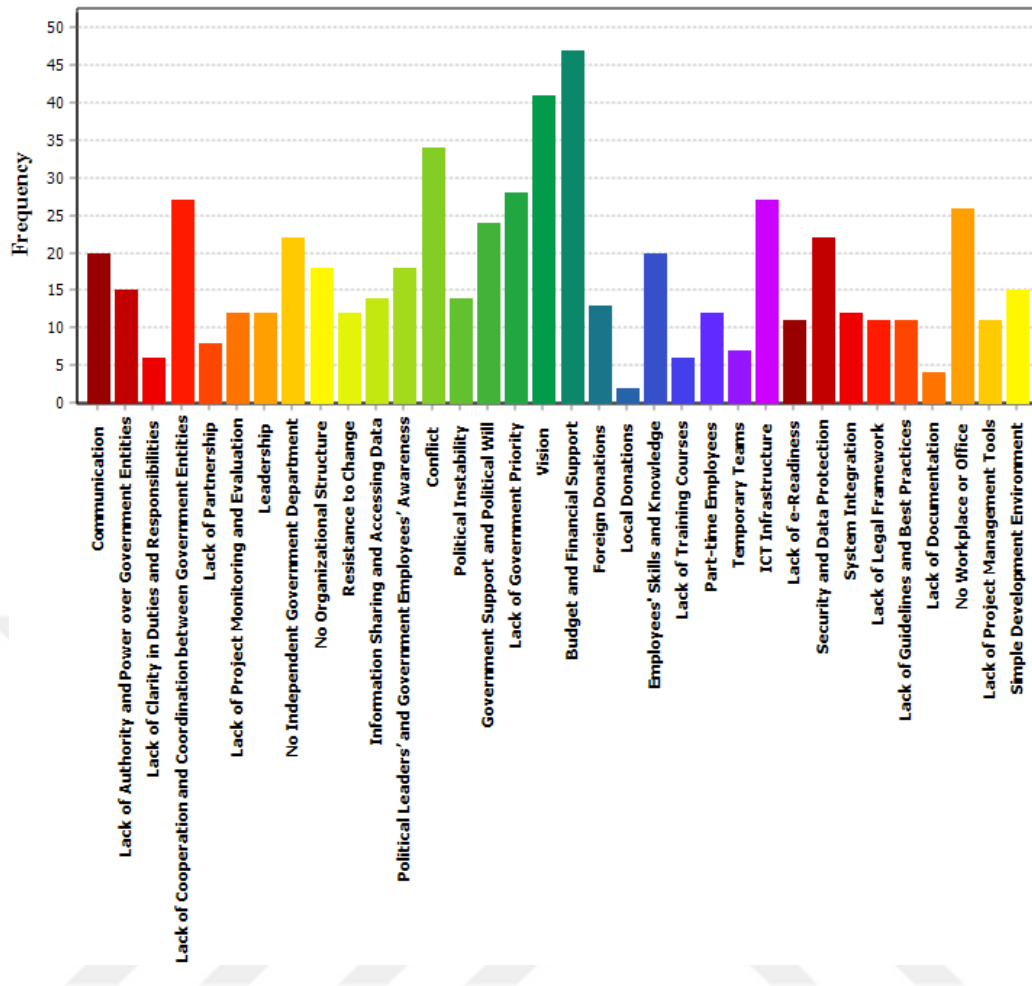


Figure 5.18. The frequency of obstacles facing the e-government project's development in Yemen

The frequency of occurrence of each challenge that faced the development of the Yemeni e-government project is shown in Figure 5.18.

Table 5.11. Obstacles to the development of the e-government project in Yemen

Categories	Challenges
Organizational Challenges	Communication
	Lack of Authority and Power over Government Entities
	Lack of Clarity in Duties and Responsibilities
	Lack of Cooperation and Coordination between Government Entities
	Lack of Partnership
	Lack of Project Monitoring and Evaluation
	Leadership
	No Independent Government Department
	No Organizational Structure
	Resistance to Change
Social Challenges	Information Sharing and Accessing Data
	Political Leaders' and Government Employees' Awareness
Political Challenges	Conflict
	Political Instability
	Government Support and Political Will
	Lack of Government Priority
	Vision
Financial Challenges	Budget and Financial Support
	Foreign Donations
	Local Donations
Human Resources Challenges	Employees' Skills and Knowledge
	Lack of Training Courses
	Part-time Employees
	Temporary Teams
Technological Challenges	ICT Infrastructure
	Lack of e-Readiness
	Security and Data Protection
	System Integration
Policy and Legal Challenges	Lack of Legal Framework
	Lack of Guidelines and Best Practices
	Lack of Documentation
Development Environment Challenges	No Workplace or Office
	Lack of Project Management Tools
	Simple Development Environment

Table 5.11 summarizes all the challenges and obstacles that were encountered in the development of the e-government project in Yemen.

Chapter 6 DISCUSSION

There is a lack of research on the development of e-government initiatives in developing and least-developed countries as a result of the general lack of interest in this topic among researchers and students. Moreover, most studies about e-government are focused primarily on e-government implementation and adoption. As discussed in Chapter Three, there appears to be a scarcity of studies on the Yemeni e-government project, specifically the difficulties that were encountered in its development. Therefore, this study aims to investigate the barriers to the development of the e-government project in Yemen.

