

Barriers to Electronic Government Citizens' Adoption

A case of Municipal Sector in the Emirate of Abu Dhabi

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Abstract— The advances in information and communication technologies have changed the way the governments interact with their citizens. The development of the internet and its vast capabilities played a vital role in this change. According the UN report 2010, the UN e-Government development index of the world rated United Arab Emirates in 49 which comes late 17 places than 2008 ranking. During 2008 the UAE ranked in 32. Therefore, it can be seen that UAE is having some troubles in citizens' adoption of the e-Government. In this paper, we will examine the key berries to the use of the e-Government services by citizens through testing the effect of 11 independent variables on the citizens' use of e-Government in municipal of Emirate of Abu Dhabi.

Keywords-eGovernment; adaption to eGovernment; Citizens' perception of eGovernment. Citizens' Adoption of e-Government

I. INTRODUCTION

With the new communication technology, many governments decided to adopt a new way of interacting with their citizens such as e-Government. Government has used information technologies like the Internet, Intranet, Wide Area Networks, and mobiles to advance their relations with citizens, businesses, and other governments [1]. Using the e-Government has reshaped how governments work, distribute information and deliver services to citizens. The World Bank defines e-Government in AOEMA report as "E-Government refers to the use of information technologies (such as Wide Area Networks, the Internet, and mobile computing) by government agencies that have the ability to transform relations with citizens, businesses, and other arms of government"[2].

e-Government applications have a lot of benefits for citizens and government together. e-Government services could enhance the interaction between citizens and government. It could improve business and industry. The government management would be more efficient, less corrupted, and more transparent.

With all these benefits, citizen adoption of the e-Government could be low. The government use of information technology as an innovation instrument to advance their relationship with their citizens, could be implemented in a way

that it is hard for citizens to adopt it. The government should study the citizens' views of using the information technology before and while designing the e-Government system.

According the UN report 2010, UAE is considered one of the top 4 leading countries in Western Asia's region that implemented the e-Government initiative. The e-Government implementation process in UAE had started in 2000 in Emirate of Dubai [4] and the beginning of 2005 in the emirate of Abu Dhabi [3]. The UN e-Government development index of the world rated United Arab Emirates in 49 which comes late 17 places than 2008 ranking. During 2008 the UAE ranked in 32. Obviously UAE is having some troubles in citizens adoption of the e-Government as citizens' perceived value of e-Government is still beneath the expected level.

The purpose of the paper is to present research study to determine barriers to e-Government use perceived by citizens at the municipal sector of in Emirate of Abu Dhabi. This paper examines the key berries to the use of the e-Government services by citizens through testing the effect of 11 independent variables on the citizens' use of e-Government in municipal services of Emirate of Abu Dhabi.

II. LITERATURE REVIEW

Many researchers have studied the factors that affect citizens' adoption and use of e-Government services. These studies see the adoption of e-Government as the adoption of new technology and base their conclusions on well-known models such as the Technology Adoption Model (TAM) [5], the Diffusion of Innovations (DOI) [6], and Uniform Theory of Acceptance and Use of Technology (UTAUT) [7]. Below are some of the most important models done by the researchers.

A. Technology Adoption Model

According to Davis, adoption of a technology depends on two basic things; Perceived Usefulness (PU) and Perceived Ease of Use (PEU). Perceived usefulness is the perception of gained skills by the use of the technology. Perceived ease of use is the perceived reduction in the effort required to use the technology. Perceived usefulness and perceived ease of use determine the intention to use the system[5].

B. Diffusion of Innovations Model

Diffusion of innovations model has come from sociology. Moore and Benbasat [6] designed this model for the newly adopted technologies. The model consists of eight independent variables: voluntariness, relative advantage, compatibility, image, ease of use, result demonstrability, visibility, and trialability [8].

C. Uniform Theory of Acceptance and Use of Technology

Venkatesh and others reviewed the two previous models and added additional factors to be considered about the users' adoption of technology. They have added performance expectancy, effort expectancy, social influences, facilitating conditions, demographics and voluntariness. This model was like improvement for the other previous models [9].

Carter and Bélanger in [10] have used both the TAM, and the innovation diffusion theory. He concluded that citizens' adoption of e-Government is based on the perceived ease of use, compatibility, and trust to use an e-Government service. Welch in [11] found that citizens' use of the government website use is linked to their trust in government. Yao and Murphy [12] studied the use of electronic voting systems in e-Government and they concluded that ease of use, mobility, privacy, and accuracy are factors of citizens' use of the e-Government.

