

TECHNOLOGY MODEL OF E-GOVERNMENT READINESS IN  
LIBYA

MUSTAFA OMAR MOHAMMED BAEUO

UNIVERSITI TEKNOLOGI MALAYSIA

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LIBYA

MUSTAFA OMAR MOHAMMED BAEUO

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## DEDICATION

*I dedicate this thesis to  
my late parents, my late brother, may God have mercy on them*

*It is also dedicated to my wife  
for her moral support and encouragement, my adorable kids  
You give me hope, direction and light*

*I am truly grateful to ALLAH for having them in my life*

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## **ABSTRACT**

E-government has become a reality and it has become a global issue that has a great impact on all aspects especially governmental reform programs. The technology readiness is a significant aspect of e-government readiness and vital for its successful implementation. However, most barriers and challenges resulting in failures of e-government come from the technology perspective. Although there are studies on e-government readiness, there is still a lack of agreement on which factors shape the technology readiness of e-government. The aim of this research is to formulate a model for the technology factors contributing to e-government technology readiness. Analysis of the related literature led to the identification of eight factors namely, hardware, software, connectivity, security, operations and maintenance, technical support and skill, IT standard and information system structure. The Technology-Organization-Environment theory was used to guide the research theoretical foundation and measure the e-government technology readiness. A quantitative approach using structural equation modelling was utilised as a research design to collect the data from respondents in three ministries and five universities in Libya. A survey questionnaire was developed and verified for its content validity and reliability based on judgments of 12 experts and a pilot study involving 30 respondents by using the SPSS. Exploratory factorial analysis was conducted by the IBM SPSS version 24 on 100 respondents to verify that the research variables could actually measure their relationships. The actual survey was conducted on 380 respondents comprising technicians, engineers, programmers, administrators, lecturers, researchers and students who were selected through a simple random sampling technique from the target ministries and universities. The SPSS AMOS was used to conduct the confirmatory factor analysis and develop the structural equation model. The results indicated that all hypotheses were supported which proved that the selected technology factors affect significantly the e-government technology readiness, and are incorporated as the variables in the model. In conclusion, the identified eight technology factors contribute significantly to assess the e-government technology readiness. Besides, the technology model can help the Libyan government to assess readiness and ensure efficient implementation of their e-government systems.

## ABSTRAK

E-kerajaan telah menjadi kenyataan dan menjadi salah satu isu global yang memberi kesan besar kepada semua aspek terutamanya program reformasi kerajaan. Kesediaan teknologi adalah aspek penting dalam kesediaan e-kerajaan dan penting untuk keberhasilan pelaksanaannya. Namun, kebanyakan halangan dan cabaran yang mengakibatkan kegagalan e-kerajaan datang dari perspektif teknologi. Walaupun terdapat kajian mengenai kesediaan e-kerajaan, masih terdapat kurang kesepakatan mengenai faktor-faktor yang membentuk kesediaan teknologi e-kerajaan. Tujuan penyelidikan ini adalah untuk merumuskan model faktor teknologi yang menyumbang kepada kesediaan teknologi e-kerajaan. Analisis literatur yang berkaitan membawa kepada pengenalan lapan faktor iaitu perkakasan, perisian, penyambungan, keselamatan, operasi dan penyelenggaraan, sokongan dan kemahiran teknikal, Standard IT dan struktur sistem maklumat. Teori Teknologi Organisasi Alam Sekitar digunakan untuk membimbing asas teori penyelidikan dan mengukur kesediaan teknologi e-kerajaan. Pendekatan kuantitatif menggunakan pemodelan persamaan struktur digunakan sebagai reka bentuk penyelidikan untuk mengumpul data daripada responden di tiga kementerian dan lima universiti di Libya. Soal selidik tinjauan dibangunkan dan disahkan untuk kesahan dan kebolehpercayaan kandungannya berdasarkan penilaian 12 pakar dan kajian rintis yang melibatkan 30 responden dengan menggunakan SPSS. Analisis faktor eksploratori dilakukan menggunakan IBM SPSS versi 24 kepada 100 responden untuk mengesahkan bahawa pemboleh ubah penyelidikan sebenarnya dapat mengukur hubungan mereka. Tinjauan sebenar dilakukan terhadap 380 responden yang terdiri daripada juruteknik, jurutera, pengaturcara, pentadbir, pensyarah, penyelidik dan pelajar yang dipilih melalui teknik persampelan rawak mudah dari kementerian dan universiti sasaran. SPSS AMOS digunakan untuk melakukan analisis faktor pengesahan dan membangunkan model persamaan struktur. Hasil kajian menunjukkan bahawa semua hipotesis disokong yang membuktikan bahawa faktor teknologi yang dipilih mempengaruhi kesediaan teknologi e-kerajaan secara signifikan, dan dijadikan sebagai pemboleh ubah dalam model. Kesimpulannya, lapan faktor teknologi yang dikenal pasti menyumbang secara signifikan untuk menilai kesediaan teknologi e-kerajaan. Selain itu, model teknologi dapat membantu pemerintah Libya untuk menilai kesediaan dan memastikan pelaksanaan sistem e-kerajaan mereka dengan cekap.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Overview

With the advent of the Internet and online technology, new frameworks of doing business have emerged. Governments in addition to business companies have experimented with these various frameworks with varying degrees of success. According to Poostchi (2002), governments are not immune to these changes and are under increasing pressure to change their traditional business framework to what is commonly referred to as “e-government - electronic government”. This system provides ready access to information, increased self-service options for citizens and businesses, as well as increased accountability and democracy. In this regard, e-government has become a major issue of modernization and government reform programs. In short, e-government is the use of information and communications technology (ICT), such as the Internet, to enhance government processes (Elmorshidy, 2012; Joseph, 2017; Mokone et al., 2018). The e-government process facilitates the improvement of the quality of service provided to citizens by obtaining service or information in minutes or hours instead of days or weeks. E-government helps government employees to perform their work easily in efficient and effective ways compared to employees in the commercial world (Daniels, & Forman, 2002).

Actually, E- government has become a common focus of government efforts in most countries. The Internet and information technology growth has inspired many governments to transform their conventional services to electronic ones. Many governments in the world today are now seeking to develop, implement and improve their strategies to transform government services using ICT. A review of relevant literature indicates the reasons why governments are pursuing the e-government process. The main reasons among these include, namely: provision of general information relating to government activities; electronic benefits transfers (EBT); cost

reduction; as well as improvements in transportation, health, education, democracy, and external pressures (Poostchi, 2002). E-government improves the efficiency and effectiveness of government functions. Further, it is a strong driver for resources allocation and sharing (information, services and business processes) as well as for standardization of organizational, legal, and technical frameworks (OECD, 2008).

Conventionally, e-government increases operational efficiency to better serve citizens by providing online information and services to citizens 24 hours a day with low costs. In addition, it helps to reduce the burden on an over-stretched bureaucratic system. E-government provides numerous services such as: payment of traffic infringement tickets, fines and bills; voter information; issuance of birth and death certificates; health and education services; and more. E-government also can be expanded to conduct transactions with business partners such as suppliers, vendors and contractors (Daniels, & Forman, 2002).

E-government development is promptly proportional to the infrastructure of IT, which has the capability to support and enable e-government execution. Generally, the infrastructure of e-government involves, specifically: network and security infrastructure systems; data management and application development tools; hardware; operating systems; and system management platforms. However, several developing countries do not have the necessary infrastructure for deploying e-government services in their countries (Basu, 2004; Almarabeh, & Abuali, 2010). In addition, there is still a limited knowledge of strategies to guide infrastructure development, as well as which functions or services should be a part of the infrastructure (Fraefel et al., 2013).

Developing countries have embarked on e-government initiatives as part of their modernization activities, but despite the effort of implementation, e-government is still rated as not sufficient and many e-government projects failed (Mkude, & Wimmer, 2013). The main challenges faced in developing countries relate to poor management and limited availability of resources. Most developing countries suffer from problems relating to emerging economies, high corruption, political instabilities, unclear legal structures and diverse social and cultural norms. These contribute

significantly to the challenges of designing e-government systems (Mkude & Wimmer, 2013). However, some developing countries have raised hopes and demonstrated opportunities to become advanced countries in the field of e-government. These countries include Tunisia, Bahrain, Saudi Arabia and Malaysia respectively.

