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Major challenges in developing a successful e-government: A review on the Sultanate of Oman

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Abstract   The technological development has turned the government policies and strategies toward e-government. The e-government is considered the primary tool to facilitate the access of the citizens to various services. Thus, the government plans and subsidies shall reach the public through e-government portals. Some of the developed countries had sufficiently integrated the e-government technology whereas others are still under development. In this respect, we have reviewed and studied the major challenges faced by the Sultanate of Oman in the process of developing and implementing the e-government. We have also analyzed secondary data to identify the level of e-government acceptance in the Sultanate of Oman. We have suggested a model, which the government may apply in order to develop and implement its own successful e-government.

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1. Introduction

The technological development has supported the business and government activities in various perspectives. Providing necessary and sufficient services to the public and the stakeholders is one of the major issues in the government services. World Wide Web (WWW) has enabled a breakthrough in this issue with various tools, gadgets and techniques. The governance of the country has been made significantly straightforward due to the technological usage, one such technique being the e-government.

Some definitions of e-government are stated below. The World Bank has defined "E-Government" as "the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government"(Worldbank.org). E-government is the use of information and communication technologies (ICTs) to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens (Working Group). UNESCO has defined e-governance as "The use of ICT by different actors of the society with the aim to improve their access to information and to build their capacities" (Visited1).

In general government services are provided through various methods such as e-portals, retailers, banks, government and private sectors. The major idea of the e-government

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strategy is to inform the citizens about the government policies by providing sufficient infrastructure within their cultural and economic constraints. The prime goal of the e-government is to deliver the government policies, strategies and services to the citizens through the internet.

Many developing countries are in the initial stages of implementing electronic government with the aim to improve public sector services and deliver them in an effective and efficient manner. Although e-government efforts in most Gulf countries started during the early 2000s there are still some lapses in reaching the required stages compared to western countries (Al-Busaid and Weerakkody, 2011). Huge investments have been made by the respective governments for the development, implementation and maintenance of the e-government portals.

The Sultanate of Oman is located in the southeast of the Arabian Peninsula, bordered by the Kingdom of Saudi Arabia and the United Arab Emirates, the Gulf of Oman in the north-east and the Arabian Sea in the southeast. Oman covers an area of about 119,500 square miles, with a population of approximate 2.846 million as per 2011 census (Worldbank.org) and with a Literacy Rate (15–24) of 98%. Ministry of National Economy.

The Sultanate of Oman has defined e-government as follows: "E-Government is the transformation of internal and external public sector relationships, through Information and Communications Technology (ICT) in order to optimize government service delivery and citizen participation. Digital society is a society or community that is well advanced in the adoption and integration of digital technology into daily life at home, work and play" (Visited2). The e-governance has been defined by the Sultanate of Oman as "E-Governance is the development, deployment and enforcement of the policies, laws and regulations necessary to support the functioning of a Knowledge Society as well as of e-Government" (Visited).

The Sultanate of Oman government has taken good initiative in using ICT in order to meet its goals and objectives and to provide structured services to all its stakeholders. Most of the large and international organizations in Oman have effective computer systems to efficiently conduct their business. A number of large organizations have spent huge amounts of money on installing computer systems to support their business processes (Parker and Castelman, 2007).

In this paper, we would like to review the development methodologies used in the construction of e-government in the Sultanate of Oman, one of the Gulf nations which is showing tremendous developments in all sectors. We tried to identify the major issues in implementing e-government initiatives in the Sultanate of Oman. Also, we have identified some major challenges in such performance; therefore we have suggested some recommendations, which may be helpful for the realization of ICT. Though there are various studies conducted in this regard, this paper concentrates on identifying the strengths and weaknesses with respect to the secondary data available through various internet resources.

