Journal of Theoretical and Applied Information Technology
20th June 2016. Vol.88. No.2

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

PRIORITIZING IMPLEMENTATION FACTORS OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEM (EDMS) USING TOPSIS METHOD: A CASE STUDY IN IRAQI GOVERNMENT ORGANIZATIONS

[1]HAIDER ABDULKADHIM, [2]MAHADI BAHARI, [3]HASLINA HASHIM,

[4]ARYATI BAKRI, [5]WAIDAH ISMAIL

[1,2,3,4] Faculty of Computing, Universiti Teknologi Malaysia, MALAYSIA

[5]Faculty of Science and Technology, Universiti Sains Islam Malaysia, MALAYSIA

E-mail; [1]alwanh24@gmail.com,[2]mahadi@utm.my,[3]haslinah@utm.my,
[4]aryati@utm.my, [5]waidah@usim.edu.my

ABSTRACT

Taking into consideration a complexity of EDMS implementation process which involves a combination of technological, organizational and users factors, this study explores how EDMS implementation factors can be ranked through these dimensions. This paper begins with an examination of the literature on EDMS implementation studies where a conceptual framework has been derived. The study then adopts the TOPSIS method as the analytical tool that tackles the issue in prioritizing the most desirable factors influencing EDMS implementation project. From the results, the top management support, budgetary, strategic planning, staff training, awareness, resistance to change, IT implementation team, ICT infrastructure, security and privacy/trust, and collaboration are the top-ten important factors for Iraqi government organizations to implement EDMS applications. This paper draws on the research results for implications of IT managerial practice, and then suggests some empirical tactics in order to enhance in managing the EDMS implementation process in government.

Keywords: *Electronic Document Management System (EDMS), EDMS Implementation, Implementation Process, TOPSIS*

1. INTRODUCTION

Previous studies have emphasized that the Electronic Document Management System (EDMS) is an important component in e-Government project implementation. For instance, the German government have successfully implemented EDMS by means towards a paperless office at the three levels administrative in the country [1]. In another example, the UK government have introduced organizational-wide EDMS to transform and integrate the many departmental working practices, environments and culture at the local authorities level. The key objectives of the UK's EDMS are to transform the local authorities by improving information flow, business processes, working arrangements and organizational efficiency [2].

As such, the deployment of EDMS has been heralded as the solution to a myriad of many government organizations. Proponents of EDMS claim that the implementation can improve work processes and forms publications, easier search of governmental records, access information in a faster and easier way [3,4,5]. Organization EDMS implementation also provides better security measures in government document processing procedures [6] and delivers accountability and transparency which are main requirements for effective corporate governance [7]. These benefits indicate that the implementation of EDMS is vital in e-Government projects, ensuring a better quality of keeping good records at different types of works in public organizations [8].

Despite the interest shown by many governments in implementing the EDMS, not many studies have been documented to show the significant role of implementation factors influencing its implementation process. Previous studies on EDMS have not shown what the most desirable factors are that influence IT implementers

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

(e.g., project managers, senior managers) in government organizations to allow them make decision for EDMS implementation. However they did highlight other areas, such as in establishing the concept of EDMS [9, 4, 10], deploying the EDMS [2] or showing the user acceptance of EDMS [11]. In addition, only a few studies provide a tool to prioritise the EDMS implementation factors. That is the objective of this study.

The aim of this paper is, therefore, to prioritise implementation factors that have been considered as the most desirable in influencing government organization in implementing EDMS application by using a formal method (a multicriteria decision making) for ranking. This will provide IT practitioners (e.g., project managers, senior managers) with a ranking point of view at obtaining the prioritizing factors (i.e., based from the EDMS implementation studies). The study uses the Iraqi government organizations in pursuing the case purposes. According to [17,18], there are many factors at play when it comes to Iraqi government case, factors such as lack of qualified software experts, technical restrictions and unwillingness of end-users to change their habits and work practice are the primary reasons that the initiative implementation of EDMS failed in the first place. Due to the fact that many stakeholders take part in this initiative and that they are so closely linked to one another, the chances that something may go wrong are high. Therefore, it does worth to study the desirable of EDMS implementation factors that focus on Iraqi government, to a great extent, to determine whether the implementation will be successful. In doing this, the TOPSIS method is used to determine the weight evaluation of criteria and prioritise the EDMS implementation factors. This study looks forward to provide some empirical tactics to enhance management performance for the EDMS implementation projects.

