

An Enhanced Model for e-Government (A Comparative Study between Jordanian and Iraqi Citizens)

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Abstract

The application of the e-Government systems differs from one country to another, based on the government strategies and limitations. Also, the e-Government system itself differs from one country to another, based on the system analysis, features, and complexity. In this research, a new proposed conceptual model of e-government system is developed. Also, all possible technical factors that affect the citizens' behavior and decisions towards relying on the e-Governments system in two different countries which are Jordan and Iraq are studied and investigated. Also, it has studied improving Iraq e-Government system based on comparison between Iraq and Jordan e-Government system and benefiting from Jordanian experiment, which is considered the elder in its uses and application. The methodology was based on two sources; the primary source is based on the questionnaires were distributed on samples of 500 Iraqi citizens, where 450 questionnaires were collected. Besides that, the same questionnaire was distributed to a similar sample in Jordan for the purpose of comparison objectives to determine the gap between the two nations. The results of questionnaires showed that most of Iraqi citizens are not satisfied with the current Iraqi e-Government system in terms of several aspects, such as: user interface, security, services, and overall performance of the system. Also, the results showed that most Jordanians are satisfied with Jordan e-Government system. Based on previous indications, Iraqi e-Government system framework was developed to meet the Iraqi requirements. The new framework was introduced, database management system was also indicated besides to represent strategies of system in dealing with official documents instead of traditional methods.

Moreover, the secondary source (desk research) which discussed many previous e-Government frameworks, which were introduced and analyzed to indicate its weakness as well as benefiting from them in the enhancement process for the new framework of Iraq e-Government. The new Iraq e-Government framework will be suitable for all applications because it has enhanced all issues that the Iraqi citizens faced and experienced.

Keywords

Framework, e-Government, conceptual model, GSM, SMS.

1. Introduction

It is by now the era of rapid technological, political, cultural and social influx. Electronic technologies and businesses that were unknown a few years ago are now widespread. Recently, the explosive growth of telecommunication technologies and software solutions especially the "Information Infrastructure platforms" or the "Information Superhighway" including Internet and intranet has enabled people to communicate and exchange information on an unprecedented scale. The telecommunication infrastructure has also widened the horizon of communications without increasing costs in locating users, knowing their needs and requirements, and supplying them with products or services. Governments now recognized that the information systems are an appropriate platform to deal and communicate wider with citizens.

Instead of concentrating governments in localities, with the help of the e-Government system can expand and render services to those citizens virtually where it would have been difficult in the past considering the distances, time, costs, and more efficiencies and effectiveness [1]. According to [2] the computers and the Internet have changed significantly the way in which the citizens can have access to public services. The informational society is more and more present in all the activities of the public sector, including through complex applications of electronic governance. This research will study all

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possible factors that have affect on the citizens' behavior and decisions towards relying on the e-Governments system for implementing their public and official services, which also will investigate and measure the impacts of the current implemented e-Government systems on the citizen's behavior, such as the interfaces, ease of use, functions, telecommunication tools, help menu, etc. Moreover, the application of the e-Government systems differs from country to another, based on the government strategies and limitations. Also, the e-Government system itself differs from country to another, based on the system analysis, features, and complexity.

Furthermore, the research will be arguing the application of the e-Government systems, taking into considerations the main aspects, rules, and limitations as a comparative technique in order to find out all differences that influence applying e-Government systems in two different countries, which have a key role of analyzing the citizen's behavior as well.

Overview of e-Government

Electronic government (e-Gov) systems can be fundamental instruments of citizens' access to knowledge [3]. According to the surveyed literature there are so many definitions of e-Government. One popular and comprehensive definition by David McClure states it as "the government use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and services to citizens, business partners, employees, other agencies and entities". Another definition by Texas's Electronic Government Strategic Plan, (Department of Information Resources, State of Texas, and January 2001) [4] states it as Government activities that take place over electronic communications among all levels of government, citizens, and the business community, including: acquiring and providing products and services; placing and receiving orders; providing and obtaining information; and completing financial transactions. Texas. Moreover, [5] introduces the terms "Continuous optimization", "participation", "internal and external relationships" in his definition. His definition indicates implicitly some aspects as reliability and quality of service delivery by optimization. Participation and, internal and external relationships terms indicate the mutual relationship internally between the departments of the government and externally between the government and citizens.