Besides the fact that this research will enrich the literature about e-government in developing and least-developed countries, the results will also aid and guide the Yemeni government and policymakers in reviving the e-government initiative. However, this chapter concentrates on comparing and discussing the study findings mentioned in Chapter 5 with the literature.

6.1 Organizational Challenges

6.1.1 Communication

Previous studies have only focused on communication between agencies and between agencies and residents. As stated by Almutawkkil et al. (2016), it is necessary to establish a solid channel of communication among agencies and between agencies and residents to strengthen the ties of confidence between government and citizens. However, these research findings demonstrated two communication barriers, which are the communication challenges with other government organizations and the communication challenges between e-government project members. The findings revealed that there were obstacles to communication with government entities because the project teams lacked power over other government agencies and there was no dedicated workplace for the project. This finding shows clearly that obstacles encountered by the Yemeni e-government project are interrelated. The findings also showed that the absence of a workplace was the main cause of the communication barriers between the project members. However, the communication between the project team members is effective.

6.1.2 Lack of authority and power over government entities

The e-government project leaders and members did not have the authority and power over other government entities. These are important findings in the understanding of the failure or slow progress of the e-government project development in Yemen. Previous studies did not mention the lack of authority and power over government organizations as an obstacle to the development of e-government projects. The results indicated that different countries have different challenges. Therefore, some countries might have more barriers as their environments are different.

6.1.3 Lack of clarity in duties and responsibility

The current study found that roles and responsibilities were not clear. Previous studies have not reported the lack of clarity in duties and responsibilities as a barrier to the development of e-government projects. However, this study showed that the Yemeni e-government project lacked clarity on duties and responsibilities. This challenge affected the development of the project as e-government project members did not know their exact roles and responsibilities.

6.1.4 Lack of cooperation and coordination among government entities

Mohammad et al. (2009) mentioned that barriers appear when government agencies cannot coordinate with each other and when the departments make conflicting decisions. Consistent with the literature, this research found that a lack of cooperation and coordination among government organizations could hinder the development of e-government projects. This study indicated that the Yemeni e-government project lacked cooperation and coordination with other government agencies.

6.1.5 Lack of partnership

The findings are directly in line with previous findings. Several studies have shown that partnership is essential in e-government projects. An effective partnership among the government, residents, and the private sector is required for the success of e-government (Farelo and Morris, 2006). Additionally, partnership and cooperation efforts toward a clear implementation plan and business process reengineering attempts will fail if public agencies oppose such programs (Almarabeh and Abuali, 2010; Bhatnagar, 2009; Jaeger

and Thompson, 2003). Over half of the participants mentioned the importance of partnership between all government entities to make progress in the e-government project development in Yemen. Interviewees in this study noted that the partnership with other government organizations was not effective. The research findings indicated that lack of partnership is one of the main factors that affects the Yemeni e-government project development, which is consistent with what has been found in previous studies.

6.1.6 Lack of project monitoring and evaluation

One of the organizational challenges revealed as a result of this research and which is not found in the literature is the lack of project monitoring and evaluation. The findings showed clearly that the Yemeni e-government project lacked a team or a department to monitor and evaluate the process of developing e-services. Monitoring and evaluation are critical to ensure the success of any project. Therefore, the absence of monitoring and evaluation processes would increase the gap between what has been planned and what has been done.

6.1.7 Leadership

(Caldow, 2001) believes that successful e-government requires strong leadership. Thus, insufficient leadership will contribute to sluggish and inconsistent e-government progress (Eynon & Dutton, 2007). Another study by Al-Kaabi (2010) showed that leadership is one of the main success drivers for e-government initiatives. Additionally, decision-makers should have both the required skills for ICT and the ability to make decisions (Al-Shuaili et al., 2019). In line with previous studies, the research findings illustrated the role of leadership in the e-government project in Yemen. The participants in this research confirmed the essentiality of strong leadership to develop and manage the e-government project. The interviewees also noted that the lack of leadership in the Yemeni e-government project is a direct result of the absence of organizational structure. It is essential to highlight the fact that the e-government project did not have an organizational structure and that there was no independent management department to manage the project.

6.1.8 No independent government department

One unanticipated finding of this research, which was not found in the literature, was that the Yemeni e-government project did not have an independent government department. This result indicated that there were only two teams that were responsible for the e-government project. There is no government entity that is fully responsible for the project. Participants in this study mentioned that this was one of the biggest challenges facing the Yemeni e-government project. The absence of an independent management department definitely caused numerous organizational and management challenges.

6.1.9 No organizational structure

What is surprising is that the Yemeni e-government project lacks an organizational structure. There were only teams to develop and manage the e-government project efforts. This unexpected challenge was not found in the previous studies. The absence of organization structure in a huge and significant project shows clearly that the Yemeni government was not sufficiently aware of the benefits and value of the e-government project. The findings also demonstrated that the e-government project in Yemen did not obtain adequate government support. The research also found that not having an organizational structure causes many other challenges, such as a lack of leadership, a lack of clarity in duties and responsibilities, communication problems, and many others.