The reminder of this paper is structured as follows: the following section presents the knowledge body of EDMS implementation studies in government and a solution of TOPSIS method in ranking the most desirable factors of EDMS implementation. The third section discusses the methodology used in the study. This is followed with the fourth section that describes the research design, which includes the research framework, research procedure, and empirical results. The fifth section presents some managerial implications and ways of improving efficiency. The last section, the sixth section, concludes study's limitations and provides some possible future research directions.

2. RELATED STUDIES

This section will mainly review the EDMS implementation studies in e-Government projects. The main outcome of this review shows that there are enormous numbers of successful factors influencing EDMS implementation project. This outcome guides the study to the selection of TOPSIS method as a solution in priorizing the most desitrable factors for EDMS implementation project.

2.1 EDMS Implementation Studies

Electronic document management (EDM) can be defined as *"the application of technology to save paper, speed up communication, and increase the productivity of business processes"* [12]. Research on EDMS has become important since the 1990s due to many governments who is much more invested to implement various of e-Government services [12, 13]. According to [11], EDMS has been the object of researchers' study in the US and Taiwan in recent years. In fact, other scholars in Europe, Asia and Australiasia have also given a lot of attention on the EDMS topic [e.g., 14, 15].

In the case of the Iraqi government, EDMS have also been implemented at various agencies since 2003 through the e-Government project (i.e., with the help from Italian government). Despite the trainings and support given by the Italian government, the e-Government implementation project in Iraq turned out to be a complete failure [16]. Many studies in the country have agreed that the rate of acceptance among local government organizations in adopting the electronic management component was not convincing. For instance, [17] reported that EDMS implementation in the Nineveh province has ended at a preparatory stage only. The lack of IT staff expertise and the absence of regulations are considered challenges that hindered the EDMS implementation at this province. Another study, [18] also claimed that the electronic environment is often complicated due to the absence of proper rules and guidelines in the General Directorate of Nineveh Governorate of Education.

Meanwhile, [19] has proposed three divisions on the prior research on EDMS implementation studies: (1) adoption model; (2) the system's application; and (3) the benefits of EDMS implementation. The first and second division, the adoption model and the system's application, discusses the acceptance of a new EDMS in government organizations and addresses the needs

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

of EDMS application to be integrated, respectively. While in the third division, the benefits, the literature discusses the benefits of implementing EDMS application.

There are enormous factors have also been found from the existing studies on EDMS implementation in government. Common factors on IS implementation such as top management support [15, 20, 21], implementation planning [6, 15], IT implementation team [6, 15] and staff training 22, 23,24] were also connected for EDMS implementation studies. In addition, [8] has identified 14 common factors from the existing studies that one should be considered when implementing EDMS in government. The 14 factors were then mapped to the organizational, technological and use-related dimensions [25] as shown in **Table 1**.

Table-1. Common factors of EDMS implementation, adapted from [8].

Division	Factors	Criteria No.
Organizational	Top management support	F1
	Budgetary	F2
	Strategic planning	F3
	Legislation environment	F4
	Collaboration	F5
Technological	ICT infrastructure	F6
	IT implementation team	F7
	Security and privacy/trust	F8
	User requirements	F9
	Data quality	F10
	System integration	F11
User-related	Awareness	F12
	Staff training	F13
	Resistance to change	F14

Although the factors underlying EDMS implementation in Iraqi government are believed to be similar to Table 1, one cannot simply accept this belief prior to conducting an empirical study. Furthermore, [8] only list the factors and do not indicate the priority of the factors in implementing EDMS applications. Therefore, to rank those factors, this study has given attention to the TOPSIS method. This method is especially applicable when one cannot prefer any ranking method to others [26].

2.2 TOPSIS Method

Multi criteria decision making (MCDM) is one of the popular methods in today's decision science as it assists decision makers in determining the most desirable alternative(s) from a given set of attributes [27]. MCDM has been widely applied to various areas such as in economic, engineering, management and information systems.