Features of e-Government

Areas where e-Government can make a significant difference are wide. Researchers in [3] listed some examples such as: certificates applications, tax payment, governmental portals, tele-consulting and tele-consultation, e-procurement, e-forms, online opinion polls, online job vacancies, online statistical data, traffic information, e-forums etc. there are different ways to categorize these services. Authors categorized services according to the content they provide. These categories are mentioned in [6] as:

- Information acquisition: provides access to information about government directives and decisions;
- Service access: allows online transactions of government products and services;
- Participation: enables citizens to participate in the decision making process.

Other authors used different criteria to define different service categories [7] and [3].

An effective e-Government system is more responsive to citizens' needs, as information are accessed easily and quickly, consequently lowers the reliance on paperwork or reduces its time span and decreases the administrative costs.. It also provides transparency and reduces the scope of corruption and the subjective decisions in providing services, where Transparency could increase investors' confidence [8].

E-Government in Iraq

The political unrest in 2011 in the Middle East is a testament to how far citizens may go to demand accountability from their governments. An example of a developing country is Iraq, where the majority of citizen services are provided by government offices with the same office hours as educational institutions and private companies. If for any citizens to finish their paper work, they have to be excused from their work and sometimes they have to spend a very long time in queues waiting to finish their work. In case of women, this is much harder as the social regulations are very strict and she needs her legal guardian or a hired agent with her to enter a government office. E-Government promises to eliminate diminished productivity, frustration, and wasted effort, time, and money. With several clicks, citizens can perform their tasks whenever and wherever they want at their convenience 24 hours a day, 365 days a year. Therefore, in this unique Iraqi culture, e-Government is a necessity, not a luxury [9]. Furthermore, given that most of the Iraqi population has little experience with the Internet, it is more important to design

citizen-centered web sites that promote higher acceptance and create more positive attitudes toward e-Government.

As it was mentioned by [10] there are still many problems and challenges related to the e-Government success such as: Iraqi citizen's fear from personal data loses and weak confidence of citizens with e-Government, so Iraq e-Government has not achieved its objectives. To outline, People aspect has issues of political and civil instability, stakeholder discontinuity and lack of skilled personnel. In Process aspect, the lack of a political process that suits the e-Government project goals such as centralization of ministries and other government offices. Political decision has effect the e-Government process such as, there are many of manual G2C services have not been converted to e-Government because it need political decision. On the other hand, the infrastructure of Iraq still needs to stabilize with electricity service and internet technology as major components. Besides that, Iraq suffers from poor in resources management and corruption which slows the project progress and the dissatisfaction of the project staff.

E-Government in Jordan

Jordanian Government launched the Electronic Government initiative in 2006, which generally known as e-Government, to reinvent it to lead the country into the Information Age. As far as Jordan concerned, the implementation of e-Government was initiated with the introduction of the Multimedia Super Corridor (MSC) in 2006. e-Government seeks to improve the expediency, openness, and quality of interactions with the public and businesses at large. Concurrently, it will enhance information flow and processes within the government, enhance the speed and quality of policy development, and enhance coordination and enforcement. This would allow the government to be more responsive to the needs of its citizens. There are many models that have described and suggested about four to six stages of e-Government evolution such as the UN model [11], and Two-Dimensional model of e-Government. All of them show the development of e-Government as an evolutionary process. According to [11] e-Government implementation in Jordan based on international best practices, from the western countries such as the UK and US that have been implementing e-Government project successfully. Jordan developed a model called the e-Government Maturity Model which is based on the UK e-

Government Maturity Model. The e-Government Maturity Model shows the development of e-Government in Jordan as an evolutionary process. In this research the Jordanian initiative for the Information Age is introduced. The main applications are: Electronic Government, Multipurpose Card, Smart School, Tele health and Telemedicine, Research and Development Clusters, Electronic Business, and Techno-preneur Development.