III. RESEARCH MODEL

The research model (shown in Figure 1) of this study was developed based on TAM, DOI and UTAUT models with some adjustments to the UAE. The model will be used to examine the effects of the 11 independent variables on the use of e-Government services.

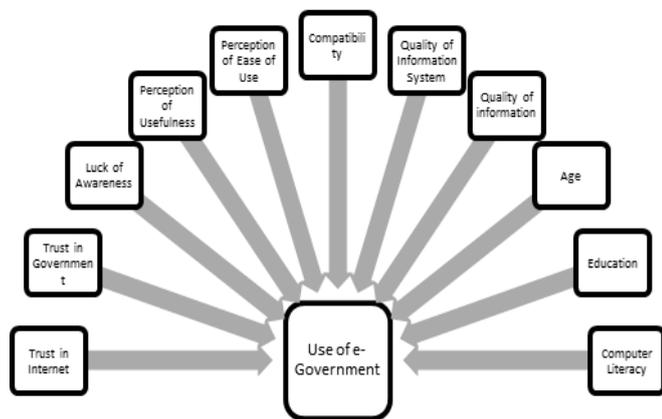


Figure 1 The proposed model of barriers

IV. RESEARCH METHODOLOGY

A. Research Method

The quantitative, correlational nature research method used to examine the association between the known dependent and independent variables [13]. However, the qualitative method is used by the researcher who seeks to discover the unknown variables [13]. Therefore, quantitative, correlational method is used in this research because the dependent and independent variables are known, but the existence of relations between them needs to be identified. This research method is used to check the relationship between the dependent variable citizens' use of e-Government services and the eleven mentioned independent variables. Correlational is used by the researchers to relate two or more variables to test if they have an effect on each other [14]. This relation can be determined through testing the eleven relational hypotheses. Survey has been used as a mean to gather data. Creswell showed that survey is an efficient and cost effective mean to simplify the collection of quantifiable data and to come up with general results for large population. Pearson's correlation coefficient r is used to determine the correlation between independent variable 'citizens' use of e-Government and the eleven independent variables.

B. Research Design

As mentioned above, the main goal of this research was to answer the following question: What are the barriers to e-Government adoption as perceived by the citizens at the municipal sector of in Abu Dhabi?

A survey (see Appendix A) was conducted to look at the problem of why citizens don't use the e-Government services of the municipal government in Abu Dhabi.

A survey was used because it is the efficient and cost effective method to find about a certain population reaction toward a certain variables. Basha and Harter in [15] state that "a population is any set of persons or objects that possesses at least one common characteristic."

The first set of the questionnaire designed to capture demographic information such as age, education, and computer usage. The second set designed to obtain information on citizens' behavioral intentions toward Abu Dhabi e-Government such as acceptance, awareness, trust, usefulness, ease of use and quality of Abu Dhabi e-Government. The questionnaire was developed in Arabic, and then being translated into English to target non-Arabic speakers that uses the services provided by municipalities.

The resulted quantifiable data of the survey (i.e., citizens' answers to the questionnaire) then used to test the hypothesis in order to see the relation between the dependent variable citizens' use of e-Government services and the eleven mentioned independent variables. The independent variables which have an effect on the citizens' use of e-Government services will be identified as barriers. Therefore, this will help the government to highlight and address these issues and take them into account when designing e-Government strategy.

C. Research Question and Hypotheses

The research question is what are the barriers to e-Government adoption perceived by the citizens at the municipal sector of in Abu Dhabi?

To answer this research question, 11 hypotheses were tested. The dependent variable was the use of e-Government services. The independent variables:

- Lack of awareness
- Trust in internet, and website security
- Trust in municipal organizations
- Perception of usefulness
- Age
- Information literacy
- Computer literacy
- Perceptions of compatibility
- Citizens' perception of ease
- The quality of information system
- The quality of information
-

The following hypotheses tested the effects of the independent variables on the use of e-Government services:

H1: Lack of awareness affects citizens use of Abu Dhabi e-Government municipal services.

H2: Trust in internet, and website security affect citizens use of Abu Dhabi e-Government municipal services.