One of the popular methods in MCDM is Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), which was first developed by Hwang and Yoon [28]. The TOPSIS procedure consists of the following steps:

(1) The basic principle (first step) is that building a decision matrix,

$$X = \lfloor x_{ij} \rfloor \quad (1)$$

Where the i^{th} alternative ($i = 1,\ldots,n$) is evaluated with respect to j^{th} criteria ($j = 1,\ldots,m$).

(2) The second step is to normalize the above matrix, which can be done by using:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{n}(x_{ij})^2}} \qquad j = 1,..,m \quad (2)$$

(3) The third step is to compute the weights of each comparison criterion based on the calculation of entropy value. Let e_j represents the entropy of the j[th] criterion.

$$e_j = -\frac{1}{\ln n}\sum_{i=1}^{n} r_{ij} \ln r_{ij} \qquad j = 1,..,m \quad (3)$$

while $\frac{1}{\ln n}$ is a constant term and it keeps the value of e_j among 0 and 1. Later this entropy value needs to be converted into the weight as follows:

$$w_j = \frac{1-e_j}{\sum_{j=1}^{m}(1-e_j)} \qquad j = 1,..,m \quad (4)$$

(4) The fourth step is to determine the positive ideal solution (V^+) and negative ideal solution (V^-) of each benefit criterion and vice versa for cost criteria, as follows:

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

$$V^+ = (\max_i(r_{i1}), \max_i(r_{i2}), \ldots, \max_i(r_{in})) \quad i = 1, \ldots, n$$
$$= (v_1^+, v_2^+, \ldots, v_n^+) \qquad (5-1)$$

$$V^- = (\min_i(r_{i1}), \min_i(r_{i2}), \ldots, \min_i(r_{in})) \quad i = 1, \ldots, n$$
$$= (v_1^-, v_2^-, \ldots, v_n^-) \qquad (5-2)$$

With benefit and cost attributes, the discrimination between criteria that the decision maker desires to maximize and minimize respectively.

(5) The fifth step is to compute the distance for the criterion between ideal solutions and negative ideal solutions by using the following equations:

For distance i from positive ideal, use

$$d_i^+ = \sqrt{\sum_{j=1}^{m} w_j (v_j^+ - r_{ij})^2} \qquad (6-1)$$

and for distance i from negative ideal, use

$$d_i^- = \sqrt{\sum_{j=1}^{m} w_j (r_{ij} - v_j^-)^2} \qquad (6-2)$$

The d_i^+ represents the distance from the i^{th} criterion compared to positive ideal solution, and d_i^- is the distance from the i^{th} criterion compared to negative ideal solution.

(6) The final step, sixth, is to compute the relative maintenance critically index C_i of the ideal solution by using the following formula:

$$C_i = \frac{d_i^-}{(d_i^+ + d_i^-)} \qquad (7)$$

The C_i represents the performance index of i^{th} criteria, whereas d_i^+ and d_i^- represents the distance as mentioned earlier.

3. RESEARCH DESIGN

Figure 1 shows a research design in conducting this study. The goal of this study requires a questionnaire to be distributed as a means of data collection method. In doing this, surveys were sent to respondents at different government organizations in Iraq by electronic mail. All questions (except for demographic purpose) were exactly based on the EDMS implementation factors that had been identified earlier in the literature (see Table 1). The structured questions is also used in this study where the ranked index: 1 (not important), 2 (slightly important), 3 (moderately important), 4 (important) and 5 (very important) has been given for knowing the practitioners' knowledge about the EDMS implementation.

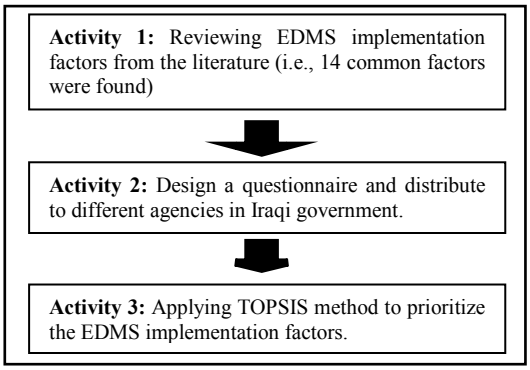

Figure-1. Research design of conducting the study

After three months waiting for the feedback, this study has received about 317 respondents. Subsequently the study has filtered to omit 74 respondents (e.g., they were not completing the questionnaire questions) and this makes about 243 respondents eligible to feed the study's data (see Table 2).