Arab countries have started to implement e-government programs but in different degrees. However, implementation of government services is still in the very early stages and has not yet been utilized to its full extent or potential in most of the Arab countries (Al-Hujran, 2012). Some of these countries, such as the United Arab Emirates, Bahrain, Saudi Arabia and Qatar, have made positive strides compared to other countries of the world. Others are on the right track for implementing e-government programs (such as Tunisia, Egypt and Jordan); while some countries, namely Iraq and Libya, are still in the initial steps.

However, the preparedness of governments to make the transition to e-government is affected by a set of divergent factors (Joseph, 2014). In this regard, Al-Omari and Al-Omari (2006) articulate in a comprehensive study that e-government planning methodology consists of four phases, specifically: strategic planning; readiness assessment; implementation plan; and e-government plan. Since the first phase is normally launched by governments themselves and the goals, objectives and visions are set by the policymakers from each government, the next phase is readiness. A country should consider e-government readiness level when planning to enhance e-government. According to Joseph (2014), e-government readiness is a function of government, entrepreneurs, development partners, civil society, technology, and citizen readiness. Alaaraj and Ibrahim (2014) indicated that ICT infrastructure and internet penetration are among the crucial components of e-government readiness. Khaemba et al. (2017) stated that e-government readiness includes various indicators such as the necessary ICT infrastructure, network, computer hardware and software. Shouran et al. (2019) stated that technology plays a key role in services so as to enhance e-government infrastructure. Therefore, the technology is significant for e-government adoption, implementation and use. Dzhusupova et al. (2010) stated that technology is a significant factor for assessing e-government readiness and it

comprises hardware, software platform, and network and security infrastructure, availability of public access to information and services, and ICT applications. Alghamdi (2011) indicated the ICT infrastructure includes several physical ICT resources namely 1) hardware and software; 2) connectivity; 3) security; and 4) operations. Therefore, all these factors should be considered to assess the e-readiness technology as a significant facet of e-government readiness.

### **1.1.1 E government in Libya**

In Libya, the government controls most economic activities. Since the launch of the Libyan government website in June 2005, it initially targeted a few key services such as provision of information concerning legislation, law and some government activities (Sweisi, 2010). The e-government process in Libya did not achieve tangible progress due to the conditions experienced, which led to regime change. After 2011, the new Libyan government commenced programs to create and prepare the requirements for developing an effective e-government program as a significant tool to aid economic development. Government departments were required to undertake active programs by which to transform all governmental transactions into “digital deals” on the Internet. On the other hand, it was anticipated that citizens would experience the ease of use and saving of time and money by using e-government services (Hamed, 2009).

According to the United Nations (2018), Libya had a middle level of e-government development index EGDI (0.3833) in 2018, which gave the country a significant opportunity to achieve an advance in its e-government development. Future Libyan governments can achieve more if they have clear strategies, invest sensibly in ICT infrastructure, continue to invest in all education levels, as well as achieving fundamental transformation in providing online public services. Hence, the Libyan government should assess the country’s readiness to ensure the success of transformation from conventional government to e-government.

Assessing a country's readiness to undertake e-government is a driving force towards a government's success in transforming the traditional government into e-government. The UN has advanced the (EGDI) to measure the capacity and willingness of countries to implement e-government services for ICT-led development. The EGDI is a composite measure of three dimensions of e-government, namely: connectivity of telecommunications; online services scope and quality; and human capital and e-participation as sub indicator (Almarabeh, & Adwan, 2013; Chipeta, 2018).

## **1.2 Problem Background**

E-government is the using of ICT in government to deliver services to citizens, businesses and across government (Chipeta, 2018). However, many e-government initiatives in developing countries fail due to due to the gap between the design and reality in terms of several issues including technology, information, staffing and skills (Al-Shboul et al., 2014). In fact, several developing countries suffer from difficulties in implementing ICT projects and in installing the proper ICT infrastructure for deploying e-government projects (Alghamdi et al., 2011). Al-Soud et al. (2014) indicated that telecommunication infrastructure components are among the causes of failure of many of e-governments in developing countries. According to Alghamdi et al. (2011), it was indicated that more than one-third of e-government initiatives in developed countries fail (e.g. the failure of decision support systems in East Africa). Others "half partially" fail; (e.g. the partial failure of management information systems in Eastern Europe) while around one seventh succeed.

In Libya, alongside the limited services, the transformative potential of ICT is limited by its existing reach and use. Internet penetration rate, however, was only 14 percent, which is lower than many other countries in the region (Jones et al., 2012). This low rate can be attributed to the problem of resistance to change and the high cost involved with using new technologies. Compared with other countries, access costs are high, which has a negative impact on efficient use of the network among Libyan people. There is a scarcity in the number of telephone lines, which represents one of

the main barriers to Internet use (Sweisi, 2010). However; mobile phones offer a beneficial opportunity for accessing the Internet; in fact, many users access the Internet primarily through their mobile devices.

In addition to the problem of poor infrastructure in Libya, security is also one of the main technical challenges that e-government faces. The Libyan government has still not evolved e-government laws for including digital signatures (Ahmed et al., 2013). Improper technologies may cause serious security breaches on e-service providers and stakeholders. This can lead to a decrease in trust and confidence among users to employ e-government services. This would affect the participation rate and may even lead to failure of the e-government program (Sweisi, 2010).

In general, Libya is still facing a poor infrastructure, a lack of strategic model or approach for gaining and adopting the right and adequate technologies and weak innovation system in most sectors. The Libya vision of 2020 asserts the significance of adopting new technologies to enhance the social progress and be the base for a thriving economy (Khalifa et al., 2019).

E-government readiness is commonly used to measure a country's readiness level to participate in electronic activities such as e-commerce and other electronic services. According to Joseph (2014), assessing e-government readiness is very important to a country since it helps the government to measure its stages of readiness, identify any gaps, and then redesign its governing strategy. The primary reason for e-government failure is incorrect assessment of the readiness for e-government (Joseph, 2014; Mkude, & Wimmer, 2013; Almarabeh, & Abuali 2010), where this problem brings challenges and does not guarantee successful implementation of e-government (Joseph, 2014; Mkude, & Wimmer, 2013).

As the e-readiness is a function of organizational readiness, governance and leadership readiness, customer readiness, competency readiness, technology readiness and legal readiness (Omari, & Al-Omari ,2006), its assessment is a very difficult job (Abu-Shanab et al., 2010). Technology readiness is one of the most important facets of e-government readiness as indicated by various researchers (Alghamdi et al., 2011a;

Kurdi et al., 2011; Joseph, & Oludayo, 2108). In the same context, Shouran et al. (2019) indicated that the high effect of technology readiness underlines that technology has the ability to provide power for enabling e-government projects implementation. Al-rawahna et al. (2018) indicated that the significant factor affecting e-government and user satisfaction is the lack of IT infrastructures readiness. However, the previous researches identify different factors for assessing the technology readiness for e-government. Shouran et al. (2019) pointed out that technology readiness includes security, IT standards, IT infrastructure, coordination and integration, network infrastructure, IT skill and staff. Azab et al. (2009) outlined that technology readiness includes information system structure, hardware, technical support and development. Kurdi et al. (2011) indicated that technology readiness includes ICT infrastructure (hardware, software), Network infrastructure, security infrastructure and information system infrastructure (information quality, system quality, and services quality).

Without ICT infrastructure no e-government initiatives can be established. However, this does not diminish the importance of other factors, which play a vital role after building the ICT infrastructure in successful implementation and adoption of e-government. This attracted our attention and motivated us to study the technology readiness of e-government in order to help governments to implement the required technology for e-government and reduce barriers and challenges during implementation and adoption processes. Various models and theories on readiness and adoption have been used to understand and determine the technology acceptance and the preparedness of an organisation to utilise a particular new technology and usage in various contexts such as Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Theory of Acceptance and Use of Technology (UTAUT), Technology-Organization-Environment (TOE). Yet, no theory or model is inclusive to specify all the required technology or the technology factors that affecting the e-government technology readiness. However, the TOE theory has been adopted by different researchers in developing their models for technology acceptance and adoption (Srivastava, & SH Teo, 2006; Elmansori et al., 2017). The TOE framework identifies three contexts, technological, organizational, and environmental, which influence the process an organization adopts, implements, and uses technological innovation (Pudjianto et al., 2011). Since the technology

readiness is the research focus, therefore, this theory can guide the research theoretical foundation and highlight the technology context as the most significant structure for e-government technology readiness.

