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# E-government Development in Yemen: Assessment and Solutions

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## ABSTRACT

Least developed countries have more challenges on e-government implementation than other countries among the world. Yemen however, as one of the least developed countries seeks to improve its e-government development index. This study assesses the e-government development scenario in Yemen comparing with other countries in the same region based on the e-government surveys conducted by the United Nations. The present paper further finds that online services in Yemen is the most needed index to be enhanced. Therefore, the national portal needs to be reviewed and rebuild. The low scores of Yemen e-government development comes from the poor economic situation of the country, low ICT indicators, and high illiteracy among citizens.

**Keywords:** *E-Government Development Index (EGDI), Human Capital Index (HCI), Least Developed Countries, Online Services Index (OSI), Telecommunication Infrastructure Index (TCI), Yemen.*

## 1. INTRODUCTION

Electronic government (e-government or e-gov) refers to the use of information and communications technology (ICT) as a platform for exchanging information, providing services and transacting with citizens, businesses, and other arms of government.

E-government is a powerful tool for human development and essential to the achievement of the internationally agreed development goals including the Millennium Development Goals (MDGs) [1] – Yemeni government committed itself to (MDGs) to be realized until 2015. However, e-government offers the public service can be accessed 24 hours, whenever, and wherever the user is located. E-government also allows the public service to be more efficient since the service should not be conducted by face-to-face communication. Beside the interaction between the government and citizens (G2C) that provided by e-government, it also provide an interaction with government (G2G) and with other private sectors (G2B). In this study we assume that Yemen is more needed to have a strong (G2G) than (G2C) to solve many interaction problem in the public sector such as data misfit and lead to achieve data compatibility.

During the last two decades, the e-government stream of research has grown significantly. Some of the previous research elaborated on the advantages and disadvantages of e-government as well as the opportunities and challenges that it raises [2]. While some researchers investigated the potential impacts of ICT and management issues [3,4]. Some of the researches which deal with e-government in developing countries addressed the following issues: e-Government Adoption [5,6,7], e-Government readiness [8, 9, 10, 11], the failure of e-government [12,13] and e-

government Challenges in a specific country such as Pakistan [14] or India [15,16].

E-government in Yemen also faces many challenges and problems such as e-government initiatives are not centrally organized but instead public institutions are developing their own projects. Therefore, this study aims to investigate the e-readiness of Yemen and analyze the current situation and the challenges. The study is based on the secondary data gathered primarily from the e-government surveys (2003, 2004, 2005, 2008, and 2010) conducted by the United Nations and the statistics of various countries published by the UN.

The next sections of this paper are organized as follows. First, a review of literature related to e-government. The following section describes the study methodology. After that, e-government in Yemen will be analyzed and assessed compared with choosing countries from the region. Then, finding and discussion with the recommendations and finally the paper conclusions.

## 2. REVIEW OF LITERATURE

A few researches discussed e-government in Yemen. Al-Hagery [17] highlighted twelve challenges facing the task of the transition to e-Government in the current stage in Yemen. Then, suggested that it is possible to implement e-government in Yemen in case of achieving several criteria. In addition, Mahdy [18] emphasized the technology element in Yemen e-government and came up with two proposals. The first proposal includes the national infrastructure for wide area network, channels of access to electronic services and the integration between information system merged within the e-government. The second proposal components are the framework of services and web patrols, government e-mail, information patrols,

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service web patrols for electronic applications and services. However, the government of Yemen is seeking to strengthen the role of ICT in development [19].

## 2.1 E-government and e-readiness Definitions

The literature has provided various definitions to e-government, but they lead to the same core that e-government is the use of information technology by the government in carrying out the duties of government and public services. According to the World Bank (2004, p.22) E-government is “*government owned or operated system of ICTs that transform relation with citizens, the private sector and/or other government agencies so as to promote citizen empowerment improve service delivery, strengthen accountability, increase transparency, or improve government*”.