2. Literature review

Various researches were conducted to identify the challenges in implementing the successful e-government. There are primarily three perspectives including citizens, businesses and government that need to be considered to develop a successful e-Government (Reynolds and Regio, 2001). Al-Azri et al (2010) have discussed the successful implementation of e-government projects. They concluded that the organizational paradigm, technology paradigm and end – user paradigm are the factors that have impact on implementing successful e-government (Al-Azri et al, 2010). Al-Rahbi (2012) studied the technical factors that are affecting the implementation of successful e-government in the Sultanate of Oman. They identified that the major factors are: ICT Infrastructure, IT Security, IT Standards, and Technical Expertise (Al-Rahbi, 2012).

Al-Khouri (2013) presented a six – staged road map for the successful implementation of e-government in the Arab world (Al-Khouri, 2013).

Though various studies were conducted with respect to the development and implementation of e-government by various researchers Ashrafi and Murtaza (2008), Valentina (Dardha) Ndou (2004), Sonntag et al. (2002), still some countries could not achieve the required output in this regard. The technological development and people acceptance of this technology play a vital role in the successful implementation of e-government. In this paper, we have tried to identify the major flaws in the development and implementation of e-government in the Sultanate of Oman.

2.1. Oman e-government strategy

Transforming Oman into a sustainable knowledge-based economy began with setting the economic vision for the sultanate toward the year 2020 to which the Oman e-Government strategy, endorsed in March 2003, contributes in terms of developing the Omani Digital Society and e-Government. E-Government strategies were revised and there is more focus on the Omanization process, digital literacy and increasing competency of the Omani citizens (Ministry of National Economy).

Also e-Oman offers to the citizens more benefits and advantages that will change the life for the better. Digital Oman provides for the citizens services such as training and awareness of ICT, e-legislation, national statistics online and national registration system for higher education admission (e-Oman).

E-Government in Oman services is presented in a thematic classified manner and in a standard format that enables easy access and use. Many forms related to the services are provided for citizens to download and utilize. Citizens also have online services related to school results, college admissions, training and employment, healthcare, Omani culture, housing regulations, social support from the government, etc. information related to passport, visa, driving permits (Oman official website).

E-Government through e-Oman locates services related to various stages of the business life cycle including starting, running, enhancing and closing a business, many other services such as relevant laws, policies, regulations, permits and government assistance with the business. Online services for registering a company, import and export, value added tax, investing in Oman are nowadays available in e-Oman (Oman official website).

3. Research methodology

To identify the sustainable development in e-government in the Sultanate of Oman, secondary data were collected through

various sources. The statistical data provided by the United Nations on sustainable development and readiness of e-government implementation were downloaded for different years 2003, 2004, 2005, 2008, 2010, 2012. The data were analyzed with respect to various e-government development perspectives. The statistical data available in the Sultanate of Oman official e-government portal were downloaded and analyzed for the usage and strategies that the country applies in the e-government development.

3.1. UN survey analysis

United Nations has conducted various studies and analyses regarding e-government readiness and development worldwide. Since 2003, it has conducted analysis on readiness of each country in implementing the e-government methodologies. The following Table 1 shows various readiness indices of Oman during 2003 to 2008 according to UN Survey Results.

Table 1 shows a 29 position lower rank of the country in 2004 as compared to the 2003 report where the country was appreciated for the availability of information. This may be caused by technical reasons and by the construction of websites and portals. The readiness index had gone down by 18.9%. The web measure index had gone down by 80.9%. But Telecom Index and Human Cap Index increased by 2.2%, and respectively 1.5%. Apart from that Internet Index, Online Index, Tel line Index and Mobile Subscribers Index were also increased by 33.3%, 58.7%, 3.1% and 63.9% respectively. The Technology Infrastructure Index also increased by 1.5% in 2004 compared to 2003.

But the country has shown significant development in later years. In 2005, the country started improving the implementation of e-government initiatives and the country started gaining its position back. In 2008, the country had a tremendous improvement in ICT, due to which it has reached 84th position. The readiness index was also above the world average readiness index. The web measure index increased more than 180% compared to 2005.