### **1.3 Problem Statement**

Government in Libya is facing a poor quality infrastructure and lack of Internet availability (Elmansori et al., 2017), as well as low Internet penetration rate (Jones et al., 2012). Moreover, funding and technical matters are not quite prioritised due to war and unstable conditions (Khamallag et al., 2017). In addition, there are many weaknesses in the information technology structure of the country and lack of knowledge about technology among the citizens (Elmansori et al., 2018). Regarding security, Libyan government has still not yet formulated e-government services and e-business laws, such as laws for incorporating digital signatures (Ahmed et al., 2013). All those factors are significant for technology readiness of e-government. Therefore, the incorrect assessment of e-government readiness from all facets (including technology readiness) is one of the significant challenges for successful e-government. Particularly, the lack of technology readiness is a significant factor affecting e-government implementation. Researchers developed many models for assessing the technology readiness for e-government, however, their models do not have consistent factors in terms of type and number, and they do not cover all the required technology factors. Therefore, there is a need for a model that includes the significant technology factors necessary for assessing e-government technology readiness properly in order to ensure successful implementation of e-government initiatives.

### **1.4 Research Purpose**

The main purpose of the research is to propose a model to identify the technology factors needed for assessing technology readiness of e-government. This model can assist governments in developing countries to evaluate their potential to



conduct electronic initiatives without possibility of failure, especially since most of the failures originate from a technological perspective.

### **1.5 Research Questions**

1. What technology factors influence e-government technology readiness?
2. How to propose technology model of e-government readiness by using the identified technology factors?
3. How can the proposed technology model of e-government readiness be evaluated?

### **1.6 Research Objectives**

1. To identify the technology factors influencing e-government technology readiness.
2. To propose technology model of e-government readiness by using the identified technology factors.
3. To evaluate the proposed technology model of e-government readiness.

### **1.7 Research Scope**

This research aims to propose a model for assessing technology readiness for e-government. The research focuses on Libya and investigates the challenges to implementation of e-government that the Libyan government faces. It also describes the manner in which they overcome these challenges. The model was constructed as a proposed solution to help governments to realize the technological factors that should be considered to assess the e-government technology readiness. The research methodology utilizes a quantitative approach to collect the necessary data. The

respondents are Libyan employees at the Ministry of Communications and Informatics, Ministry of the Interior, and the Ministry of Higher Education as well as five government universities namely university of Tripoli, Omar Al-Mukhtar university, university of Benghazi, Sirte university and Al-Mergib university. The unit of analysis is individuals including engineering, technicians, programmers, software engineers, lecturers, etc

The Ministry of Communications and Informatics was selected as it is responsible for the e-government program, whereas Ministry of the Interior, and the Ministry of Higher Education were selected because they provide some e-services in Libya. Moreover, Ministry of Higher Education provides the expertise and consultancy for such program. The employees of the three ministries are chosen so that all points of view are taken into consideration, such as those of technicians, engineers, programmers, administrators and all other categories of employees who have knowledge and expertise and are familiar with e-government system and services. Moreover, lecturers and researchers in information technology and computer science were selected from the target universities due to their knowledge and expertise in e-government literature as well as students. Furthermore, some of them participated in collaboration program with government in e-government project. Libya was chosen for several reasons: 1) it has the intention and determination to develop its e-government experience, 2) it is a rich country and has enough financial resources to implement and deploy e-government programs, 3) it has middle EGDI (between 0.25 and 0.50), which gives it a good chance to continue to enhance e-government development (UN, 2018), 4) It has made a quantum leap in its e- government program, where it jumped from rank 191 in the world rankings for 2012 to rank 121 in 2014 (UN, 2014a). Then it returned back to rank 140 in 2018 (UN, 2018).

## **1.8 Research Significance**

The research proposed a model that demonstrates the required technology factors for assessing the technology readiness for implementing e-government including; hardware, software, connectivity, security, operation and maintenance,

Technical support and Skills, IT standard and IS structure. This model can help to assess and provide a clear vision on the technology required for implementing e-government projects successfully. In addition, it contributes to reduce the time and effort necessary for such an evaluation process.

### **1.8.1 Theoretical Implications**

The research will theoretically contribute to enriching the literature by explaining the main factors that shape technology readiness of e-government. This includes the lack of a model which focuses more on the role of technology in e-government readiness. For this reason, the current research aims to fill this gap related to the issue of technology readiness in an e-government context. The research will also contribute to the literature by utilizing the TOE theory to guide the research theoretical foundation to identify the factors of e-government technology readiness. Moreover, from a theoretical perspective, this research attempts to add significantly to knowledge and practice of e-government in the Arab/African region by shedding light on the required technology for e-government readiness in one of the Arab/African countries.

Furthermore, this research proposes a model that is anticipated to assist Libya, as well as other countries with a similar context, in the decision-making process for planning and implementing effective e-government. In conclusion, the research demonstrates a contribution to knowledge through adding to the knowledge of the field of e-government; identification of the required technology influencing e-government readiness in Libya and developing a model for e-government in developing countries.

### **1.8.2 Practical Implications**

This study provides some useful insights for the public sector organizations in Libya on their technological readiness for e-government services. It will practically contribute to providing possible directions to overcome the technological related e-government readiness. It can also help governments to determine how and where to

adopt the required ICT to ensure their abilities to successfully implement e-government programs. The research will lead to the development of a model to assess the technology readiness of e-government. The readiness status will help to provide guidance for the policymakers and help to understand the factors that affect successful implementation of e-government.

The model will assist the Libyan government in assessing and analysing preparedness before initiating an e-government project. Consequently, it will provide help in clearly understanding the current status of e-government technology readiness in Libya. Assessment of the status of e-government technology readiness in Libya contributes to minimize any gaps related to technology for implementing the e-government project effectively and efficiently. Therefore, it is anticipated that citizens will be able to gain maximum benefits from e-government to fulfil their needs.

## **1.9 Definition of Terms**

The following terms will be used throughout this research:

**E-government:** Refers to electronic government, also known as digital government, online government, or transformational government. It is defined as the delivery of public information and government services through the use of ICTs (AISuwaidi & Rajan, 2013; Joseph, 2014). In this research, e-government refers to the use of proper information and communication technologies designed to successful implementation and adoption of Libyan e-government.

**E-government readiness:** Refers to a comparative ranking of the 191-member states of the United Nations based on many factors including government website assessment, telecommunication infrastructure, and human resource endowment. (UN, 2014b). In this research e-government readiness is defined as the readiness of the Libyan government to use technology factors to enhance access to and delivery of government services to benefit citizens, business partners and employees.

Technology readiness: All necessary technologies to enable the e-initiative including hardware, software, communication and networks infrastructure, Internet penetration, software application, legacy systems and the current organization's technology and electronic systems (Joseph and Oludayo, 2018). In this research, technology readiness is defined as the required technology to successful implementation and adoption of e-government by different stakeholders.

## **1.10 Thesis Outline**

This thesis is organized into six chapters.

Chapter 1 demonstrates the research background. It introduces an overview of e-government and e-government readiness in developing countries, in particular, Libya. In addition, it demonstrates the research problem, objectives, significance and contribution, as well as the it explains the research scope.

Chapter 2 reviews the literature and presents a theoretical foundation on e-government. It provides an overview of the e-government definition, benefits, drivers and barriers. It also demonstrates e-government challenge and influencing factors. In addition, it explains the e-government in developing countries and explores some e-governments experience in some developing countries and discusses the failure causes of e-government programs in such countries. Finally, the e-government readiness is described.