H3: Trust in municipal organizations affect citizens use of Abu Dhabi e-Government municipal services.

H4: Perception of usefulness affects citizens use of Abu Dhabi e-Government municipal services.

H5: Citizens' age affects their use of Abu Dhabi e-Government municipal services.

H6: Citizens' education affects their use of Abu Dhabi e-Government municipal services.

H7: Citizens' computer literacy affect their use of Abu Dhabi e-Government municipal services.

H8: Citizens' perceptions of compatibility affect their use of Abu Dhabi e-Government municipal services.

H9: Citizens' perception of ease of use affects their use of Abu Dhabi e-Government municipal services.

H10: The quality of e- Government information system affects citizens' use of Abu Dhabi e-Government municipal services.

H11: The quality of information in the e-Government portal affects citizens' use of Abu Dhabi e-Government municipal services.

V. DATA ANALYSIS

A. Data Analysis procedures

For the statistical analysis of the data, the SPSS program was used. The data analysis has covered measures such as mean, median and standard deviation and percentage for variables' weigh. The eleven hypotheses were tested using Pearson's correlation coefficient.

Of the 400 questionnaires, 73 surveys were excluded due to missing information for being incomplete or not readable. The 5-point Likert scale was applied in questions which express the participants' opinion where 1—Strongly disagree, 2—disagree, 3—neutral, 4—agree and 5—strongly agree.

B. Descriptive Statistics

Of the citizens interviewed, 56% said that they know that the Abu Dhabi government has a website for municipal services. The age of the 64% of participants ranged from 20 - 40 years and only 36% of the participant are above 40 years. The education levels ranged from high school and undergraduate of 95% of the participants. 32% participants say that they use computer for less than 12 hours a week and 51% said they use computer between 12-24 hours a week. N equal to 327.

TABLE I. COUNT AND PERCENTAGE FOR SELECTIVE QUESTIONS

	n	%
know that Abu Dhabi government offer electronic services through the web		
Yes	183	56%
No	144	44%
Have you visited Abu Dhabi e-Government municipalities' websites?		
Yes	190	(58%)
No	137	(42%)
Age (years)		
20-30	75	23%
31-40	134	41%
41-50	95	29%
51-60	23	7%
Education		
High School	144	44%
Undergraduate	167	51%
Graduate	16	5%
How many times did you use computer per week		
Less than 12 h	105	32%
12-24 h	167	51%
More than 24 h	55	17%

Table1 displays some characteristics for the eight summated scale scores. The mean of those eight scores is 2.8. Alpha range is between 0.65 and 0.84. This suggested that all scales had acceptable levels of internal reliability

C. Hypothesis testing

The Pearson's correlation coefficient is a measure which tells about the direction (positive or negative) of relation

between variables [13]. The value of r can range anywhere between -1 and 1. The higher the value of r tells that there is a strong relation between the two variables. The positive r indicates that first variable increases and the second variable increases too. However, negative r means that the first variable increases and the second variable decreases and vice versa. Low correlation indicates that the independent variable has low probability of affecting the dependent variable [14]. If the value of r is zero, it indicates that a relation between the independent and the dependent value does not exist[14]. However, if the value of r is 1 or -1, it means that the two variables are perfectly correlated [14]. SPSS used to calculate the correlation coefficient. Below is the formula used to calculate r. Where X is the independent variable and Y is the dependent variable [16].

$$r = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{n}}{\sqrt{\left(\sum X^2 - \frac{(\sum X)^2}{n}\right) \left(\sum Y^2 - \frac{(\sum Y)^2}{n}\right)}}$$

H1 predicted that lack of awareness affects citizens' use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r=0.61) which provided support to retain H1.

H2 predicted that Trust in internet, and website security affect citizens use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was not statistically significant (r = 0.09) which provided support to reject H2.

H3 predicted that Trust in municipal organizations affect citizens use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r = 0.35) which provided support to retain H3.

H4 predicted that Perception of usefulness affects citizens' use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r = 0.22) which provided support to retain H4.

H5 predicted that Citizens' age affects their use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was not statistically significant (r = 0.05) which provided support to reject H5.

H6 predicted that Citizens' education affects their use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was not statistically significant (r = 0.0234) which provided support to reject H6.

H7 predicted Citizens' computer literacy affect their use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was not statistically significant (r = 0.012) which provided support to reject H7.