3.1.1. E-participation

The 2003 analysis shows that the Sultanate of Oman had scored 3 points for e-information, 6 points for e-consultation and 6 points for e-decision making. It had the e-participation index as 0.259. But unfortunately, the Sultanate of Oman had scored only 0.000 as e-participation index during the 2004 study. This may be due to the construction of websites and other e-government tools. In 2005, the e-participation index just started to increase. But in 2008, it increased by more than 1000%.

3.1.1.1. UN survey analysis for 2010 and 2012. The Sultanate of Oman had tremendous IT development during 2010 and 2012. Table 2 shows the major factors that influenced the study.

Table 2 shows that the Oman ranking has been greatly reduced in 2012 compared to 2010. The country was showing gradual development in ICT and other related field as compared to 2003. When the rank was compared to previous studies from 2003 and 2004, Oman scored the best rank in 2012. Beginning with 2010, Oman readiness index was above the world average index. In 2010, it was 3.9% above the world average and in 2012 it was 21.75% above the average. The web measure and human cap indexes also noticed an increase by more than 80%.

E-participation index increased by 184% in 2012 compared to 2010.

3.2. ICT survey 2012 by Sultanate of Oman

Based on the core ICT indicators suggested by UN, the Sultanate of Oman conducted its survey of ICT development in 2012. For this study, 55 government entities were surveyed out of which 96% of the entities responded. 52 higher educational institutions were surveyed with 9868 employees and 90,556 students. 2003 business sector enterprises were surveyed out of which 87.4% responded. The survey helped the government to study its ICT applications and usage in the Sultanate as well as their development.

The study shows that 75% of the business firms said that they do not need internet connection and 20% said that they have lack of ICT knowledge. 30% of the business concerns were using internet for internet banking, 33% were using B2C services. Only 6% of the business companies had their own website.

3.3. Web portal usage statistics

Table 3 shows the portal statistics available on e-Oman portal, official e-governance website. From the table, it is clear that

Table 1 UN survey results on Oman.

s. no.	Factor	2003	2004	2005	2008
1	Total number of countries analyzed	191	191	191	192
2	Oman position	98	127	112	84
3	World average readiness index	0.402	0.413	0.4267	0.4514
4	Western Asia average readiness index	0.410	0.409	0.4384	0.4857
5	Oman readiness index	0.355	0.288	0.3405	0.4691
6	Web measure index	0.262	0.050	0.1731	0.4849
7	Human cap index	0.67	0.680	0.710	0.7659
8	PC index	0.043	0.0	0.045	0.056
9	Internet index	0.075	0.1	0.105	0.138
10	Online index	0.063	0.1	0.063	0.110
11	Tel line index	0.097	0.1	0.085	0.458
12	Mob sub index	0.122	0.2	0.1912	0.018
13	Technology infrastructure	0.132	0.135	0.1385	0.1559
14	E-participation index	0.259	0.000	0.0159	0.2045

Source: UN e-governance survey.

Table 2 UN factor analysis 2010 and 2012 survey.

S. no.	Factor	2010	2012
1	Total number of countries analyzed	192	192
2	Oman position	82	64
3	World average readiness index	0.4406	0.4882
4	Western Asia average readiness index	0.4732	0.5547
5	Oman readiness index	0.4576	0.5944
6	Web measure index	0.3683	0.6667
7	Human cap index	0.2633	0.7224
8	E-participation index	0.1571	0.4474

Source: ibid.

Table 3 E-portal visitor statistics – Change with respect to base month Aug 2012. (The rate of changes are shown in Bold/Italic fonts).