6.1.10 Resistance to change

The research findings tie well with previous studies wherein the resistance to change is one of the challenges that face government projects. As believed by T. E. Ibrahim (2014), government staff might oppose e-government projects for several reasons, such as: fear of job loss due to technology; fear of change; unfamiliarity with technology; and fear that technology would reduce corruption and end their power. Furthermore, Dent and Goldberg (1999) contend that people oppose change because they fear losing their position, money, or comfort. (Luke, 1982) stated that people are shown to avoid anything that may hinder their jobs or disturb their routine. The opposition may come from citizens or staff (Bhatnagar, 2009). In some government agencies, opposition to change comes from the upper levels of management (Alzahrani, 2014). All participants mentioned the resistance to change as a barrier to the development of the Yemeni e-government project, as seen in

Figure 5.1. Interviewees in the study declared that the e-government project encountered some resistance to change and that there were no plans to overcome this challenge. The findings indicated that resistance to change could cause a delay in the e-government project's development.

6.2 Social Challenges

6.2.1 Information sharing and accessing data

Another challenge that was not widely discussed in the literature but was revealed by the research findings was the difficulty in accessing and sharing information. A. Y. Al-Eryani (2009) showed that some Yemeni government bodies related to the e-government project are not careful about sharing their information. The current study also found that the Yemeni e-government project members, especially developers, encountered some obstacles in acquiring the necessary data. Some government organizations provide irrelevant or incomplete data. This delayed the progress of the project since most of the delays occurred because other government entities did not provide the essential information required by the e-government teams. The research findings showed that this happens as a result of a lack of partnership and cooperation among government agencies.

6.2.2 Political leaders' and government employees' awareness

Previous studies have reported that e-government awareness should be increased among leaders of government organizations, as mentioned by Almutawkkil et al. (2016). In addition, Aldrich et al. (2002) claimed that awareness of leaders is essential at the beginning of an initiative to explain ideas and increase enthusiasm. It is also necessary to manage change and provide support throughout the project. In the project's final stage, leadership can ensure that the necessary stability and adaptability have been accomplished. Participants claimed that the weakness of political leaders' and government employees' awareness is one of the challenges that face the e-government project development in Yemen. The results showed that the e-government project did not get adequate support as the political leaders were not aware of the significance and advantages of the e-government project. Therefore, the findings cast a new light on the importance of increasing awareness of the e-government project among political leaders and government employees.

6.3 Political Challenges

6.3.1 Conflict

To the researcher's knowledge, the conflict was not included in the literature as a challenge to the development of the e-government project. The study found that the current conflict in Yemen and its repercussions have had detrimental impacts on the progress of the e-government project. The conflict was mentioned by participants as an obstacle that has a huge effect on the Yemeni e-government project. This is an important finding in the understanding of the suspension of the Yemeni e-government project. Furthermore, the research results revealed that the ongoing conflict affected the financial support, foreign donations, and international cooperation that the project had obtained in the past. Moreover, the findings showed that government priorities had also changed as a result of the conflict.

6.3.2 Political instability

As mentioned in the literature review, Yemen completed its national ICT project in 2007-2008. In 2011, it was officially approved, but political instability and unrest impeded its adoption (ESCWA, 2016). (Stoltzfus, 2005) noted that the implementation of e-government is expensive and has many requirements. One of them is a stable political environment. The findings of this study also showed that political instability affected the development and building of the Yemeni e-government project. As presented in Figure 5.5, ten of the participants considered political instability as a barrier to the development of the Yemeni e-government project. Moreover, the study's results declared that e-government project development requires a stable country with strong political leaders.

6.3.3 Government support and political will

Based on the literature, politicians, ministers, and managers must all demonstrate political will for e-government to succeed (T. E. Ibrahim, 2014). IT changes can be adopted if politicians have the motivation and power to push changes in the current system. The EU's strong political will might provide lessons for developing country leaders to establish a knowledge-based society and economy (Seifert, 2003). The research findings support the literature about the importance of government support and political will to build successful e-government projects. The participants emphasize the significance of the role of the

government's support and political will. The interviewees stated that the Yemeni e-government project lacks government support and political will. They noted that if this project received adequate government support or if there was a real political will, the e-government project would be in a better place and many obstacles would be addressed easily.

6.3.4 Lack of government priority

Little research was found in the previous studies on the impact of low government priority on e-government project efforts. Al-Wazir and Zheng (2012) evaluated e-government in Yemen and stated that there are several challenges confronting e-government in Yemen, one of which is the low government priority to handle and execute the project. The research findings seem to be consistent with other research which found that a lack of government priority affected e-government projects' development. In this study, all interviewees mentioned the lack of e-government priority as an obstacle to the development of the e-government project in Yemen. The participants claimed that the e-government project was not among the Yemeni government's priorities. Some of them noted that at the beginning of the initiatives, the e-government project was among the government's priorities, but it was not a high priority. The findings also indicated that the government was not interested in the e-government project. Moreover, it seems that the political leaders in Yemen did not recognize the importance and value of e-government projects.

6.3.5 Vision

According to the literature, it is critical to build a clear vision for e-government initiatives. The e-government project's vision must be aligned with the community's major objectives. Both the public and commercial sectors must contribute to the e-government vision. Moreover, the vision ought to be understood and shared with all residents (T. E. Ibrahim, 2014). Al-wali (2015) claimed that the absence of a strategic vision may be a result of constantly changing senior personnel and/or a constantly changing policy and political climate. A. Y. Al-Eryani (2009) mentioned that the lack of a unifying vision and the discrepancy between the project's vision and reality were encountered with the first e-government project in Yemen, in 2003. The research findings support the literature about the role of vision in succeeding in e-government project development. Participants stated

that the e-government project in Yemen had an ambitious vision in the early stages of launching the project. However, in the last few years, there has been no vision. This indicates the cause of the slow movement of the e-government project for some time and the total suspension of the project in recent years.