H8 predicted that Citizens' perceptions of compatibility affect their use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was not statistically significant (r = 0.065) which provided support to reject H8.

H9 predicted that Citizens' perception of ease of use affects their use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r = 0.43) which provided support to retain H9.

H10 predicted that the quality of e- Government information system affects citizens' use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r = 0.32) which provided support to retain H10.

H11 predicted that the quality of information in the e-Government portal affects citizens' use of Abu Dhabi e-Government municipal services. This hypothesis was tested using a Pearson correlation. The correlation was statistically significant (r = 0.27) which provided support to retain H11.

TABLE II. HYPOTHESES TESTING

No.	Hypothesis	Statistic	Result
H1	Lack of awareness affects citizens use of Abu Dhabi e-Government municipal services.	r= 0.61	Retained
H2	Trust in internet, and website security affect citizens use of Abu Dhabi e-Government municipal services.	r= 0.09	Rejected
H3	Trust in municipal organizations affect citizens use of Abu Dhabi e-Government municipal services.	r= 0.35	Retained
H4	Perception of usefulness affects citizens use of Abu Dhabi e-Government municipal services.	r= 0.22	Retained
H5	Citizens' age affects their use of Abu Dhabi e-Government municipal services.	r= 0.05	Rejected
H6	Citizens' education affects their use of Abu Dhabi e-Government municipal services.	r= 0.0234	Rejected
H7	Citizens' computer literacy affect their use of Abu Dhabi e-Government municipal services.	r= 0.012	Rejected
H8	Citizens' perceptions of compatibility affect their use of Abu Dhabi e-Government municipal services.	r= 0.065	Rejected
H9	Citizens' perception of ease of use affects their use of Abu Dhabi e-Government municipal services.	r= 0.43	Retained
H10	The quality of e- Government information system affects citizens' use of Abu Dhabi e-	r= 0.32	Retained

	Government municipal services.		
H11	The quality of information in the e-Government portal affects citizens' use of Abu Dhabi e-Government municipal services.	r= 0.27	Retained

VI. CONCLUSION AND RECOMMENDATION

In this section the result and findings will be concluded and interpreted. The population that has been surveyed 400 citizens who came physically to one of the three municipalities' customer services offices to request services. Among the sample population, 51% of the participants reported that they are using computer between 12 and 24 hours per week and 44% were not aware of the existence of e-Government services provided by the municipalities.

Referring to the table II (shown below) six of the hypotheses were retained, and five were rejected. According to these findings only the awareness of the existence of e-Government services variable has an effect on the citizens' intention to use e-Government services of those persons who made face-to-face request at the customers' service offices. However, the rest of demographic variables were found that they didn't have an effect on the citizens' intention to use e-Government. As it has been expected, Citizens' age, education and computer literacy have no effect on citizens' intention to use e-Government municipal services in Abu Dhabi. This result contradicts some of the literature review emphasized into the importance of the digital divide and knowledge in using computers and internet as barriers to the use of e-Government services [10, 17]. In the case of UAE it makes sense since the education as reported by The Global Information Technology Report 2010–2011 is 90% and most of the population knows how to use computer and internet. These results might also indicate that the influence of demographic variables over citizens' intention to use e-Government services differs from country to country and open a research issue that can be investigated more.

In this research, trust in the Internet, and perceptions of compatibility were found not to have an effect on the citizens' intention to use e-Government services. This can be justified because population in UAE gets used to use the Internet for online banking and online shopping. On the other hand, trust in government, perceptions of usefulness, perceptions of ease of use, quality of e- Government information system, and the quality of information in the e-Government portal were found to have an effect the citizens' intention to use e-Government services. In the literature, the barriers to the use of e-Government services from the citizen's perspective range from perceptions of ease of use, usefulness and trust in the government's institutions.

Szeremeta & Kerby in [18] identify citizens' perception of the difficulty of using e-Government services compared to the value they would receive from using these services is one of the main barriers to e-Government usage. Some of the citizens in the survey stated that the municipal electronic systems were not easy to use and required a lot of effort to learn how to use them. Moreover, they required the citizens to repeat doing

some steps for each service request such attaching a copy of the passport or family book which waste citizens time and effort.