Chapter 3 explains the research methodology, which includes methodology type, procedure, research instruments, data gathering and analysis tool respectively. It also explains the questionnaire contents, and the validation process. The validation includes experts' judgment and a pilot study. The chapter also demonstrates the sampling technique and sample size of the actual survey. Finally, the chapter introduces the development of the research model.

Chapter 4 explains the questionnaire validity by using experts' judgments. It also explains the questionnaire reliability using a pilot study.

Chapter 5 shows the research analysis and results. The collected data by the questionnaires is analysed using the SPSS and AMOS. The SPSS is used to conduct the EFA through a set of statistical methods to ensure that all items are actually measuring their constructs. Then, AMOS is used to conduct the confirmatory factor analysis (CFA) in order to develop the structural equation model (SEM), and test the hypotheses.

Chapter 6 introduces the research discussions and conclusion. It discusses the fulfilment of research objectives. Then, the chapter introduces the discussion of hypotheses testing and research contributions. Then, it demonstrates the research limitations. Finally, the chapter provides some recommendations for future work.

## **1.11 Summary**

This chapter introduces an overview to the research including the e-government concept, as well as the advantages of and necessity for developing countries especially in the Arabic region. It also covers the background problem involving the e-government readiness concept as well as implementation and deployment of challenges in developing countries, especially Libya. The chapter also includes the problem statement, the research objectives that should be achieved and the questions raised by the research. It also presents the research purpose, significance, scope and implications. Finally, the chapter demonstrates the research outline.

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## Appendix A                      Experts Judgments Questionnaire

### LETTER OF INVITATION TO PANEL OF EXPERTS

My name is Mostafa Omar Beauo. I am a PhD student at Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia (UTM). The title of my research is "A model for assessing technology readiness of e-government readiness in developing countries".

You are invited to participate in this study based on your expertise and experience in this field after I reviewed your profile on website. I am writing to you to invite your participation in reviewing these eight technology factors of e-government readiness. It is anticipated that the questionnaire will take few minutes to complete, however, this will vary between participants and will be dependent on the amount of information you are happy to provide. I would be very grateful if you are willing to participate in the study.

Thank you for your cooperation and please do not hesitate to contact me or my supervisor if you require further information through the below details.

Regards,

Mustafa Omar Baeuo  
PhD Student,  
Razak Faculty of Technology and  
Informatics,  
Universiti Teknologi Malaysia (UTM)  
Email : mustafaomar12@yahoo.co.nz  
Tel: +60126441426

Assoc. Prof. Dr. Nor Zairah Binti  
Ab Rahim,  
Supervisor,  
Razak Faculty of Technology and  
Informatics,  
Universiti Teknologi Malaysia (UTM)  
Email: [nzairah@utm.my](mailto:nzairah@utm.my)

## Expert Information

Please mark '√' where applicable

### 1. Level of Education and Field of Study:

Bachelor	Master	PhD	Others (Please State)
Field of Study:			

### 2. What is your current employer:

--

### 3. What is your current job position?

--

### 4. Where do you work?

--

### 5. Working experience (in years):

--

### 6. What is your experience in e-government?

Researcher	Establishing	Maintaining	Others (Please State)

### 7. Please provide your valid email address here .....



## The Research Model

Reviewing the literature have been conducted to identify technology factors that should be consider when assess e-government readiness, we obtained eight technical factors: hardware, software, connectivity, security, operations and maintenance, technical support and skills, information technology standards, and information system architecture. The list of technology factors in e-government readiness, as in Table 1.

**Table 1** Technology Factors of E-government Readiness

Technology Factors	Description
Hardware	Any device that can be used to connect and increase the accessibility to the Internet such as: smartphones, laptops, personal computers, desktops, printers, scanners, routers, and switches
Software	The collection of software applications or any products that can be used to support and improve the use of e-government
Connectivity	The high-quality basic communications services, such as Local Area Network (LAN) and Wide Area Network (WAN)
Security	The protection of data and the networks against unauthorized access to or modification of information whether in storage, processing, or transit, and protection from digital attack
Operations and Maintenance	A set of processes provides the day-to-day work needed to monitor and maintain a continuous ICT infrastructure and operating systems
Technical support and Skills	The required ICT skills to adopt e-government such as availability the technical experience and expertise of e-government teams, IT department
IT Standard	The specification for hardware and software that are either widely used and accepted or sanctioned by a standard organization
Information Systems Structure	The significant elements which affect stakeholders' enactment through the usage of e-government services which include information quality, system quality, and services quality

Based on the technology factors in Table 1, a model covering the hypotheses is proposed as shown in Figure 1.1

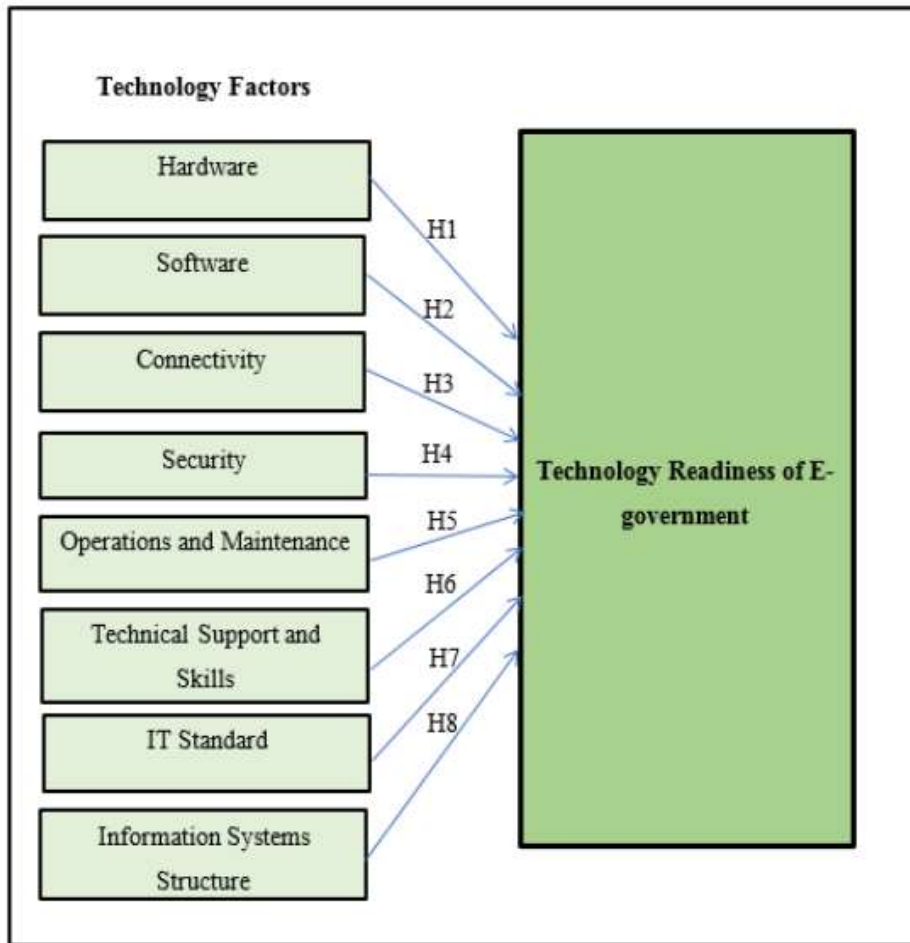


Figure 1.1: A model for technology readiness of e-government

Based on the model in Figure 1.1, Please answer the following questions:

- 1- What is your opinion about that the model sufficient and capable of measuring technology readiness in the e-government?

- 2- What do think about that the constructs in the model sufficient to measure the technology readiness of e-government?

## The Questionnaire

### Section 1: Technology Factors

**Part A1:** Please use the following Likert scale to rate your level of agreement with the technology factors (Mark ‘√’ where applicable using the scale provided). Also provide additional remarks if necessary.