6.4 Human Resources Challenges

6.4.1 Employees' skills and knowledge

As mentioned in the literature review, most developing countries lack skilled personnel and adequate training programs. E-government requires new human capabilities in technical, management, and commercial domains in order to develop, build, maintain, and operate ICT infrastructure (Ndou, 2004). Furthermore, Heeks (2003) stated that the lack of employees' skills is one reason for the e-government failure. The research findings partially contradict the study conducted by Ndou (2004) that concluded most developing countries lack skilled staff. The participants mentioned that the e-government project members in Yemen are well-educated, but they are not experts in the field of e-government projects. However, that does not mean that there is no gap between their skills and the vision of the e-government project. The e-government project is a huge project that requires more training to fill the gap between the knowledge of the e-government project team members and the vision of the project.

6.4.2 Lack of training courses

The research finding is consistent with that of Almutawkkil et al. (2016), who found that IT specialists should be prepared to carry on the various roles of e-government departments. The research findings showed that the staff had adequate skills, and some participants mentioned that the personnel were highly qualified. However, the e-government project in Yemen lacks training courses. There are some training programs coordinated with ESCWA, but they are insufficient. The e-government project is a massive project that demands ongoing training courses.

6.4.3 Part-time employees

It is somewhat surprising that the e-government project staff were not full-time employees. This finding was unexpected. All of the employees were working part-time jobs on the e-government project. They were not fully dedicated to the e-government project. They worked on the e-government project in addition to their regular duties in the government agencies to which they belonged. This challenge affected the development of the e-government project. Previous studies did not note this challenge, which was revealed by the current research.

6.4.4 Temporary teams

Another unanticipated finding that was not found in the literature is that the e-government project had temporary teams. The research findings showed that the project teams were changed from time to time. This challenge complicated the management and development of the e-government project. Changing employees from time to time might indicate the absence of the government's desire to develop the project within a predefined time.

6.5 Financial Challenges

6.5.1 Budget and financial support

The findings are directly in line with previous findings. Financial support is one of the difficulties that face e-government projects (Al-Shboul et al., 2014; Al-Tourki et al., 2012; Alqahtani, 2016; M. Alshehri and Drew, 2010; Aneke et al., 2019; Bagde, 2020; Glyptis et al., 2020; Heeks, 2003; M. Mohammed and Hakizimana, 2019; Müller and Skau, 2015; Sang et al., 2009; Sinawong, 2008; Ziemba et al., 2013). The findings of this study indicated that budget and financial support play a pivotal role in the success of e-government initiatives. The findings revealed that the Yemeni e-government project lacked financial support. There are only some operational budgets. Every government agency paid some awards to their employees who participated in the e-government project.

6.5.2 Foreign donations

Ciborra and Navarra (2005) showed that e-government projects required foreign support. However, most previous studies mentioned financial challenges as one challenge. They did

not dig more into other difficulties associated with the financial challenge. In this research, participants stated that foreign donations or international financial aid were important to the success of e-government projects in developing countries. The Yemeni e-government project has obtained some foreign donations in the past, which supports the e-government project's efforts. However, these donations have completely stopped in recent years as a result of the ongoing conflict in Yemen.

6.5.3 Local donations

The research findings go beyond previous studies, showing other obstacles that are related to the financial challenges that face e-government projects. Previous studies considered financial resources as one category. However, participants in this study mentioned the role of local donations, either by private sectors or other government entities, in the success of the development of e-government projects. The findings showed that the Yemeni e-government project lacked the financial support of local organizations. The local donations are crucial as this project lacked adequate government financial support. Most local organizations mainly support the education and medical sectors. Almost no one thinks about the e-government project requirements, which will have huge positive impacts on many sectors, including the private sector.

6.6 Technological Challenges

6.6.1 ICT infrastructure

In the literature, technology is a key component in the transition to e-government (Al-Solbi and Mayhew, 2005). ICT, or telecommunications network infrastructure, is tied closely to e-government (Basu, 2004). The research findings support the literature that considers ICT infrastructure as a barrier to the development and implementation of e-government initiatives. All participants in this study mentioned the ICT infrastructure in Yemen, which puts another challenge in the way of the development of the e-government project. Therefore, the weakness of the ICT infrastructure does not encourage the e-government project members to put all their efforts and time into the project. Additionally, citizens will face numerous challenges in using e-services as the ICT infrastructure is unsatisfactory. The findings also revealed that there is a mini data center, which is enough for the moment because it hosts only websites. When the project moves forward and more e-services are

added, it will be difficult for the current data center to host all the e-services and keep up with the growing demand for e-government services.

6.6.2 Lack of e-readiness

Many studies on e-readiness in developed and developing countries indicate that e-readiness is very critical before developing an e-government project (Kortemann, 2005; Kovačić, 2005; Marchewka and Kostiwa, 2007). This is mostly because e-readiness is very essential in order to succeed in e-government. This study supports previous studies about the significance of e-readiness. The research results indicated that the Yemeni government's readiness for the e-government project is low and insufficient.