The participants in the survey see that Abu Dhabi e-Government is not useful for them. This can be justified because the top ranked used services are not available as electronic services such as issuing a land certificate, ownership certificate and issuing a site plan.

In brief, the overall findings of this research show that citizens find e-Government services attractive and are willing to use them, and trust in the Internet. However, they don't trust in government agencies that they will process their requests as when they are physically in the municipality. They don't find e-services usefulness, and they don't think that the electronic services are easy to use. Moreover the participants don't trust the quality of e- Government information system and quality of information in the e-Government portal.

Therefore, it is recommended that the government agencies should work on enhancing citizens' trust in them, increasing e-service usefulness, increasing usability of their e-Government applications, enhancing the quality of e- Government information system and quality of information in the e-Government portal. The government should also market the usefulness of the e-Government so that citizens use these online services.

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APPENDIX A

Appendixes

Appendix A: Survey about Abu Dhabi e-Government Municipal services

Part I: Demographic information

Please select the suitable answer:

1. Age (years)

- 20-30
- 31-40
- 41-50
- 51-60

2. Education

- High School
- Undergraduate
- Graduate

3. How many times did you use computer per week

- Less than 12 h
- 12-24 h
- More than 24 h

4. Do you know that Abu Dhabi government offer electronic services through the web?

- Yes
- No

5- Have you visited Abu Dhabi e-Government municipalities' websites?

- Yes
- No

Part 2: User intention toward e-Government.

Please select the number that best describe your opinion.

(1—Strongly disagree, 2—disagree, 3—neutral, 4—agree and 5—strongly agree)

Users acceptance of e-Government

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | 1 | 2 | 3 | 4 | 5 |
| 1. I think e-Government offers helpful services | <input type="checkbox"/> |
| 2. I think e-Government offers useful information | <input type="checkbox"/> |
| 3. I think e-Government doesn't cost me money | <input type="checkbox"/> |
| 4. I think e-Government adds value to my lifestyle | <input type="checkbox"/> |

Users trust of internet

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 5. I think using the internet in the e-Government is a good idea. | <input type="checkbox"/> |
| 6. I feel comfortable to use the internet to finish my government applications | <input type="checkbox"/> |
| 7. I feel safe to pay online my government applications fees | <input type="checkbox"/> |

Users trust of e-Government

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 8. I feel confident to use the e-Government system to finish my applications | <input type="checkbox"/> |
| 9. I trust the e-Government to carry out online payment transactions faithfully. | <input type="checkbox"/> |
| 10. I trust the e-Government to keep my best interests in mind. | <input type="checkbox"/> |
| 11. I recommend others to use e-Government and information technology services. | <input type="checkbox"/> |

Perceived usefulness of e-Government

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 12. I think using the e-Government improve my performance in my workplace and my life. | <input type="checkbox"/> |
| 13. I think using the e-Government saves me time. | <input type="checkbox"/> |
| 14. I think the e-Government is useful in my life | <input type="checkbox"/> |

Perceived ease of use of e-Government

- | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 15. It is easy for me to use the e-Government. | <input type="checkbox"/> |
| 16. I could get the e-Government to do what I want it to do very easily | <input type="checkbox"/> |
| 17. I find the e-Government portal flexible to interact with. | <input type="checkbox"/> |
| 18. I find the e-Government portal clear and easy to use. | <input type="checkbox"/> |

The quality of system in e-Government

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 19. I find e-Government services very secure to do my transactions online. | <input type="checkbox"/> |
| 20. I find the e-Government provides full time access (24/7). | <input type="checkbox"/> |
| 21. I find my information very easily in the e-Government portal. | <input type="checkbox"/> |
| 22. I could use the e-Government services at anytime, anywhere. | <input type="checkbox"/> |

The information quality in the e-Government system

- | | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 23. The information in the e-Government is accurate | <input type="checkbox"/> |
| 24. The information in the e-Government is complete | <input type="checkbox"/> |
| 25. The information in the e-Government is precise | <input type="checkbox"/> |
| 26. The information in the e-Government is relevant | <input type="checkbox"/> |

e-Government Compatibility

- | | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 27. I think using the web fits well with my way to gather information about my payments to the government. | <input type="checkbox"/> |
| 28. I think using the web fits well with my way to do my applications with the government. | <input type="checkbox"/> |
| 29. I think using the e-Government fits well with my lifestyle. | <input type="checkbox"/> |