There are also many definitions for e-readiness. For example, e-readiness can be defined as “the degree to which an economy or community is prepared to participate in the digital economy” [20]. This definition is limited to the digital economy but e-government includes all aspects of citizens, employees and businesses lives: economical, political and social. Dada [21] defined e-readiness with a wider range as “*a measure of the degree to which a country, nation or economy may be ready, willing, or prepared to obtain benefits which arise from information and communication technologies (ICTs)*”.

## 2.2 E-government Development Index (EGDI)

Three sub-indices – online service index (OSI) which used to be called web measure index (WMI) in UN survey (2008) and before, telecommunication infrastructure index (TCII) and the human capital index (HCI) – are used to form the e-Government development index (EGDI) which used to be called E-government Readiness Index (EGRI) in the previous UN surveys. For calculating the (EGDI), all three sub-indices are allocated equal weights [11]. Developed countries have a distinct advantage in achieving higher rankings in UN survey (2010), as nearly two-thirds of the weight of e-government development index is allocated to the telecommunication infrastructure and human capital components, which both require long-term investment.

### ▪ Online Service Index (OSI)

A country’s strength in online service provision is measured against four benchmarks: Does the national government provide basic information services online? Does the national government use multimedia technology and promote two-way exchanges with citizens? Does the national government use the Internet to deliver public services and solicit occasional input on matters of public interest? Does the national government connect public service functions and routinely consult with citizens on matters of public policy? If there is clear evidence that a country does all four of these things well, and therefore has

established a digital foundation for citizen empowerment and inclusion, then it will be highly placed in the online service index.

### ▪ Telecommunications infrastructure index (TCII)

The telecommunication infrastructure index is a composite of five indicators: number of personal computers per 100 persons, number of Internet users per 100 persons, number of telephone lines per 100 persons, number of mobile cellular subscriptions per 100 persons and number of fixed broadband subscribers per 100 persons.

### ▪ The human capital index (HCI)

This index is a composite of the adult literacy rate and the combined primary, secondary and tertiary gross enrolment ratio with two thirds weight given to the adult literacy rate and one third to the gross enrolment ratio.

### ▪ e-participation index

The e-participation questions expand the survey by emphasizing quality in the connected presence stage of e-government. (Manal,2009) [8] could not find any relationship between e-participation index and e-government readiness index, indicating the possibility that e-participation is more or less a government strategy and policy.

## 3. STUDY METHODOLOGY AND OBJECTIVES

The present study reviews the e-government readiness in the least developed countries with special reference to Yemen, the home country of the author. The purpose of this study is to assess the e-government scenario in Yemen and benchmark it against the better performers in the region. The study is based on the secondary data gathered primarily from the E-government surveys (2003, 2004, 2005, and 2008,2010) conducted by the United Nations and other surveys provided by the Ministry of Telecommunication and Information Technology (MoTIT) in Yemen. The following are the compared countries included in this study:

- Oman: one of the western Asian countries and borders Yemen from the east.
- Maldivians: A least developed country that face poverty as one of its main problems as Yemen.
- Egypt: one of the developing countries which has big population compared with Yemen.
- Bahrain: The top country in e-government development among Middle East countries and one of the top 20 countries in the world.

The Author attempt to examine the e-government scenario in other countries in the region so that the

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benchmarks to Yemen can be identified. The purpose of this benchmarking is to pinpoint the weaker links of the e-government infrastructure in Yemen.

#### 4. YEMEN E-GOVERNMENT ANALYSE AND ASSESSMENT

Yemen government has approved the national project for information technology (e-government) in 2002 with a total cost of \$50 million [22]. The project aims to provide the following advantages:

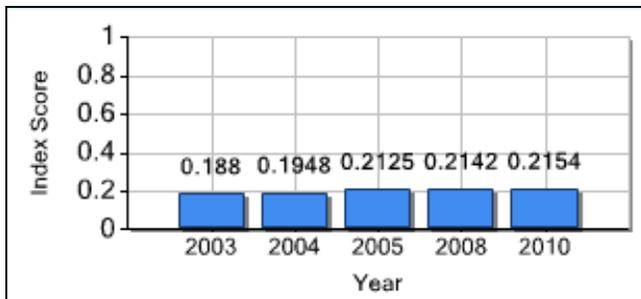
- Dissemination and delivery of services to disadvantaged populations and increasing the density of telephone service.
- Keep abreast of international trends in the development of the local's international telecommunication and information market.
- Move to the electronic financial transactions and reduce the traditional cash transactions.
- Electronic linkage between the various banks to ensure the preservation of the national currency against damage.
- Satisfy local needs of the computer hardware through the assembly of computers to overcome

the problem of import costs. It could lead to the introduction to an industry of assembling the components of the computers in Yemen.