6.6.3 Security and data protection

In the prior studies, security and data protection were considered as technical challenges that face e-government projects (Al-Tourki et al., 2012). Security is costly, but it must be addressed throughout the design process to preserve the trust of the public (Almarabeh and Abuali, 2010). Moreover, it is critical that government personnel are adequately trained on the importance of privacy and how to create successful software with privacy protections (Al-Sharafi, 2014). The research findings showed that security and data protection were not addressed in the Yemeni e-government project. The participants stated that the e-government project was in its early phases, so security and data protection were not included because they are advanced topics. They said that the e-government project in Yemen is still in the information dissemination phase.

6.6.4 System integration

In reviewing the literature, system integration was one of the obstacles facing e-government projects (Hitham et al., 2017). The current study found that the Yemeni e-government project faces challenges with system integration. Each government entity has its own systems, which may differ from one government agency to another. The findings showed that system integration is a technical challenge that can be addressed easily and that it is not a huge challenge to the development of the e-government project.

6.7 Policy and Legal Challenges

6.7.1 Lack of guidelines and best practices

The research findings showed new challenges to the e-government project that were not found in the literature. Eleven out of twelve participants mentioned the lack of guidelines and best practices as a barrier to the Yemeni e-government development efforts. Some participants noted that there are only simple guidelines and that these guidelines are not comprehensive. Other participants mentioned that there are no guidelines or best practices.

6.7.2 Lack of legal framework

According to the literature, it is crucial for the success of e-government initiatives and operations to have a suitable legal framework (Basu, 2004). A whole legal system should be developed to deal with new problems associated with ICT and e-government programs (Abdallah, 2012). The findings of this study were in line with those found in the literature. The participants claimed that there was no legal framework in the Yemeni e-government project, even though a legal framework is essential to the success of the e-government project.

6.7.3 Lack of documentation

Lack of documentation is an obstacle that is rarely mentioned in the literature. (Al-Eryani, 2009) stated that it is important to report and document all project stages, including any challenges, which might save money, time, and effort by preventing mistakes from being made again. The findings of this study confirm the significance of e-government project documentation in prior studies. Documentation is an essential component of any technological project, such as information technology initiatives. However, the Yemeni e-government project lacked the required and necessary documentation for the development of the e-government project. The absence of documentation adds more challenges to the e-government project efforts, so it is not surprising that there are no guidelines or best practices to follow. However, it is not expected that such a huge national project would lack the necessary documentation. This challenge shows that the Yemeni e-government project did not obtain the required attention.

6.8 Development Environment Challenges

6.8.1 No workplace or office

This is another barrier that was not found in the literature. The research findings showed that the Yemeni e-government project did not have a workplace or office. It is surprising that this huge project did not have an independent work environment or a dedicated department. Participants emphasized the absence of a workplace. They maintained that this challenge created communication barriers within the project team members and affected the whole development of the e-government project. Furthermore, this obstacle is considered one of the main challenges facing the Yemeni e-government project.

6.8.2 Lack of project management tools

One unanticipated finding was that the Yemeni e-government project lacks project management tools. This is an important finding in the understanding of the difficulties that faced the e-government projects' development. The research findings indicated that the Yemeni e-government project staff did not use any project management tools. The absence of project management software created several management challenges. This complicated the management and monitoring of all project activities and operations.

6.8.3 Simple development environment

Another unanticipated finding was that the Yemeni e-government project had a simple development environment. This finding was not even found in the previous studies. The study found that the e-government project developers had only basic and simple development tools and facilities.

6.9 Conclusion

The findings of this study revealed that the development of the e-government project in Yemen faces numerous difficulties. These various obstacles hinder the progress of the e-government project initiative. These barriers could be categorized into eight main themes, which are organizational, social, political, financial, human resources, technological, policy and legal, and development environment challenges.

The findings of this research were compared with the prior studies. This study found some unexpected challenges. These challenges are a lack of authority and power over government entities, a lack of clarity in duties and responsibilities, the lack of project monitoring and evaluation, no independent government department, no organizational structure, conflict, local donations, part-time employees, temporary teams, a lack of guidelines and best practices, no workplace or office, a lack of project management tools, and a simple development environment.



Chapter 7 CONCLUSION AND SUGGESTIONS

This chapter aims to provide a general conclusion of the research by summarizing the most significant research findings. Additionally, it will discuss the contributions the thesis has made to the literature and the development of the Yemeni e-government project. It is then followed by a discussion of the limitations of the research, recommendations, and suggested directions for future research.

This study aimed to explore the barriers that face the development of the Yemeni e-government project. The challenges encountering e-government projects are numerous, and the journey to delivering e-government services is extremely challenging. The findings reveal that, despite the fact that the Yemeni e-government initiative was established two decades ago, it was still in its early stages. However, this study has identified eight categories of difficulties based on a qualitative analysis of twelve semi-structured interviews conducted to determine the obstacles to the development of the e-government project in Yemen. Figure 7.1 presents the summary of these challenges.