Year	2012					2013			
Month	Aug	Nov	Change	Dec	Change	Jan	Change	May	Change
No. of visitors	26,331	26,707	*1.01*	57,557	*2.19*	70,459	*2.68*	28,804	*1.09*
Average no. visitors per day	849	890	*1.04*	1856	*2.19*	2272	*2.55*	921	*1.08*
No. of transactions through the e-payment gateway	11,204	11,485	*1.03*	12,778	*1.14*	12,884	*1.15*	16,710	*1.49*
Total value of transactions through the e-payment gateway in OMR (1 OMR = 2.6 USD)	374,783	372,242	*0.99*	412,814	*1.10*	467,856	*1.25*	728,933	*1.95*
Total no. of visitors feedback/enquiries	942	812	*0.86*	1202	*1.28*	2409	*2.56*	2352	*2.50*

Source: e-Oman portal statistics.

the web usage has been gradually increasing over the last years, 2012 and 2013 Portal Visit Statistics and Telecommunication Regulatory Authority (2012).

4. Findings

Based on the above analyses, it is evident that the Sultanate of Oman is showing a comparable improvement in the implementation of e-government. The various studies show that the Sultanate of Oman has developed internationally benchmarked strategies to develop and implement e-government initiatives to reach its citizens. Government has developed various websites related to e-government services and other G2B and G2C provisions. Most of the websites are externally interlinked to get connected to each other.

The publications and other data, reports are made available through the data website, while the updated records are made available to the customers. The government has developed clear mission and vision for the achievement of e-Oman; the key mission statements of e-Oman begin with streamlining the government services to achieving Oman 2020 as a cycle (AlRahbi, 2011). The strategic visions are also set from developing society and human capital to increase and promote awareness among the citizens. Under each strategic objective various achievable goals are set. E-government architecture has been set to achieve the target with standards.

4.1. Information technology authorities (ITA)

The Sultanate of Oman is responsible for the development and maintenance of e-government portals. The ITA provides efficient services, integrates processes and improves service efficiency. ITA is responsible for the implementation, supervision and maintenance of Digital Oman Strategy (Information and Communication Technology Surveys Results, 2012). ITA executes national level initiatives and processes whereas the regional directorate of ministries implements and maintains the regional level plans.

Telecommunications Regulatory Authority (TRA) is responsible for developing, implementing and facilitating telecommunication policies (Telecom Sector of Oman) (TRA Annual Reports (2011)). The statistical report "Statistical Publication of Telecom Sector of Oman-5 years at Glance Development at Glance: December (2012)" shows that post and telecommunication services contribute 1.8% to GDP in 2010. The report also shows the following compound annual growth rates for the five years 2007–2011: Total Mobile Subscribers 18%; Total Fixed Internet Subscribers 5.8%;

Internet Penetration (Subscribers/100 inhabitants) 5.5%; Internet Penetration (Subscribers/100 Households) 1.7%. The report also shows that Fixed Telephone Line penetration during 2010 and 2011 was 10% per 100 inhabitants and 70%, 71% per 100 Households. The active mobile broadband penetration (subscribers/100 inhabitants) is 59.3%.

5. Challenges in implementation

Various studies were analyzed to identify and measure the challenges faced by the Sultanate of Oman in implementing e-government strategies. Wimmer and Bredow (2002) defined the holistic approach for providing security solutions. They discussed the social, cultural, legal and political aspects of the challenges in e-government implementation (Wimmer and Bredow, 2002). Hwang et al. (2004) defined the challenges and obstacles under the aspects: technical, political, cultural and legal (Hwang et al., 2004). As said by Al-Busaidy and Weerakkodi (2011), the previous studies identified that the Sultanate of Oman lacked in legal frameworks, strategy, project plans, usability issues and information quality. Also, the authors identified that web accessibility and integration of various government agencies were also the major factors that affect the development (Al-Busaid and Weerakkody, 2011).

Oman is a developing country. The government has sufficiently invested in infrastructure developments. The major challenge that every government faces in implementing e-government is the proper planning and management. The Sultanate of Oman has planned and developed e-Oman vision, together with various government e-portals developed and maintained by ICT. The complexity and development in technology put various developing nations to face uncertainty in providing various e-governance services. The governments need to develop the systems that reflect the stakeholders' requirements and values.