2. Research Plan based-Methodology

The Research Design

Two source of collecting data was used in this descriptive research:

1. Primary Source (Questionnaire), which was designed for studying Iraqi and Jordanian satisfaction towards the e-Government system.
2. Secondary Source (Previous Models Frameworks), which aimed to study the previous e-Government models and finding the weaknesses in them.

Population of this study

The population of this study consisted of the citizens of Jordan and Iraq countries. Where, the study concluded the citizens from all the categories (different educational background, ages geographical region and from both gender) to have comprehensive vision into the real citizen's behavior. A multi-stage random sampling technique was adopted to conduct the study.

Sample for this study

A proportionate random sampling procedure ultimately utilized to locate the respondents for enumerations, representative random sample was chosen for both Jordanian and Iraq citizen 500 from Iraq citizens and 500 from Jordanian citizens; to assure a response of 450 for both samples.

Instrumentation

The research instruments that were used for this study are mainly:

1. Questionnaire of recognizing the satisfaction of Iraqi and Jordanian citizens towards to the e-Government system.
2. Desk Research

E-Government system feature satisfaction questionnaire

The questionnaire sought to find the level of satisfaction of citizens towards the e-Government system and the scale was configured on 5-points scale as follow:

Table 1: 5-Points likert scale

Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5	4	3	2	1

Desk research

Jordan and Iraqi e-Government systems are compared based on their website features. The researcher compared the two systems according to their website interface, security, services and overall performance.

Validity and reliability

The instruments were validated using experts' judgments. The reliability was measured by the consistency of the survey data through Cranach's Alpha. The reliability for the entire questionnaire was .82 for Iraqi sample, and .85 for Jordanian sample, both values are over the acceptable level .60 according to [12].

Administrative of the instruments

The instruments were administered on Iraqi and Jordanian citizens by the researcher in each aspect of the research. The citizens were given a reasonable time limit to complete the instruments and the completed instruments were collected from respondents on the spot.

3. Research findings

The research findings divided into two parts:

Questionnaire findings

Through questionnaire results, a comparison between Jordan and Iraq case in terms of satisfaction on e-Government system's models features take place. Such issue could open the doors towards more upgrading and developments in the e-Government system in Iraq, as having a comparative study approach will facilitate the diagnosis of weakness areas, limitations, imperfections processes, and make it easy to catch up modern and contemporary systems, thus; this step will be addressed afterward, to find out the extent of potentials improvements within e-Government system in Iraq, with regard to Jordanian e-Government system as ideal case, so that could be expanded to include more strengths and successful functioning.

Table 2: Frequency percentage of awareness level in e-Government system for both citizens

Variable	N (%) (Number of Targeted Participants)
Awareness in system	
Jordanian	450 (100%)
Iraq	450 (100%)
Awareness in system benefits	
Jordanian	296 (65.8)
Iraq	175 (38.9)

it's clear that for the first statement, all Jordanian and Iraqi sample ever heard and know about the existence of such system as they all try it, but the important difference was regarding the awareness of the system contents and benefits, where there is observable difference to Jordanian side, it's worth to mention that this low level of awareness regarding Iraqi citizen lead to low usage, which will be confirmed through the coming table results.