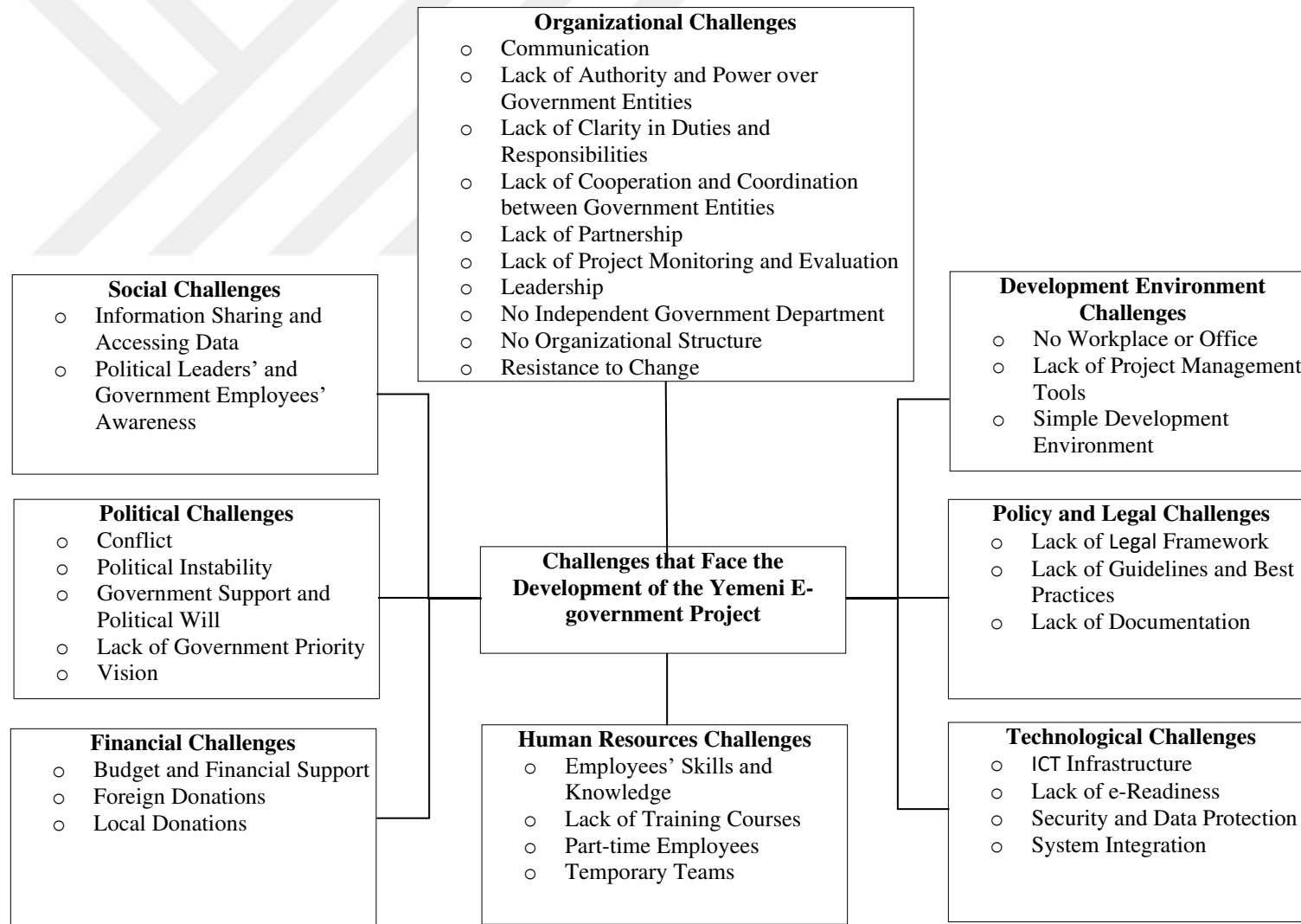


Figure 7.1. Obstacles to the development of the e-government project in Yemen

Research results also demonstrate that the e-government initiative in Yemen experienced unexpected challenges that were not even mentioned in the literature to the best knowledge of the researcher. These unanticipated difficulties are summarized in the following:

- Lack of Authority and Power over Government Entities
- Lack of Clarity in Duties and Responsibilities
- Lack of Project Monitoring and Evaluation
- No Independent Government Department
- No Organizational Structure
- Conflict
- Local Donations
- Part-time Employees
- Temporary Teams
- Lack of Guidelines and Best Practices
- No Workplace or Office
- Lack of Project Management Tools
- Simple Development Environment

7.1 Research Contributions

This thesis has provided a deeper insight and contributes to our understanding of the obstacles that have encountered the Yemeni e-government project development. Furthermore, the current study has been one of the first attempts to comprehensively explore the difficulties that stand in the way of the development of the Yemeni e-government project. This study aims to add substantial information to the body of research about e-government initiatives in developing and least developed countries since Yemen is an example of a developing country. There are only a few studies about the Yemeni e-government project, and these studies are inadequate to better understand the challenges and barriers that face this important national project.

The findings of this thesis are valuable to a variety of groups, including:

1. Yemeni e-government project members who are in charge of the e-government project. This research assisted them by highlighting the barriers that faced the

Yemeni e-government project development and providing some suggestions to overcome or mitigate the effects of these obstacles.

2. Political leaders and decision-makers who are directly or indirectly related to the Yemeni e-government project. This study indicates that there were some barriers which could not be easily addressed by the project members or teams. These obstacles require the involvement of political leaders and top government decision-makers.
3. Academic researchers who are interested in investigating the challenges and barriers that e-government projects face in developing and least developed countries.