Table-2. Demographic profile of all respondents

Variable	Category	Frequency	%
Gender	Male	193	79
	Female	50	21
Position	Senior manager	2	1
	IT project manager	18	7
	Database administrator	5	2
	Record managers	24	10
	Others	194	80
Experience	<5 years	34	14
	5 – 9 years	107	44
	10 – 15 years	74	30
	16 – 20 years	26	11
	>20 years	2	1

Table 2 provides the respondents' demographic profile, where about 79% of them were male, and 21% were female. 10 % of respondents came from Record Managers, 7% came from I.T Project Manager, and 2 % from Database Administrator. The remaining 1% came from very small from Top Management/ Senior Manager. Very large number, about 80% came from other positions, related to management unit or under IT

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

group (i.e., a Technical unit such as a programmer, Server Administrator, Computer Engineering, System developer). The mean years' experience of the respondents was about nine years.

4. CASE ANALYSIS IN IRAQI GOVERNMENT

This section explains step-by-step on how a case analysis in Iraqi government organizations has been carried out through the use of TOPSIS method, as follows:

First step: The EDMS implementation factors (see Table 1) were set as the weight of criterion while the respondents answered were set as the rating of alternative. **Table 3** shows a respondents' responses which has been catagorized based on their importance. For instance, for criteria F3 (i.e, strategic planning), 8 respondents marked as "not important", 4 respondents marked as "slightly important", 10 respondents marked as "medium important", 36 respondents marked as as "important" whilst 53 respondents marked as "very important".

Table-3.The matrix of R_{ij} in TOPSIS method

Criteria No	Alternative				
	NI (1)	SI (2)	MI (3)	I (4)	VI (5)
F1	1	1	6	37	66
F2	2	7	12	37	53
F3	8	4	10	36	53
F4	11	21	23	25	31
F5	3	7	17	59	25
F6	1	1	19	47	43
F7	2	3	16	57	33
F8	1	2	19	45	44
F9	1	18	27	42	23
F10	1	3	27	36	44
F11	1	14	29	29	38
F12	9	14	10	23	55
F13	3	7	14	34	53
F14	6	11	16	24	54

Second step: In the second step of the TOPSIS method, the scores assigned to each factors are normalized based on equations (2). **Table 4** shows the results of this step.

Table-4.The normalized matrix

Criteria No	Alternative				
	1	2	3	4	5
F1	0.0547	0.0261	0.5129	9.2752	25.5384
F2	0.2189	1.2802	2.0515	9.2752	16.4686
F3	3.5019	0.4180	1.4247	8.7806	16.4686
F4	6.6208	11.5218	7.5364	4.2345	5.6342
F5	0.4925	1.2802	4.1172	23.5844	3.6643
F6	0.0547	0.0261	5.1430	14.9664	10.8403
F7	0.2189	0.2351	3.6471	22.0126	6.3846
F8	0.0547	0.1045	5.1430	13.7198	11.3504
F9	0.0547	8.4650	10.3857	11.9514	3.1014
F10	0.0547	0.2351	10.3857	8.7806	11.3504
F11	0.0547	5.1208	11.9813	5.6979	8.4659
F12	4.4321	5.1208	1.4247	3.5841	17.7350
F13	0.4925	1.2802	2.7923	7.8321	16.4686
F14	1.9698	3.1613	3.6471	3.9025	17.0960

Third step: In the third step, the weights of each factors were computed based on the calculation of entropy value. In doing this, firstly, the entropy values were computed from equations (3) which produced:

e_1	e_2	e_3	e_4	e_5
-8.5339	-25.2079	-49.5277	-140.2687	-170.3634

Next, the weights were computed from equations (4), producing:

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

W1	W2	W3	W4	W5
0.0239	0.0657	0.1267	0.3541	0.4296

The matrix of W_j can then be defined as:

W_1	W_2	W_3	W_4	W_5
0.0239	**0**	**0**	**0**	**0**
0	0.0657	**0**	**0**	**0**
0	**0**	0.1267	**0**	**0**
0	**0**	**0**	0.3541	**0**
0	**0**	**0**	**0**	0.4296

Fourth step: The fourth step is to determine the positive ideal solution (V^+) and negative ideal solution (V^-) of each evaluation criterion. The values were obtained using equations (5-1) and (5-2), producing:

Max v1	Max v2	Max v3	Max v4	Max v5
2.892	28.973	223.440	1232.776	1871.285

Min v1	Min v2	Min v3	Min v4	Min v5
0.023	0.065	4.560	187.342	227.252

***Fifth step*:** The fifth step is to compute the distance for the criterion between positive ideal solutions and negative ideal solutions. **Table 5** and **Table 6** show the results of this step based on (6-1) and (6-2) equations.

Table-5. Positive ideal solutions

di+	Value
d1+	779.8627
d2+	1021.6987
d3+	1041.9397
d4+	1781.7277
d5+	1613.8531
d6+	1181.1986
d7+	1419.0705
d8+	1174.3369
d9+	1752.8993
d10+	1302.9004
d11+	1566.1901
d12+	1210.1866
d13+	1076.9113
d14+	1215.7357

Table-6. Negative ideal solutions

di-	Value
d1-	1670.7303
d2-	1023.7358
d3-	1016.4615
d4-	200.8483
d5-	1046.7423
d6-	822.9383
d7-	993.2491
d8-	804.8096
d9-	489.5406
d10-	668.4487
d11-	421.0421
d12-	1072.3604
d13-	1004.5243
d14-	1025.9707

***Sixth step*:** This step has been conducted to compute the final ranking of factors. **Table 7** shows the final ranking of EDMS implementation factors based on equation (7).

Table-7. The final ranking of EDMS Implementation factors

Ci	Value	Ranking
C1 1+	0.6818	1
C1 2+	0.5005	2
C1 3+	0.4938	3
C1 4+	0.1013	14
C1 5+	0.3934	10
C1 6+	0.4106	8
C1 7+	0.4117	7
C1 8+	0.4066	9
C1 9+	0.2183	12
C1 10+	0.3391	11
C1 11+	0.2119	13
C1 12+	0.4698	5
C1 13+	0.4826	4
C1 14+	0.4577	6

According to the raking, the most top ten implementation factors of EDMS are top management support, budgetary, strategic planning, staff training, awareness, resistance to change, IT implementtaion team, ICT infrastructure, security and privacy/trust, and collaboration. The less prioritize factors then followed by data quality, user requirements, system integration and legislation environment.

5. DISCUSSIONS

Based on the TOPSIS method, the top-ten factors influencing Iraqi government organizations in implementing EDMS systems are the top management support, budgetary, strategic planning,

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

staff training, awareness, resistance to change, IT implementation team, ICT infrastructure, security and privacy/trust, and collaboration. Whilst other factors such as data quality, user requirements, system integration and legislative were specified as minor success factors. Table 8 shows these top-ten rank of EDMS implementation factors in Iraqi government organizations.

Table-8. The top-ten rank of EDMS implementation factors in Iraqi government organizations

EDMS Factors	Rank	Dimension
Top management support	1	Organizational
Budgetary	2	
Strategic planning	3	
Staff training	4	User-related
Awareness	5	
Resistance to change	6	
IT implementation team	7	Technological
ICT infrastructure	8	
Security and privacy/trust	9	
Collaboration	10	Organizational

Within the *organizational factors* dimension, there are four factors in total, out of which respondents' responses that top management support, budgetary and strategic planning were the highest top three factors influencing EDMS implementation process. It can be argued here that in EDMS implementation in Iraqi government, organizational factors still prominent for the success of implementation process like other IS implementation (e.g., DSS, ERP and CiRM) [e.g., 30, 31]. In the *user-related factors* dimension, the respondents' responses towards the important for all the three factors (i.e., staff training, awareness and resistance to change) as suggested by [8]. This findings also similar as found from other studies on EDMS implementation literature [e.g., 10,20,22,25].