**1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5= Strongly Agree (SA)**

No	Technology Factors	1 (SD)	2 (D)	3 (N)	4 (A)	5 (SA)	Additional Remarks (eg. Removal or rename of factors or other comments with your Justification)
1	Hardware						
2	Software						
3	Connectivity						
4	Security						
5	Operations and Maintenance						
6	Technical support and Skills						
7	IT Standard						
8	Information Systems Structure						

**Part B1:** Please answer the following questions:

**Q1.** Do you want to add a new factor(s) to the list of factors? Why? Please justify and write the description of the new factor(s) in the table below:

No	New Technological Factors? (If necessary)	Justification	Description
1			
2			
3			
4			
5			
6			
7			
8			

**Q2.** Do you think the factors descriptions need modifications? Please justify and provide your description in the table below:

<b>Technology Factors</b>	<b>Description</b>	<b>Justification</b>	<b>Your Description Modifications</b>
Hardware	Any device that can be used to connect and increase the accessibility to the Internet such as: smartphones, laptops, personal computers, desktops, printers, scanners, routers, and switches		
Software	The collection of software applications or any products that can be used to support and improve the use of e-government		
Connectivity	The high-quality basic communications services, such as Local Area Network (LAN) and Wide Area Network (WAN)		
Security	The protection of data and the networks against unauthorised access or any modification of information whether in storage, processing, or transmission, and protection from digital attack		
Operations and Maintenance	A set of processes providing day-to-day work needed to monitor and maintain a continuous ICT infrastructure and operating systems		
Technical support and Skills	The required ICT skills to adopt e-government such as availability the technical experience and expertise of e-government teams, IT department		
IT Standard	The specification for hardware and software that are either widely used and accepted or sanctioned by a standard organization		
Information Systems Structure	The significant elements which affect stakeholders' enactment through the usage of e-government services which include information quality, system quality, and services quality		

## Section 2: Statements to Measure Technology Factors

**Part A2:** List of statements which related to assessing technological readiness of e-government readiness were identified, please use the following Likert scale to rate your level of agreement with the statements (Mark ‘√’ where applicable using the scale provided)

**1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5= Strongly Agree (SA)**

Hardware							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
HAR1	The organization provides the appropriate hardware needed in the e-government implementation such as PCs, printers, scanners, application servers, storage devices.						
HAR2	The organization provides the appropriate networking devices needed in the e-government implementation such as routers, and switches.						
HAR3	There is a compatibility among hardware in all organization departments and with other public agencies.						
HAR4	The organization has actual equipment for storing organization’s data; this include central servers or data center.						
HAR5	The organization provides to cooperation and coordination with the other agencies in order to provide the necessary hardware.						

Software							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
SOF1	The organization has the appropriate software and applications that needed to e-government implementation such as operating systems and office applications.						
SOF2	E-government applications accept input data in simple format.						

Software							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
SOF3	The organization is fully networked with applications on central server in the organization data center.						
SOF4	The databases are integrated throughout the organization.						
SOF5	The required technologies and applications for e-government implementation are compatible with existing applications and systems in the organization.						

Connectivity							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
CON1	The organization has necessary and reliable networks and communication infrastructure among all organization departments and with other networks (internet).						
CON2	The organization provides to the communication and coordination between employees within the organization/department.						
CON3	The government data access and knowledge sharing are achieved at all levels in organization/department.						
CON4	There is intranet connectivity and digital interaction between the central and local governments.						
CON5	Citizens able to access e-government services.						
CON6	The organization provides to cooperation and coordination with the other agencies in order to provide the necessary equipment for networks and communication.						

Security							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
SCE1	There is an explicit and well-defined security policy imposed by the system to protect information and central servers/data center.						
SCE2	There is an appropriate security system to protect online transactions.						
SCE3	Reliable security systems have been configured to ICT infrastructure and organization e-government website.						
SCE4	Organization/department applied technologies and approaches to protect the ICT infrastructure, applications, information and the website contents such as Public Key Infrastructure (PKI), Biometrics systems, Intrusion Detection systems, Smart Cards, Digital Certificate, Firewalls.						
SCE5	Organization strengthens the security systems of e-government website by installing new protection technologies and approaches.						
SCE6	Authorized users access the system with appropriate grant for accessing specific e-government services to protected against unauthorized access or change.						
SCE7	Data is safely stored and transferred over the organization's network and website.						

Operations and Maintenance							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
OPM1	There are operations set of processes provide the day-to-day work needed to job scheduling, data management (including backup and recovery management), physical database administration.						
OPM2	There are operations set of processes provide the day-to-day work needed to hardware maintenance, central servers/data						

Operations and Maintenance							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
	center maintenance, networks maintenance.						
OPM3	There is continuous operation of applications and database in the presence of disasters.						
OPM4	There are operations set of processes provides the day-to-day work needed to software applications maintenance and upgrades.						
OPM5	There is a regular test for interactive features and mechanisms on the website.						
OPM6	There is a constantly upgrading along with procedural and policy changes for the website						
OPM7	There is maintenance of the information on the website.						

Technical Support and Skills							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
TSS1	There are members of the technical support staff are appropriately qualified (technical skills and expertise) for their jobs.						
TSS2	Technical support staff has the expertise required to create or evaluate for purchase the information technologies needed by the organization.						
TSS3	The technical support staff does its best to respond as soon as possible and are always willing to help.						
TSS4	The technical support staff solves problems when occur in a timely manner.						
TSS5	Technical support staff finishes projects on time						
TSS6	The technical support staff demonstrates good interpersonal communication skills in their interactions with other people						
TSS7	The appropriate hardware, software, and people required to						



Technical Support and Skills							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
	support the performance of work are always available.						
TSS8	The technical support staff keeps the employees informed in advance of scheduled system downtime.						
TSS9	The organization trains employees to enhance their skills.						

IT Standards							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
ITS1	Organization provides the necessary standards and protocols all the way through ICT network and communication infrastructure solutions such as the intranet, extranet, Internet, and VOIP.						
ITS2	There are IT standards to ensure the compatibility and interoperability between the systems and other e-services.						
ITS3	IT standards are changeable according to the requirements which are needed and due to the International Organization for Standardization (ISO), since it keeps changing the standards within a certain period of time along with IT developments.						
ITS4	There is management of IT standards by the organization itself/by outsourcing.						
ITS5	The organization has IT standards in order to compatible the used system (hardware and software) with each other, particularly with other agencies.						

Information Systems Structure							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
ISS1	Information on the organization's website is free from errors.						
ISS2	Information on the organization's website is up to date.						
ISS3	Information on the organization's website is relevant to the site.						
ISS4	Information on the organization's website is easy to read and understand.						
ISS5	Response time of e-government applications is acceptable.						
ISS6	The system (hardware, software, connectivity) is flexible to change based on its future requirements.						
ISS7	The organization's Internet applications are designed and developed to work with legacy systems.						
ISS8	The organization has high quality of (software, hardware, connectivity) to apply e-government.						
ISS9	The organization's website always works correctly						
ISS10	The organization's website provides necessary transactions to be completed and allows forms to be submitted on-line.						
ISS11	The organization's website provides helpful instructions.						
ISS12	The organization's website is accessible to users with disabilities.						

Technology Readiness of E-government							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
EGR1	There is central servers or data center to handle the administrative workflow automation, collaboration, interaction, authenticated exchange of information.						
EGR2	Organization offers education and training for the uptake of e-government.						

Technology Readiness of E-government							
Code	Statements	SD	D	N	A	SA	Additional Remarks (eg. Removal or Modify of Statements or other comments with your Justification)
EGR3	The organization pays close attention to ensuring compatibility among Internet applications.						
EGR4	The organization has a centralized function that oversees the development of all internet applications.						
EGR5	Technology readiness includes the readiness of ICT (hardware, software, connectivity).						
EGR6	Technology readiness includes the readiness of leadership and staff.						
EGR7	Technology readiness includes the readiness of security and confidentiality.						
EGR8	Technology readiness includes the readiness of technical support and skills.						