The public need to be trained for using the ICT resources, and at the same time they should be motivated and educated with regard to the importance of using e-government techniques. The basic fear regarding the data security, personal information security and other resource security needs to be removed from the public mind. ICT and IT staff members need to be trained in order to meet the local requirements. More employment opportunities need to be created in order to provide optimal services to the public. The major concern over the e-government implementation is the security issue, as it is a costly affair, proper care and steps need to be taken to ensure high data security.

The basic requirement for the successful e-governance is the best possible internet services. Omantel is the major service provider in the Sultanate, and it provides high level internet facilities with maximum speed. However, it needs to expand these facilities to all places in the country. The ADSL broadband connections need to be extended to all the places in order to provide facilities to the citizens. The dial up and fixed broadband lines need to be increased by providing sufficient technical and technology supports. International internet bandwidth capacity needs to be increased (TRA Work Plan (2013)).

The Sultanate of Oman has various mobile service providers (Telecom Market Indicators (2012)). The number of mobile users is significantly increased during Q4, 2012. The penetration rate of mobile subscribers has reached 190.3% in Q4, 2012 compared to previous quarter. The mobile services should meet the required high standards. The e-governance strategies shall be disseminated through these mobile services.

Information Technology Authority (ITA) should take proper steps to improve administration and provision of a wide range of government services. The constraints in using e-government services due to legal, social, organizational, technological perspectives need to be addressed properly (ICT Applications and Cyber Security, 2008). The Sultanate of Oman government has developed various successful strategies and plans in recent years to achieve desired results. The government official portal clearly indicates the various steps taken in this regard.

6. The initiatives of Oman

Official e-government websites and portals found more services and facilities to provide necessary information to all categories of citizens. The portals show that the Sultanate of Oman has developed various e-portals for Information Technology Authority (ITA), digital Oman etc. The official e-government website provides a wide range of information regarding the facilities and services available to public. The portals are developed in both Arabic and English versions in order to reach all the citizens in the country. The official site describes various accessibility services compared to other portals with maximum features. This is a very good strategy to reach, to educate and to train the people to optimally utilize the e-government technology.

The government has developed various policies and strategies on the successful development and implementation of e-government. Numerous projects are developed to use ICT with its maximum potential to communicate with the citizens at all levels, and several initiatives are taken to develop, link and provide sufficient information to the public (HE Majesty's Vision).

7. Suggestions and conclusion

The government needs to consider the various basic factors defined by United Nations and other benchmarking agencies. The most important issue in implementing successful e-government is the citizens' acceptance and usage. The citizens need to be trained and educated to use the e-portal services available in the corresponding structure. The education plays a vital role in this application. The computer literacy should be started from school level itself in order to achieve the desired outcomes. The

Figure 1   Successful e-government steps.

awareness related to e-government strategies and methods should be created among the citizens. Oman has a long traditional culture, and the people follow the stated principles.

The Sultanate has comparatively high adult literacy rate. The adult literacy rate was 86.9% in 2010. Thus, educating the public in using internet and related technology shall be carried out with the help of proper planning and methodologies. The population above 65 years represents 2.6% whereas the population between 15 and 64 represents 68.9%. The government shall plan accordingly to train the public in using computer and its accessories easily.

The government shall apply the following methodology shown in Fig 1 to achieve successful e-government. The findings are limited as secondary data are used to conduct the study. The government shall study the public acceptance of the new system and take necessary steps to increase it. All levels of people should be considered while developing policies and strategies. Though currently sufficient ICT infrastructure may be available, there is a need to develop the current infrastructure by taking proper guidance from knowledge-based companies. The public awareness needs to be increased through advertisements, workshops, seminars and other means. The government shall provide additional computer literacy to the people through public and private educational institutions.

8. Future scope

This study is limited to the data available from the internet resources. The suggestions are also based on the available literature. The study shall be further developed by conducting a survey with the various stakeholders and users of the e-government portals. The findings and suggestions may change if the primary data are analyzed.

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