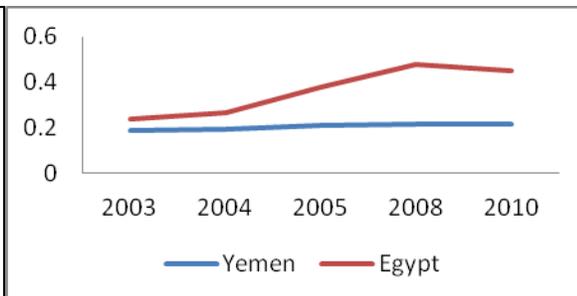
The project completion date was due in 2012. It started early but the progress of e-government index was too slow as shown in both figures: figure-1.a and figure-1.b [23,24].

##### 4.1 E-government Ranking of Yemen

E-government surveys (2010) conducted by the United Nations Department of Economic and Social Affairs (UNDESA) divided the Asian countries into five zones: central, eastern, southern, south-eastern, and western (where Yemen appears). Among Asia western countries, Yemen has the lowest ranking score. It ranks the 28<sup>th</sup> among 49 least developed countries. To clear up the E-government development index of Yemen it should be compared with another countries from the same classification. Egypt has been chosen for the comparison showing in figure-2.b due to the close rank on 2003 (starting point) for both countries. This will give a clear vision of the progress that Yemen should've went through and helps to know the steps that Yemen government should follow to improve its e-government development.



**Figure-1.a:** Yemen E-government Index Trend



**Figure-1.b:** The difference between Yemen and Egypt E-government Index Trend

E-government indices for Yemen and other countries in the region are illustrated on Table-1. The question is how to go through the huge gap and improve its EGDI to at least to 0.3 in the coming years.

**Table-1:** E-government Ranks of Yemen compared with other countries in the region

Index	Yemen	Oman	Maldives	Bahrain
EGDI (Rank)	0.2154 (164)	0.4576 (82)	0.4392 (92)	0.7363 (13)
Online service index (Rank)	0.0476 (167)	0.3683 (55)	0.1619 (127)	0.7302 (8)
TCII (Rank)	0.0298 (165)	0.2092 (83)	0.2886 (60)	0.5855 (19)
HCI (Rank)	0.5739 (153)	0.7980 (116)	0.8754 (90)	0.8933 (65)
E-participation index (Rank)	0.0429 (135)	0.1571 (76)	0.0714 (117)	0.6714 (11)

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Telecommunication infrastructure index and online service index have lower rank than human capital. This doesn't mean that HCI ranked good, but it gives more emphasis to focus on online service indicator and telecommunication infrastructure indicator more.

#### 4.2 Online Services in Yemen:

The national project for information technology has only established a web portal in the following address: <http://www.yemen.gov.ye/portal/> which has the following problems: It contains many links to different organizations in the government. However, many links are not operational. The contents are not up-to-date. For each Ministry there is a private website which is not linked to the portal. Due to such problems Yemen has got a low points on online service index. The failure to move forward in this project is attributed to three main challenges:

- Lack of budget.
- Changes of priorities where the project has low priority.
- Lack of qualified human resource to manage and implement the project.

Figure-2.a shows online service data for selected countries and shows categories on online service data including emerging information services, enhanced information services, transactional services and connected services.

The government of Yemen will need to address the possibility and requirements for establishing sector specific information portals. Each portal will need to be designed to reflect domain-specific content in an intuitive manner. The Yemeni government having vast archives of cultural and historical documents, and entrusted with the responsibility of promoting Yemen to the world should develop a portal to consolidate and promote all the historical sites to visit in Yemen. This portal must have all tourism information. Another portal that government must have is an information portal that will deliver all requirements such as the investment opportunities, laws, statistics etc. This portal should have links with other related ministries websites such as the ministry of trade, ministry of finance etc [18].