**Part B2:** Please answer the following questions:

1. Do you want to add a new statement/s to the list of statements? Please justify and write the new statement(s) in the table below:

No	New Statements? (If necessary)	Justification	Determine which factor you added the statement
1			
2			
3			
4			
5			
6			
7			

2. If you added a new factor(s) at **Section 1: Part B1 (Q1)**, then mention its/their statements in the table below:

No	New Technology Factors? (If you added above at Section 1: Part B1 (Q1))	Its/Their New Statements	Justification
1			
2			
3			
4			
5			
6			
7			
8			

3. Is there anything else you'd like to add that hasn't been covered by the questions?

--

**End of questionnaire**

Thank you very much for your cooperation

## **Appendix B Survey Questionnaire**

### **Survey on “Model for Technology Readiness of E-government in Libya”**

Dear Sir/Madam,

The successful implementation of e-government relies on the readiness of the technology readiness to realize their benefits and reduce the barriers to e-government implementation. As a part of the requirements to fulfill my thesis as a PhD student at the Universiti Teknologi Malaysia (UTM), I am conducting a research to develop a model for technology readiness of e-government in Libya. I would be grateful if you could answer the questionnaire in order to validate the proposed model.

The questionnaire contains two parts: A and B. Part A contains general questions. Part B comprises statements that are related to assessing technology readiness of e-government. It is required to determine the degree of your agreement about these statements. The questionnaire is expected to take approximately twenty minutes to complete. If you agree to participate, and I very much hope that you do, please fill in the questionnaire accordingly. You are not asked to reveal your identity. Your participation would add a tremendous value to this research.

If you require further information pertaining to this research, please do not hesitate to contact either me or my supervisor through the details given below:

**Yours sincerely**

Mustafa Omar Baeuo  
PhD Student,  
Razak Faculty of Technology and  
Informatics,  
Universiti Teknologi Malaysia (UTM)  
Email : mustafaomar12@yahoo.co.nz  
Tel: 0060126441426

Assoc. Prof. Dr. Nor Zairah Binti Ab  
Rahim,  
Supervisor,  
Razak Faculty of Technology and  
Informatics,  
Universiti Teknologi Malaysia (UTM)  
Email: [nzairah@utm.my](mailto:nzairah@utm.my)  
Tel: 0060322031397

## Survey Questionnaire

**PART A**

**General Questions**

Please mark '√' where applicable for questions

1. Gender:

Male	Female

2. Age:

From 20-30	From 31-40	From 41-50	From 51 to above

3. What is the highest level of education you have completed?

Bachelor	Master	PhD	Others (Please State)

4. What is your current position?

Administrative	Technician	Lecturer	Engineering	Manger	Direct Manger	Others

5. How many years of experience do you have in establishing/maintaining/researcher of e-government?

From 1-4 years	From 5-8 years	From 9-13 years	From 13 to above

6. What is your experience in e-government?

Establishing	Maintaining	Researcher	Others (Please State)

**PART B****Technology Factors of E-government Readiness**

The following is a set of statements which related to assessing the technology readiness of e-government. Based on your experience and point of view, please indicate the level of your agreement to these statements by ticking (√) at the number that expresses your opinion:

1=Strongly Disagree (SD), 2=Disagree (D), 3=Neutral (N), 4= Agree (A), 5= Strongly Agree (SA)

<b>Hardware:</b> Any device that can be used to connect and increase the accessibility to the Internet such as: smartphones, laptops, personal computers, desktops, printers, scanners, routers, and switches.						
No	Statements	SD	D	N	A	SA
1	The organization provides the appropriate hardware needed in e-government implementation such as PCs, printers, scanners, application servers, storage devices.					
2	The organization provides the appropriate networking devices needed in e-government implementation such as routers and switches.					
3	There is a compatibility among hardware in all organization departments and with other public agencies.					
4	The organization has actual equipment for storing organization's data; this include central servers or data center.					
5	The organization cooperates and coordinates with other agencies in order to provide the necessary hardware.					

<b>Software:</b> The collection of system software and applications or any products that can be used to support and improve operation of e-government project.						
No	Statements	SD	D	N	A	SA
1	The organization has the appropriate software and applications needed to e-government implementation such as operating systems and office applications.					
2	E-government applications accept input data in simple format.					
3	The organization is fully networked with applications on central server in the organization data center.					

<b>Software:</b> The collection of system software and applications or any products that can be used to support and improve operation of e-government project.						
No	Statements	SD	D	N	A	SA
4	The databases are integrated throughout the organization.					
5	The required technologies and applications for e-government implementation are compatible with existing applications and systems in the organization.					

<b>Connectivity:</b> The high-quality basic communications services, such as Local Area Network (LAN) and Wide Area Network (WAN).						
No	Statements	SD	D	N	A	SA
1	The organization has necessary and reliable networks and communication infrastructure among all organization departments and with other networks (Internet).					
2	The organization communicates and coordinates among employees within the organization/department.					
3	The government data access and knowledge sharing are achieved at all levels in organization/department.					
4	There is intranet connectivity and digital interaction between central and local governments.					
5	Citizens can access e-government services.					
6	The organization cooperates and coordinates with other agencies in order to provide the necessary equipment for networks and communication.					

<b>Security:</b> The protection of data and the networks against unauthorized access or any modification of information whether in storage, processing, or transmission, and protection from digital attack.						
No	Statements	SD	D	N	A	SA
1	There is a well-defined security policy to protect information and central servers/data center.					
2	There is an appropriate security system to protect online transactions.					
3	Organization/department applied technologies and approaches to protect the ICT infrastructure, applications, information and the website contents such as Public Key Infrastructure (PKI), Biometrics systems, Intrusion detection systems, Smart Cards, Digital certificate, Firewalls.					
4	Organization strengthens the security systems of e-government website by installing new protection technologies and approaches.					



<b>Security:</b> The protection of data and the networks against unauthorized access or any modification of information whether in storage, processing, or transmission, and protection from digital attack.						
No	Statements	SD	D	N	A	SA
5	Authorized users access the system with appropriate grant for accessing specific e-government services to prevent unauthorized access or change.					
6	Data is safely stored and transferred over the organization's network and website					

<b>Operations and Maintenance:</b> A set of processes providing the day-to-day work needed to monitor and maintain a continuous ICT infrastructure and operating systems.						
No	Statements	SD	D	N	A	SA
1	There are operations set of processes provides the day-to-day work needed to job scheduling, data management (including backup and recovery management), physical database administration.					
2	There are operations set of processes provide the day-to-day work needed to hardware maintenance, central servers/data center maintenance, networks maintenance, website information maintenance, software applications maintenance and upgrades.					
3	There is a continuous operation of applications and database in the presence of disasters.					
4	There is regular test for interactive features and mechanisms on the website.					
5	There is a constant upgrade along with procedure and policy changes for the website.					

<b>Technical support and Skills:</b> The required ICT skills to adopt e-government such as availability the technical experience and expertise of e-government teams, IT department.						
No	Statements	SD	D	N	A	SA
1	Members of technical support staff are appropriately qualified (technical skills and expertise) for their jobs and for purchasing the information technologies needed by the organization.					
2	Technical support staff responds quickly and finishes projects on time and solves problems when occur in a timely manner.					
3	The technical support staff demonstrates good interpersonal communication skills in their interactions with employees and keeps the employees informed in advance of scheduled system downtime /maintenance.					
4	The appropriate hardware, software, and people required to support the work performance are always available.					
5	The organization train employees to enhance their skills.					

<b>IT Standard:</b> The specification for hardware and software that are either widely used and accepted or sanctioned by a standard organization.						
No	Statements	SD	D	N	A	SA
1	Organizations provides the necessary standards and protocols all the way through ICT network and communication infrastructure solutions such as the intranet, extranet, Internet, and VOIP.					
2	IT standards are used to ensure the compatibility and interoperability between the systems and other e-services.					
3	IT standards are changeable according to the requirements of the International organization for standardization (ISO), which keeps changing the standards within a certain period of time along with IT developments.					
4	IT standards are managed by the organization itself/by outsourcing.					
5	The organization uses IT standards to ensure the compatibility of the used systems (hardware and software) with each other and with other agencies					

<b>Information Systems Structure:</b> The significant elements which affect stakeholders' enactment through the usage of e-government services which include information quality, system quality, and services quality.						
No	Statements	SD	D	N	A	SA
1	Information on the organization's website is up to date and free from errors.					
2	Information on the organization's website is relevant and easy to read and understand.					
3	Response time of e-government applications is acceptable.					
4	Systems (hardware, software, connectivity) are flexible to change based on future requirements.					
5	The organization's Internet applications are designed and developed to work with legacy systems.					
6	The organization has high quality of software, hardware and connectivity to apply e-government.					
7	The organization's website always works correctly and provides helpful instructions.					
8	The organization's website provides necessary transactions to be completed and allows forms to be submitted on-line.					
9	The organization's website is accessible to users with disabilities.					