Table 3: Frequency percentage usage of e-Government system for both citizens

Variable	N (%) (Number of Targeted Participants)
Ever Use	
Jordanian	450 (100%)
Iraq	450 (100%)
Frequency Usage	
Jordanian	296 (65.8)
Iraq	175 (38.9)

Regarding the above table that represents the usage active of Jordanian and Iraqi citizen for e-Government, it's clear that for the first statement all Jordanian and Iraqi sample ever used e-Government system, and this is a logic result as all the respondent who answer the questionnaires used e-Government system, but the important difference was regarding the frequent usage where there is observable difference between the percentage usage of Jordanian and Iraqi citizen.

Table 4: General Mean for Iraqi and Jordanian case

e-Government Feature	Iraqi		Jordan	
	Mean	Std	Mean	Std
User Interface	1.68	0.921	3.83	0.356
Security and Privacy	1.504	0.860	3.14	0.739
Provided Services	2.35	0.953	3.85	0.248
Overall Performance	2.41	1.236	3.72	0.365

Based on the questionnaire results, it is important to configure an enhanced model for e-Government system. As shown in table 4, the results show that Iraqi citizens in general are not satisfied with Iraqi e-Government system in many aspects such as: security, interface, services besides to electronic payment, moreover the awareness level, and usage is low, where on the other side Jordanian sample result show different results, the Jordanian citizen in general were satisfied with e-Government system, the only issue that was still need improvement is the security and that considered logic result as this issue still form problem all over the world. Figure 1 and figure 2 show the results statistical chart.

Desk research findings

Researcher noted that Jordan e-Government system website is more advanced than Iraqi e-Government according to the previous sides. Also, it is noted that Jordan e-Government has dynamic contents on its website. On the other side, Iraqi e-Government system has static contents and needs more updates on

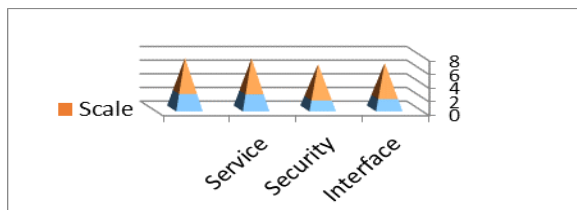


Figure 1: Iraqi average mean of satisfaction regarding four features



Figure 2: Jordanian average mean of satisfaction regarding four features

pages and functions. Therefore, this research is focusing on the enhancement of e-Government system by concentrating on the gap between Iraqi and Jordan system and benefit from Jordanian system as ideal for Iraqi system, and then develops Models, Database, Interface strategy and Services. All these elements affect user behaviour towards e-Government system of Iraq. So, it is necessary to highlight these elements and how it can be improved.

4. Enhanced e-Government model, based-conceptual model

The model of [13] did not indicate the types of services that represented to the users or the citizens. However, this algorithm also did not indicate the payment operations that should be cleared in the e-Government system. So, the researcher has to enhance this algorithm by customizing specific features associated with governmental services. These services must be distributed according to the citizens' requirements [13]. Also, the enhancement will be operated on system manager by increasing system manager roles to support governmental services.

In model of [14], the system is not fast enough because the procedure is not effective enough where distribution of elements is not suitable according to their roles. Firstly, it is not suitable to put this "government agency manager" actor in the system model because the discussion is about electronic system while this actor is not really in this electronic life-cycle. However, "Citizen Handler" may slow down the system because the system must be smart enough to check the reliability of the citizen profile data and if these data are real or not through special queries based on artificial intelligence (AI) which makes the system fast in a good level of performance. Moreover, other part of services (such as: e-payment, official documents, requesting official services... etc) must be isolated from others while these services appear in the main page through hyperlinks, where each link opens in a distributed page. However, citizen cannot use the services unless he/she have registered in the system database. Additionally, this model does not indicate the financial services when citizen have to make payment operation online. On the other side, the model of [15], is more comprehensive system than the first model, where citizen may use GSM (Global System of Mobile) module (mobile system), PC (Personal Computer) and may use voice call. But it is not suitable to consider office visiting in e-Government system; as shown in the model "user" can visit employee in the office which is called routine procedure. So, it is weak point in the model and it must be avoided. On the other hand, the model does not indicate the registration procedure where the user can enter the profile data and this entity must be connected directly with system database. Moreover, this model does not provide the database entity which is considered as important element in the e-Government system. Also,