7.2 Research limitations

Nothing in the world of science can be completely accurate. Consequently, this research has some limitations, like many other studies. These limitations could be briefly summarized as follows:

- The number of employees who were interviewed was restricted as there were insufficient employees engaged directly in the Yemeni e-government initiatives. Furthermore, some government employees have apologized for participating in this research.
- There are also significant difficulties that stand in the way of reaching more interviewees, owing to government ministries' hectic schedules as well as other bureaucratic restrictions.
- This study focuses mainly on four governmental organizations. However, having more ministries participate in the research would provide additional details since some interviewees only offered limited viewpoints.
- For data analysis, QDA miner light software was used. This free edition tool provides essential analysis. Nonetheless, some advanced features require an annual subscription or purchase of a license to use the full edition. Unfortunately, this study does not have any financial support.
- Finally, there was a limitation imposed by the data collection methods. The researcher does not have the essential permission to access the documents and

records of the e-government project to gain additional relevant information that could strengthen the study's findings.

7.3 Recommendations

Based on the findings of this study, the following suggestions and recommendations could assist in addressing the challenges and difficulties that faced the development of the e-government project in Yemen:

1. The e-government project leaders should have sufficient authority to manage the project. There should also be a single government entity that takes full responsibility for the development of the e-government project. In addition, they should have the required power over all government organizations to speed up the pace of development so the project can move forward.
2. The clarity of duties and responsibilities will positively impact the development of the Yemeni e-government initiative. Accordingly, the roles, duties, and responsibilities of each e-government project employee should be obvious. On top of this, the e-government project members should have full-time staff with the required skills and talents, and they should focus solely on the project to make real progress in the development process.
3. Cooperation and coordination among government entities should be increased to facilitate the work of the e-government project members. Furthermore, the e-government project teams should maintain effective partnerships with private and government agencies. Additionally, all government entities should contribute to the development of the e-government project by providing all the essential data and information that is required.
4. There should be a government building or department dedicated to the e-government project. The government should also build a promising development environment that is equipped with all the required tools and modern technologies. In addition, an organizational structure should be created for the e-government project. The organizational structure should also be modern and suitable for this ambitious initiative. Moreover, the organizational structure that has to be created should not lead to bureaucratic procedures that could cause another challenge to the development of the e-government project in Yemen.

5. There should be a campaign to raise awareness of the value of the e-government project among political leaders and government employees. For example, e-government members could conduct regular meetings with political leaders to make politicians and policymakers more aware of how important e-government projects are and to obtain the necessary government support. Moreover, plans and strategies should be developed to reduce public staff resistance to change.
6. The ongoing conflict in Yemen has to be stopped immediately as it is not only affecting the development of the e-government project but also causing humanitarian disasters.
7. More attention should be paid to having a clear vision, and this vision should be updated on a regular basis to be consistent with technological development, which changes radically. Additionally, specialized training courses should be provided that have to go in line with the vision of the project.
8. The e-government initiative should be included in the government's budget, and generous funds should be approved.
9. The government should make vast investments in the ICT and telecommunication sectors. In addition, there should be a large data center in the future to host all the e-government services.
10. Data security and protection should be discussed and addressed early. Besides, there should be strategies and detailed plans to solve system integration problems in the early phase to avoid spending huge budgets in the later phases.
11. The required documentation should be maintained and kept up-to-date. The team members might be changed in the future. Therefore, the new members require the documentation to understand what has been done and how it has been done.
12. Project management software should be used to manage and follow all project activities. It also assists in allocating all resources, such as financial and human resources. There should also be a separate department or dedicated team to monitor and evaluate the e-government project development process.

7.4 Future Research

This research could be used as a starting point to evaluate the awareness of political leaders and public employees about e-government. Future studies could also investigate the association between the absence of organizational structure and a lack of leadership. In

addition, it will be important that future research investigate the impact of sharing responsibilities of the e-government project with other government entities on the progress of the project's development. Lastly, further studies could examine the correlation between e-government services and transparency and accountability in Yemeni public organizations.



Chapter 8 References

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Chapter 9 Appendices

APPENDIX-1. ETHICS COMMITTEE APPROVAL



**ANKARA YILDIRIM BEYAZIT ÜNİVERSİTESİ (AYBÜ)
SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU
PROJE ONAY BELGESİ**



Ankara Yıldırım Beyazıt Üniversitesi , Sosyal Bilimler Enstitüsü , Yönetim Bilişim Sistemleri bölümü öğrencilerinden Abdulaziz Abdullah Ahmed AL-Monseb Bawazir'in, OBSTACLES OF E-GOVERNMENT DEVELOPMENT IN YEMEN adlı araştırması değerlendirilmiştir.(Bu kısım başvuru sahibi tarafından doldurulmalıdır)

Proje etik açısından uygun bulunmuştur.



Proje etik açısından geliştirilmesi gerekmektedir.



Proje etik açısından uygun bulunmamıştır.



AYBÜ SOSYAL VE BEŞERİ BİLİMLER ETİK KURULU KARARI (Etik Kurul tarafından doldurulacaktır)	
Araştırma kodu (Yıl – Araştırma sıra no)	2022-688
Başvuru formunun Etik Kurula ulaştığı tarih	31.01.2022
Etik Kurul Karar toplantı tarihi ve karar no	08.02.2022-02
Yer	Yıldırım Beyazıt Üniversitesi, Esenboğa Külliyesi
Katılımcılar	Formda imzası bulunan üyelerimiz toplantıya katılmıştır.