#### 4.3 ICT Indicators of Yemen:

There are only two ISP's for providing the Internet services owned by Government: Public Telecommunication Corporation know as (Yemen.net.ye) and Teleyemen knows as (y.net.ye). Four operating mobile phone operators in Yemen: Yemen Mobile, Mobile Telephone Networks (MTN), SabaPhone and Y. Table-2 shows the main indicators of telecommunication technology during the period: 2007-2009 provided by the Ministry of Telecommunication and Information Technology (MoTIT).

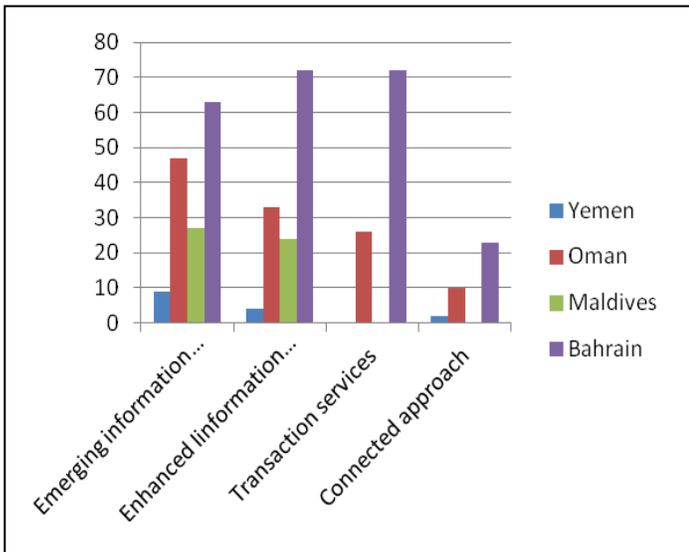
**Table-2:** Main Statistical Indicators of Communications and Information Technology: 2007 – 2009 (MoTIT)

Indicators	Unit	2007	2008	2009
Telephone stations capacity (equipped capacity)	Line	1,326,125	1,337,122	1,338,324
No. of operating telephone lines	Line	1,021,988	960,588	996,981
Percentage of public utalization	(operating/ equipped)	77.07	71.84%	74.49%
Increase in the equipped capacity	Line	1,202	10,997	26,083
Increase in the operating lines	Line	36,393	-61,400	53,660
Total of main centers	Number	49	49	49
Total of sub-centers	Number	226	225	229
Total internet subscribers	Subscriber	205,613	305,762	452,132
Total internet users	User	1,028,065	1,528,810	2,260,660
Total cellular phone users	User	4,348,264	6,445,033	8,312,773
Total subscribers of the International telephone	Subscriber	74,116	92,643	107,993
Total telecommunications centers and internet cafés	Number	14,694	15,730	16,234

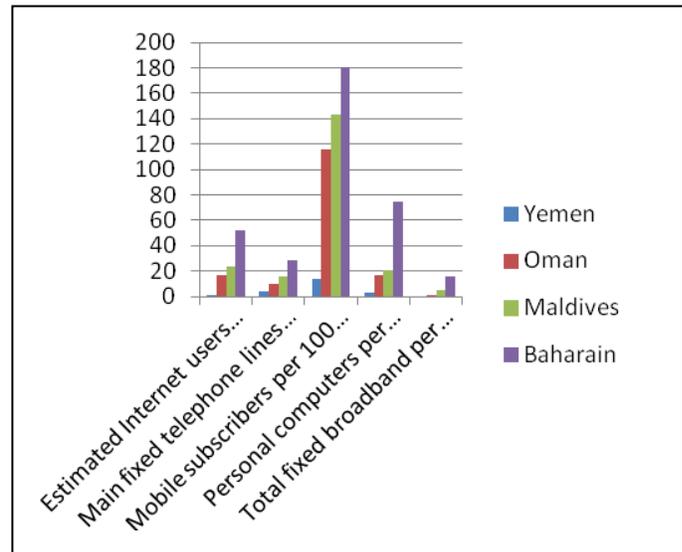
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Telecommunication Infrastructure of Yemen has also got a low ranking among other countries in the region as shown in figure-2.b. Some ministries and agencies have been equipped with local area digital data and telephony networks. The remaining government offices that have not been equipped with such networks will need to be assessed so that all government offices will be ready for digital interconnectivity using modern data and network security measures. To securely interconnect all of government offices together, a wide area network (WAN) infrastructure will be required. Another infrastructure