the model does not indicate system administrator that have all permissions on the system. As well as the administrator element may be more than one person, it may be also a group of developers who are responsible for developing the system along the time. There is another risk point, the model does not explain that there is response from the system to the user or feedback process that assure user about the requested services and the system approved the processes. The following model in figure (3) was built in the way to avoid the weaknesses in the previous models. The e-Government model includes all the system elements and actors that control the overall system procedure. In addition, administrator has all permissions in the system where he/she controls on

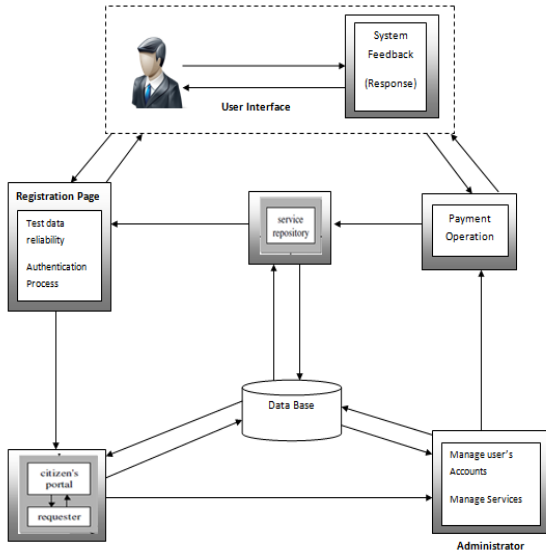


Figure 3: The New Proposed Conceptual Model of e-Government System

the available services of the system and also control with accounts of the citizens. Additionally, most of processes in the system must be connected directly with the system DB. The algorithm of the proposed conceptual model has a complexity of $O(n^2)$:

$$\begin{aligned} T(n) &= n + n + n(n+1) + n(n+1) + n(n+1) \\ &= 2n + n^2 + n + n^2 + n + n^2 + n \\ &= 5n^2 + 3n^2 \quad (1) \end{aligned}$$

The complexity is $O(n^2)$, where T the time is consumed and n is the number of a stage. However, our proposed conceptual model will support "system feedback process" which does not exist in the previous models as well as it will sort all weaknesses that have not taken into considerations in the previous researches. These processes are automatic

service that indicates to the user if the requested processes have been executed or not. Moreover, there are many ways that the system can send this feedback either by internet connection (user PC receives the feedback) or by mobile messages "SMS" as well.

Official document procedure

Figure (4) indicates how the citizen author submits official document to the system. However, figure (4) shows the registered citizen (user) opens the form of the official document and fills the form with the required data according to the nature of the document subject. After that, user actor requests the required service of the document and system replies with feedback process to indicate the result of the service. After submitting the document and executing the services the payment page will be appeared to executing the payment operation by the user. Then the official document will be stored in the database which will be checked by civil servant and replying to the user about his official document.