KURUL BAŞKANI VE ÜYELER:

Prof. Dr. Hakkı ODABAŞ

Başkan

İMZA

Prof. Dr. Mehmet Ali ZENGİN

Üye

Doç. Dr. Behlül TOKUR

Üye

Doç. Dr. Özge GÖKBULUT ÖZDEMİR

Üye

Doç. Dr. Ali POLAT

Üye

Doç. Dr. Musa ÖZTÜRK

Üye

Doç. Dr. Ömer ASLAN

Üye

Dr. Öğr. Üyesi Recep YORULMAZ

Üye

Dr. Öğr. Üyesi Semih CEYHAN

Üye

Dr. Öğr. Üyesi Keziban Büşra KAYNAK EKİCİ

Üye

Dr. Öğr. Üyesi Gülay YAZICI

Üye

APPENDIX-2. INTERVIEW FORM

This interview form was prepared within the scope of a research on “Obstacles of E-Government Development in Yemen”. This research’s goal is to explore and reveal the challenges that face the development of the e-government project in Yemen.

The information obtained through interview form will be used solely for academic purposes, and the names of the ministries interviewed will not be disclosed in the research report. Only researchers will know what is said during the interview. Furthermore, the research report will not include any identities of participants.

Abdulaziz Bawazir	Asst. Prof. Dr. Vildan Ateş
Ankara Yıldırım Beyazıt University	Thesis Supervisor
Institute of Social Sciences	
Department of Management Information Systems	
Master Student with Thesis	

Place of the interview:

Date: / /

Time (Start / End): /

Participant’s Information

Age Group: 18-25() 26-35() 36-45() 46-55() 56 and over ()

Education: Elementary () Secondary School () Undergraduate () Master () Ph.D. ()

Major:

Years of Experience: Less than 1 year () 4-6 years () 7-9 years () More than 10 years ()

Interview Questions

1. Questions Related to the Project

1.1. E-government Project Development

1. What kind of challenges do e-government developers face in accessing the necessary information?
2. What development tools and facilities are accessible to the development teams?
And is there any testing lab where the e-services will be evaluated?

1.2. Management

1. Please tell me about management challenges that were difficult to tackle and that could hinder the development of e-government?
2. Have you used some project management tools to manage the e-government project? Please clarify that.

1.3. Project Financial Resources

1. One of the key factors for many initiatives to fail is lack of financial support; did the e-government initiative have financial difficulties? If so, please explain.
2. How does the current conflict affect financial assistance and e-government project management?

1.4. Integration

1. Was system integration one of the obstacles facing the development of e-services?

1.5. Workplace Environment

1. Please explain the workplace and its suitability for developing the e-government project?

1.6. E-government Evaluation

1. How was the e-government project moving?
2. Was there a team or committee responsible for monitoring and evaluating the work during the e-government implementation process?

2. Questions Related to the Government

2.1. Support and Political Will

1. We all know the advantages of e-government to facilitate business development and economic progress. Did this significant project receive adequate government support?
2. A typical barrier in literature is “the lack of leadership”, did you face this barrier in the e-government project?
3. Do you think the government has a clear vision to implement e-government? If so, how straightforward or precise are the plans of the e-government project?

2.2. Corruption and Poor Governance

1. To what extent is the e-government initiative a top priority of the government?
2. Some government employees may regard e-government as a threat to their employment and interests? What has been done to resolve those thoughts?

2.3. Partnership and Collaboration

1. The e-government Initiative requires coordination with the other government agencies. Please clarify the partnership between the ministries in charge of e-government implementation and other ministries.

3. Questions Related to the ICT

3.1. ICT Infrastructure

1. Is there a data center to host e-government systems? If yes, please explain the scale of the data center?
2. Do all government ministries and agencies have IT departments available?

3.2. Security, Privacy, and Trust

1. Security and data protection are very crucial in all IT projects, how does the Yemeni e-government project cope with security issues?
2. Breaches in the e-government systems could harm the public trust in the project, what procedures have been taken to increase the trust?

4. Questions Related to the Human Resources

4.1 Human Resources

1. How excited the project team was at the beginning of the e-government project?
2. Do you think there is a gap between employees' skills and e-government project vision?

4.2 Communication

1. Have you noticed any obstacles to communication within the project teams? If yes, what kind of obstacles were common?

4.3 Awareness

1. To what extent have political leaders and governmental agencies been aware of the e-government initiative?

5. Questions Related to the Users

5.1 E-readiness

1. To what extent is the government of Yemen ready for an e-government project especially in the ICT Infrastructure?

5.2 E-literacy and Digital Divide

1. The digital revolution puts a lot of responsibilities on the governments around the world to eliminate or reduce e-literacy, what has been done to decrease the gap between citizens who have access to digital ICT and those who do not, to provide equal access to the information?

6. Questions Related to the Policy and Regulation

1. Have there been any guidelines or best practices that regulate the application of e-government?
2. Does the e-government project have any legal or regulatory framework? Please explain.

7. Questions Related to the Consequences

1. In your view, what barriers have been the most challenging?
2. At what time did the e-government initiative encounter its most challenges?

8. Questions Related to the impact of COVID-19

1. What are COVID-19's effects on the e-government project's vision and strategies?
2. Do you think COVID-19 will encourage the government to follow serious steps and procedures to revitalize the e-government initiative?