requires the provision of a secure global communication linkage between the government offices. The government of Yemen is also need to initiate data centres which will become the repositories of e-government data for the various types of e-government applications. Furthermore, the data center would act as an Internet Service Provider (ISP) for the government. In addition, to hosting their public information at the data center, government department and institutions would use high speed connections to access and obtain information from the internet [18].



**Figure2.a:** Online Service gap between Yemen and the other countries in the region.



**Figure2.b:** ICT gap between Yemen and other countries in the region.

## 5. FINDINGS AND DISCUSSIONS

The previous assessment indicated that the characteristics of the current reality of e-government development indicator in Yemen and its sub-indices highlights the many challenges facing the task of e-Government in the current stage. The need for Yemen government to take the short and fast way to improve its e-government is insistent. Therefore, Yemen can learn from other countries experience in the region. Egypt for example has Focused on upgrading existing online services and increasing the number of service delivery channels. A number of projects have been initiated, in particular in the area of creating databases (e.g. to manage civil certificates). Following its decision to have its e-government initiative peer reviewed by the OECD, Egypt has started some work in preparation to this project (e.g. initial data collection) [25]. Egypt e-Government Phases [26]:

Phase 1 – 01/07/2001 - 30/06/2007:- Set and approve the e-Government strategical plan, implement and assess

pilot projects and start geographical & sectorial deployment of some projects.

Phase 2 – 01/07/2007 - 30/06/2011: Expand on national level and development of government administrative body.

Bahrain's Online services ranks the 8<sup>th</sup> among the world. Bahrain national portal was launched in May 2007 with 30 services, 90 + in May 2009, 200+ services by 2010. Transactions worth USD 11 million since launch [28]. The e-government program has its presence on social networking sites such as Facebook and You Tube. In addition, the national portal and ministry websites provide features such as open forums, blogs, live chats, online polls, e-newsletters and other interactive services that involve citizens in government decision making [1].

Yemen government should focus on improving the online services by rebuilding the national portal to be able to give citizens needed services. In addition, building wide databases that include all financial and administrative sectors of the state is insistence. Using social sites such as

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Facebook and Twitters are rising. Facebook penetration in Yemen is 1.86% compared to the country's population and 103.81% in relation to number of Internet users. The total number of FB users in Yemen is reaching 436000 and grew by more than 146840 in the last 6 months [27]. Yemen government could use this kind of social networks to present its e-government program and other online services. The factors that will increase people's demand on e-Government services should be identified [6]. The governments must integrate citizens' needs to e-Government strategy and the process of service development in order to achieve maximum benefits from their e-Government promises. Implementing e-Government should also consider methods and invest in projects that would boost EC, and e-Business activities and develop their e-Society before trying to achieve advanced levels of e-Government. This will give them the chance to empower citizens and prepare them for advanced e-Government services.

## 6. CONCLUSION

Benefits of e-government are many. Not only the citizens of a country receive a quality service and empowerment, but the government and other stakeholders are also benefited by adoption of an e-government system. However, least developed countries are facing many challenges on e-government implementation than those faced by their counterparts in the developed world. Yemen is one of the least developed countries that aware of the importance and sophistication of IT to develop e-government projects through the construction of ambitious ICT strategies, but these strategies and plans have not been implemented due to many challenges such as: lack of IT budget, lack of IT skills, lack of leadership, resistance to change, lack of infrastructure and the disruption of the structure of the national economy. This paper however, has assessed and analyzed the current electronic government readiness in Yemen according to United Nations e-government readiness surveys from 2003 until 2010. On the other hand, this study offers useful implications to e-government decision makers in Yemen by clarifying the most weak parts on the e-government and gives suggestions from some countries which have gone through this experience.

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