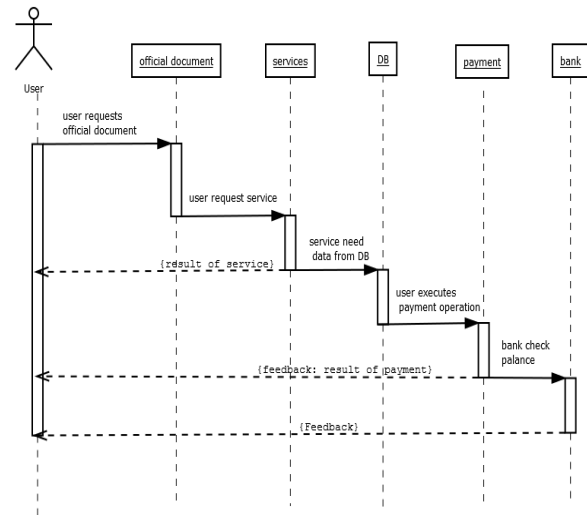


Figure 4: Scenario of Performing Official Document

Feedback

The proposed system responds to the users by sending acknowledgment for them about any operation. This acknowledgment indicates the result of operation if the operation was successful or it failed. However, this process depends on the speed of the system responding which depends on the type of programming language and also the way of managing system. Feedback process can be achieved by sending message to the user either by e-mail or by mobile network (SMS). Moreover, feedback process must be fast to avoid user to wait long time.

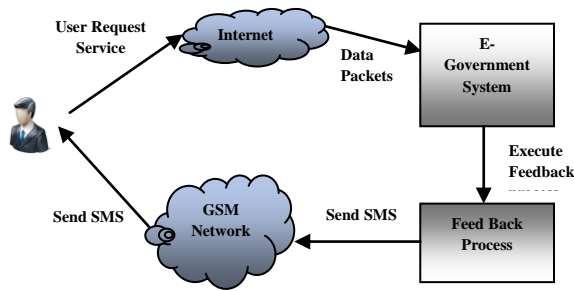


Figure 5: Feedback process using GSM

As shown in figure (5), the system can send feedback to the user using SMS via GSM network. When user creates account in the system, one of the entries is phone number. The website then sends acknowledgment via sending SMS according to the user phone number. This process is considered as secrete method because another type network in the system which is GSM is used. However, this process may be better than sending e-mail to the user because not all Iraqi people have an e-mail and not all can handle with e-mails. But most of Iraqi people have mobile phone which gives percent higher than who have e-mail accounts. The speed of the feedback process depends on the networks that used in the system. So, in this method using GSM network is considered correct choice wherein speed of data transmission over GSM reaches to (9.6 Kb/s) or 1800 MHz (when transmitting message long 160 characters [16]. If feedback process is done by sending e-mail from, the website to the user's e-mail account, then this method requires user to have an e-mail account. However, this process is considered faster than previous method (feedback process) because the same network (Internet) is used. As shown in the following figure (6), after user finishes his governmental transaction, then the system sends acknowledgment to the user's e-mail account to assure that the operation was successful. The speed of this process depends on the speed of Internet. But this method still little secure than above method because it uses the same network in requesting and feedback processes.

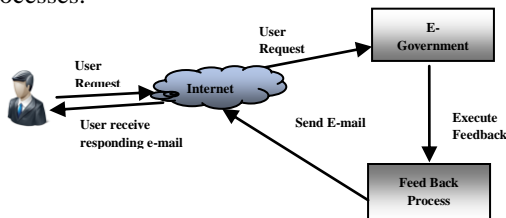


Figure 6: Feedback process using Internet

Time Processing Analysis

Analysis of the system consists analysing each part and each stage in the system procedure. Stages of executing any official document by the system includes saving the data into system database. However, stages of the official document process include many processes and executing many algorithms that takes time from overall executing time. The overall executing time is calculated by sum each stage time and also noting the delay time that may be caused by problems or delay in executing wrong service in inappropriate stage. Also, large number of users at the same time may reduce the efficiency of the website particularly when there is huge number users access the system database. The following equation shows indicates the overall time spent:

$$\text{executing time} = \sum_{i=0}^{\text{numberofstages}} (\text{stagetime})_i + \sum_{i=0}^{\text{numberofstages}} (\text{delaytime})_i \quad (2)$$

The civil servant opens the official document and checks the reliability of the entered data in order to reply to the user about the result of the document. This process takes time according to the policy of dealing with these cases based on the government policy in official procedures. The time that token in this stage is internet access time and time of revision the document by the civil servant.