<b>Technology Readiness of E-government:</b> Availability of ICT infrastructure that required for implementation and adoption of e-government.						
<b>No</b>	<b>Statements</b>	<b>SD</b>	<b>D</b>	<b>N</b>	<b>A</b>	<b>SA</b>
<b>1</b>	There is a central server or data center to handle the administrative workflow automation, collaboration, interaction, authenticated exchange of information.					
<b>2</b>	Organization offers education and training for uptake of e-government.					
<b>3</b>	The organization seeks to ensure compatibility among Internet application and oversees the development of all Internet applications.					
<b>4</b>	Technology readiness includes the readiness of ICT (hardware, software, connectivity).					
<b>5</b>	Technology readiness includes the readiness of leadership and staff.					
<b>6</b>	Technology readiness includes the readiness of security and confidentiality.					
<b>7</b>	Technology readiness includes the readiness of technical support and skills.					

**End of Questionnaire ... Thank you very much**

## Appendix C Arabic Survey Questionnaire

دراسة استقصائية عن "تطوير نموذج لجاهزية التكنولوجيا للحكومة الإلكترونية في ليبيا"

سيدي/سيدتي،

بعد التحية؛؛

يعتمد التنفيذ الناجح للحكومة الإلكترونية على جاهزية الجوانب التكنولوجية من أجل تحقيق الفوائد التي توفرها وتقليل الحواجز أمام تنفيذ الحكومة الإلكترونية. بصفتي طالب دكتوراه في جامعة التكنولوجيا ماليزيا (UTM)، أقوم بإجراء مشروع بحثي يركز بشكل أساسي على تطوير نموذج لجاهزية التكنولوجيا للحكومة الإلكترونية في ليبيا. الغرض من هذا المسح هو التحقق من صحة هذا النموذج.

سأكون ممتناً لو تفضلتم بالإجابة على الاستبيان وذلك من أجل التحقق من صحة النموذج المقترح. يحتوي الاستبيان على جزئين؛ A و B. الجزء A يحتوي على أسئلة عامة؛ أما الجزء B يشمل العبارات المتعلقة بتقييم جاهزية الجوانب التكنولوجية للتطبيق الحكومة الإلكترونية؛ و المطلوب هو أن تحدد درجة موافقتك على هذه العبارات. من المتوقع أن يستغرق الاستبيان حوالي 15 دقيقة لإكماله. إذا وافقت على المشاركة وأمل أن تفعل ذلك، فيرجى ملء الاستبيان وفقاً لذلك. لا يطلب منك الكشف عن هويتك. مشاركتك ستضيف قيمة هائلة لهذا البحث.

إذا كنت بحاجة إلى مزيد من المعلومات المتعلقة بهذا البحث، يرجى عدم التردد في الاتصال بي أو مشرفي من خلال التفاصيل الواردة أدناه.

تفضلوا بقبول فائق الاحترام،

Assoc. Prof. Dr. Nor Zairah Binti

Ab Rahim,

مشرف،

كلية الرزاق للتكنولوجيا والمعلوماتية،

جامعة التكنولوجيا ماليزيا (UTM)

البريد الإلكتروني: nzairah@utm.my

هاتف: 0060322031397

مصطفى عمر بعيو،

مرشح الدكتوراه،

كلية الرزاق للتكنولوجيا والمعلوماتية،

جامعة التكنولوجيا ماليزيا (UTM)

البريد الإلكتروني: mustafaomar12@yahoo.co.nz

هاتف: 0060126441426

الاستبيان

اسئلة عامة

الجزء A

من فضلك علم √ على أختيارك

1. الجنس

أنثى	ذكر

2. العمر

من 30-20	من 40-31	من 50-41	من 51 فما فوق

3. ما هو مؤهلك العلمي؟

بكالوريوس	ماجستير	دكتوراه	أخرى أذكرها

4. ماهى وظيفتك الحالية؟

موظف	تقني	مدرس	مهندس	مدير عام	مدير	أخرى أذكرها

5. ما هو عدد سنوات الخبرة لديكم فى مجال الحكومة الالكترونية؟

من 5-1 سنوات	من 6-10 سنوات	من 11-15 سنوات	من 16 سنة فما فوق

6. ما هو مجال خبرتك فى الحكومة الالكترونية؟

تأسيس	صيانة	باحث	أخرى أذكرها

فيما يلي مجموعة من العبارات التي تتعلق بتقييم جاهزية الجانب التكنولوجي للحكومة الإلكترونية. بناءً على خبرتكم ووجهه نظرکم؛ من فضلك حدد درجة موافقتك على هذه العبارات بوضع √ عند الرقم الذي يعبر رأيك:

1- لا أوافق بشدة ؛ 2- لا أوافق ؛ 3- محايد ؛ 4- أوافق ؛ 5- أوافق بشدة

المعدات Hardware:						
أي جهاز يمكن استخدامه للاتصال وزيادة إمكانية الوصول إلى الإنترنت مثل: الهواتف الذكية وأجهزة الكمبيوتر المحمولة وأجهزة الكمبيوتر الشخصية وأجهزة الكمبيوتر المكتبية والطابعات والمساحات الضوئية وأجهزة التوجيه والمحولات						
ر.م	العبارات	1	2	3	4	5
1	توفر المؤسسة الأجهزة المناسبة و اللازمة لتطبيق الحكومة الإلكترونية مثل أجهزة الكمبيوتر والطابعات والمساحات الضوئية وخوادم التطبيقات وأجهزة التخزين					
2	توفر المؤسسة أجهزة الشبكات المناسبة و اللازمة لتطبيق الحكومة الإلكترونية. مثل أجهزة التوجيه والمحولات					
3	الأجهزة في المؤسسة تتوافق مع الأجهزة الأخرى في إدارات المؤسسة ، وكذلك تتوافق مع الاجهزة في الهيئات العامة الأخرى					
4	المنظمة لديها معدات فعليه لتخزين بيانات المنظمة ؛ وهذا يشمل الخوادم المركزية أو مركز البيانات					
5	توفر المنظمة التعاون والتنسيق مع الوكالات الأخرى من أجل توفير الأجهزة اللازمة لتطبيق الحكومة الإلكترونية					

البرمجيات Software:						
مجموعة من برامج النظام والتطبيقات أو أي منتجات يمكن استخدامها لدعم وتحسين تشغيل مشروع الحكومة الإلكترونية						
ر.م	العبارات	1	2	3	4	5
1	لدى المؤسسة البرامج والتطبيقات المناسبة التي تحتاجها لتنفيذ الحكومة الإلكترونية مثل أنظمة التشغيل والتطبيقات المكتبية					
2	تطبيقات الحكومة الإلكترونية تقبل إدخال البيانات بتنسيق بسيط					
3	يوجد نظام شبكي كامل و التطبيقات اللازمة على الخادم المركزي في المؤسسة					
4	يوجد دمج لجميع قواعد البيانات في جميع أنحاء المنظمة					
5	التقنيات والتطبيقات المطلوبة لتنفيذ الحكومة الإلكترونية تكون متوافقة مع التطبيقات والأنظمة الموجودة في المؤسسة					

Connectivity الاتصالات:						
خدمات الاتصالات الأساسية عالية الجودة مثل الشبكة المحلية و الشبكة الموسعة						
5	4	3	2	1	العبارات	ر.م
					المؤسسة لديها تقنيات الأتصال الضرورية مثل الشبكة المحلية ؛ الشبكة الواسعة و التي توفر اتصال أجهزة الكمبيوتر داخل المؤسسة/الإدارات مع الشبكات الأخرى	1
					توفر المؤسسة التواصل والتنسيق بين الموظفين داخل المنظمة/الإدارات	2
					تمكين الوصول إلى البيانات الحكومية وتبادل المعرفة على جميع المستويات في المؤسسة/الإدارات	3
					هناك اتصال إنترنت وتفاعل رقمي بين الحكومات المركزية والمحلية	4
					المواطنون قادرون على الوصول لخدمات الحكومة الإلكترونية	5
					توفر المؤسسة التعاون والتنسيق مع الوكالات الأخرى من أجل توفير المعدات اللازمة للشبكات والاتصالات من أجل تنفيذ الحكومة الإلكترونية	6

Security الأمان:						
حماية البيانات والشبكات من الوصول غير المصرح به أو أي تعديل للمعلومات سواء في التخزين أو المعالجة أو النقل أو الحماية من الهجوم الرقمي						
5	4	3	2	1	العبارات	ر.م
					يوجد سياسة أمان واضحة لحماية المعلومات والخوادم المركزية/مركز البيانات	1
					يوجد نظام أمان مناسب لحماية المعاملات عبر الإنترنت	2
					هناك تقنيات وأساليب تطبيقها المؤسسة/القسم لحماية البنية التحتية لتكنولوجيا المعلومات والاتصالات ومحتويات موقع الويب مثل البنية التحتية للمفاتيح العامة وأنظمة القياسات الحيوية وأنظمة كشف التسلل والبطاقات الذكية والشهادة الرقمية وجدران الحماية	3
					تقوي المنظمة أنظمة الأمن لموقع الحكومة الإلكترونية من خلال تثبيت تقنيات وأساليب حماية جديدة	4
					هناك تحديد هوية للمستخدمين الذين يمكنهم الوصول إلى النظام من خلال منح وصول مناسب إلى خدمات الحكومة الإلكترونية المحددة وذلك من أجل حماية النظام من الوصول أو التغيير غير المصرح به	5
					يتم تخزين البيانات ونقلها بأمان عبر شبكة المؤسسة وموقعها على الويب	6

Operations and Maintenance عمليات التشغيل و الصيانة:						
مجموعة من العمليات التي توفر العمل اليومي اللازم لمراقبة وصيانة البنية التحتية لتكنولوجيا المعلومات والاتصالات وأنظمة التشغيل المستمرة						
5	4	3	2	1	العبارات	ر.م
					هناك مجموعة من العمليات التي توفر العمل اليومي اللازم لجدولة الوظائف ، وإدارة البيانات (بما في ذلك إدارة النسخ الاحتياطي والاسترداد) ، وإدارة قاعدة البيانات الفعلية	1
					هناك مجموعة من العمليات التي توفر العمل اليومي اللازم لصيانة الأجهزة ، وصيانة الخوادم المركزية/مركز البيانات ، وصيانة الشبكات	2
					هناك تشغيل مستمر للتطبيقات وقواعد البيانات في وجود الكوارث	3
					هناك اختبار منتظم للميزات والآليات التفاعلية على الموقع	4
					هناك ترقية باستمرار مع التغييرات الإجرائية والسياسة للموقع	5

<b>Technical Support and Skills الدعم الفني و المهارات:</b>						
مهارات تكنولوجيا المعلومات والاتصالات اللازمة لتبني الحكومة الإلكترونية مثل توافر الخبرة الفنية وخبرات فرق الحكومة الإلكترونية ، قسم تكنولوجيا المعلومات						
5	4	3	2	1	العبارات	ر.م
					هناك فريق من موظفي الدعم الفني يكونون مؤهلون بشكل مناسب (لديهم المهارات الفنية والخبرة) لأداء وظائفهم ولشراء تقنيات المعلومات التي تحتاجها المؤسسة من أجل تطبيق الحكومة الإلكترونية	1
					يستجيب موظفو الدعم الفني بسرعة وينتهون من المشاريع في الوقت المحدد ويحلون المشاكل عند حدوثها في الوقت المناسب	2
					يوضح فريق الدعم الفني مهارات التواصل الشخصية الجيدة في تفاعلاتهم مع الموظفين وكذلك يبقي الموظفين على علم مسبق بالتعطيل/الصيانة المجدولة للنظام	3
					تتوفر دائماً الأجهزة والبرامج المناسبة والأفراد المطلوبون لدعم أداء العمل	4
					المؤسسة تدرّب الموظفين لتعزيز مهاراتهم	5

<b>IT Standards معايير تكنولوجيا المعلومات:</b>						
مواصفات الأجهزة والبرامج التي يتم استخدامها على نطاق واسع والمقبولة أو المصادق عليها من قبل مؤسسة قياسية						
5	4	3	2	1	العبارات	ر.م
					توفر المؤسسة المعايير والبروتوكولات الضرورية من خلال حلول شبكات الاتصالات والبنية التحتية للاتصالات مثل الشبكة الداخلية والإنترنت	1
					توجد معايير لتكنولوجيا المعلومات و ذلك لضمان التوافق وقابلية التشغيل البيني بين الأنظمة والخدمات الإلكترونية الأخرى	2
					تكون معايير تكنولوجيا المعلومات قابلة للتغيير وفقاً للمتطلبات المطلوبة و الناشئ عن المنظمة الدولية للتوحيد القياسي؛ حيث إنها تواصل تغيير المعايير خلال فترة زمنية محددة مع تطورات تكنولوجيا المعلومات	3
					هناك إدارة معايير تكنولوجيا المعلومات من قبل المنظمة نفسها عن طريق الاستعانة بمصادر خارجية	4
					لدى المؤسسة معايير تكنولوجيا المعلومات من أجل توافق النظام المستخدم (الأجهزة والبرامج) مع بعضها البعض ، لا سيما مع الوكالات الأخرى	5

<b>Information System Structure هيكل نظام المعلومات:</b>						
العناصر المهمة التي تؤثر على تشريع أصحاب المصلحة من خلال استخدام خدمات الحكومة الإلكترونية التي تشمل جودة المعلومات وجودة النظام وجودة الخدمات						
5	4	3	2	1	العبارات	ر.م
					المعلومات الموجودة على موقع المؤسسة محدثة و خالية من الأخطاء	1
					المعلومات الموجودة على موقع المنظمة على الويب ذات صلة بالموقع و سهلة القراءة و الفهم	2
					وقت الاستجابة لتطبيقات الحكومة الإلكترونية مقبول	3
					النظام (الأجهزة والبرامج والاتصال) مرّن للتغيير بناءً على متطلباته المستقبلية	4
					تم تصميم وتطوير تطبيقات الإنترنت الخاصة بالمؤسسة للعمل مع الأنظمة القديمة	5
					تتمتع المؤسسة بجودة عالية (البرامج والأجهزة والاتصال) لتطبيق الحكومة الإلكترونية	6
					موقع المؤسسة يعمل دائماً بشكل صحيح و يقدم معلومات مفيدة	7
					يوفر موقع المؤسسة على الإنترنت المعاملات اللازمة لإكمالها ويسمح بتقديم النماذج عبر الإنترنت	8
					الموقع الإلكتروني للمنظمة متاح للمستخدمين ذوي الإعاقة	9



Technology Readiness of E-government الجاهزية التكنولوجية للحكومة الإلكترونية : توافر البنية التحتية لتكنولوجيا المعلومات والاتصالات اللازمة لتنفيذ واعتماد الحكومة الإلكترونية.						
5	4	3	2	1	العبارات	ر.م
					هناك خوادم مركزية أو مركز بيانات للتعامل مع سير العمل الإداري والتعاون والتفاعل وتبادل المعلومات	1
					توفر المؤسسة التعليم والتدريب من أجل استيعاب الحكومة الإلكترونية	2
					تسعى المؤسسة إلى ضمان التوافق بين تطبيقات الإنترنت ، وكذلك تشرف على تطوير جميع تطبيقات الإنترنت	3
					جاهزية تكنولوجيا المعلومات والاتصالات (الأجهزة والبرمجيات والاتصال)	4
					هناك استعداد للقيادة والموظفين	5
					هناك استعداد للأمن والسرية	6
					هناك جاهزية للدعم الفني والمهارات	7

أنتهي الأستبيان

شكرا جزيلا لتعاونك

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3. **Baeuo, M. O. M.**, Rahim, N. Z. B. A., & Alaraibi, A. A. M. (2018). Exploring the Technology Factors influencing E-government Readiness among the employees of Ministry of Interior, Ministry of Communications and Informatics, Ministry of Higher Education and Universities in Libya. **(In Progress)**
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