5. Conclusion

The e-Government system is considered as electronic governmental system which allows the citizen to execute the official procedure for any official document using the web based platform only. In this research, it can be concluded that all official documents can be conducted and processed at web based e-Government system. However, new e-Governmental model that preserved all e-Government factors is represented and the suggested model supports good interface strategy for the website of system which makes user satisfied. On the other hand, the suggested system represents strong security plan on the database using different methods in order to keep data from hacking or lost. The security also covers all pages on the website and increases the citizen confidence with e-Government system because it supports feedback processes for each operation on the system website.

E-Government systems affect the official employees and Iraqi citizens parallel. E-Government system

benefits citizens by allowing them to perform the official document in little time and without routine procedures. Also, the system affects the employees by reducing the official daily documents and reducing the wasted time in performing the official procedures. In general, e-Government systems reduce the wasted time in the official procedure time with low costs.

References

- [1] Imran, A. and Gregor, S. (2007), "A Comparative Analysis of Strategies for e-Government in Developing Countries", *Journal of Business Systems, Governance and Ethics (JBSGE)*, Vol. 2.
- [2] Vrabie, C., Öktem, M. K., (2012) "Local e-Government: A Comparative Study of Romania and Turkey", *NISPAcee Annual Conference*.
- [3] Hornung H., Cecilia M., Baranauskas C., (2007), "Interaction Design in eGov Systems: Challenges for a Developing Country", *Semenario Integrado de Software e Hardware*.
- [4] Department of Information Resources, (2001) "e-Government definitions", [Document], [accessed online: 3 March 2013], available at: <http://www.dir.state.tx.us/Search/Pages/ResultsByDocuments.aspx?k=e-government&s=Site%20Collection%20Documents>.
- [5] Fang, Z., (2002), "e-Government in Digital Era: Concept, Practice, and Development", *International Journal of the Computer, the Internet and Management*, Vol. 10, No.2, p 1-22.
- [6] Kaur, R., (2006), "Malaysian e-Government Implementation Framework", *Master Dissertation*, May 2006.
- [7] Lee, T., Wu, H., Lin, C., Wang, H., (2008) "Agricultural e-Government in China, Korea, Taiwan and the USA", *Electronic Government, an International Journal*, Inderscience.
- [8] Lee, S. M., Tan, X., and Trimi, S. (2005), "Current Practices of Leading e-Government Countries", *Communication ACM*, 48(10):99104, 2005.
- [9] Bellare, M., (2000) "public-key Encryption a Multi-User Setting: Security Proofs and improvements", [PDF]: Springer Berlin Hiedelberg.
- [10] AL-Dabbagh, M., (2011) "Electronic Government in Iraq: Challenges of development and implementation", *Swedish Business School, Örebro University*, (6 April 7, 2013).
- [11] Alkhaleefah M., Alkhawaldeh, M., Venkatraman, S., Alazab, M., (2010) "Towards Understanding and Improving e-Government Strategies in Jordan", *Jordan*, [online]: 5 April 6, 2013,

available at: <http://mamounalazab.com/wp-content/uploads/v66-281.pdf>.

- [12] Sekaran, U., (2003) "Research Methods for Business", [Book], Fourth edition, published by John Wiley.
- [13] Governo, M., Cidadania M., (2004) "Oficinas de Planejamento Estratégico RELATÓRIO CONSOLIDADO Comitês Técnicos", *Comitê Executivo do Governo Eletrônico*.
- [14] Meo, P., Quattrone, G., Ursino, D., (2008) "A decision support system for designing new services tailored to citizen profiles in a complex and distributed e-Government scenario", 89122 *Reggio Calabria, Italy*.
- [15] Dias, G., Rafael, A., (2007) "A simple model and a distributed architecture for realizing one-stop e-Government", *Journal of Science Direct*, [online]: 30 June 2013.
- [16] AbdWahab, M., Gopalakrishna, S., Johari, A., (2008) "Speed Trap Image Transfer through GSM Network", [pdf], *the World Congress on Engineering and Computer Science, USA*, [online]: 11 June 2013.



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