In the last dimension, the *technological factors*, there are only three important factors out of six factors in which results have been reported from the EDMS implementation literature [e.g., 8,10,15,16,22,25]. It appears that the emphasis of literature concerning the IT group pertains to the technical part of EDMS with little guidance on how they could deal with social issues. The findings of this study suggest that the success of EDMS implementation is more dependent upon numerous organisational factors. This provides clear indication that *organizational factors* are indeed highly significant in ensuring successful EDMS implementation, particularly in the context of the public sector. In addition, the important factor of top management support reaffirms those studies concerning the importance of organizational factors in a similar sector [15,19].

Therefore, failure to consider these subjective elements in the EDMS implementation process, that is, in understanding IT group's involvement along with the major factors, may lead to the failure of the EDMS implementation. Instead, the three dimensions (organizational, user-related and technological) are merged tightly in influencing Iraqi government organizations to implement EDMS systems. Therefore, the Iraqi government must notice to the ranking of these factors along together with their dimension.

6. CONCLUSIONS

This study has sought to prioritize of implementation factors that have been considered as the most desirable one in influencing government organization in implementing EDMS through the use case analysis in Iraqi government organizations. The ranking of the factors in Iraqi government uptake from the IT staff experience and perspective. The finding has provided empirical data for the confirmation of the success factor in our initial framework.

However, the empirical findings from the identified factors which have been based on organizational, user related and technological dimensions in this paper cannot be generalised. Nonetheless, the study gives other IT groups in different settings to relate their experienes to what has been reported here.

In the future work, the study would like to assess the general relevance of these top-ten factors in each phase of the EDMS implementation life cycle, specifically in the Iraqi government organizations. This definitely need to explore in-depth knowledge of IT groups that involed in the projects of EDMS implementation in different government organizations.

REFRENCES:

[1] R. Kunis, G. Rünger and M. Schwind, "A New Model for Document Management in EGovernment Systems based on Hierarchical Process Folders", *The Procedings of the 7th European Conference on E-Government (Eceg 2007), Academic Conferences Limited*, 2007, pp. 229.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[2] S. Jones, " eGovernment document management system: A case analysis of risk and reward", *International Journal of Information Management*, Vol. 32, 2012, pp. 396-400.

[3] J., E. Ejlertsson, Gustafsson, H. Hagman, M. Hellgren, and H. Ullman, "Electronic management systems-efficient tools and inefficient implementation processes". *Paper presented at the Technology Management Conference (ITMC), 2011 IEEE International.*

[4] G. Johnston and D. Bowen, "The benefits of electronic records management systems: a general review of published and some unpublished cases". *Records Management Journal*, Vol.15, No. 3, 2005, pp.131-140.

[5] H. S. Abdulwahida, A. A. Mutaliba, S. A. M. Yusofa and S. J. Alib, "Designing and Implementation Iraqi E-Government front office Online System", *Journal of Knowledge Management, Ecandonomics And InformationTechnology*, Vol.4, No.1, 2014.

[6] A. A. Tough, and Y. Z. Mohammad, "Electronic records management in the Malaysian public sector: the existence of policy". *Records Management Journal*, Vol. 19, No. 3, 2009, pp. 231-244.

[7] A. Willis, "Corporate Governance and Management of Information and Records", *Records Management Journal*, Vol. 15, No.2, 2005, pp. 86-97.

[8] H. Abdulkadhim, M. Bahari, A. Bakri and W. Ismail, "A research framework of electronic document management system (EDMS) implementation process in government", *Journal of Theoretical and Applied Information Technology*, Vol. 81, No. 3, 2015, pp. 420-431.

[9] T. Groenewald, "Electronic document management: a human resource management case study", *SA Journal of Human Resource Management*, Vol. 2, No. 1, 2004, pp. 54-62.

[10] B. E. Asogwa, "The Challenge of Managing Electronic Records in Developing Countries: Implications for Records Managers in Sub-Saharan Africa*", Records Management Journal,* Vol. 22, No.3, 2012, pp. 198-211.

[11] S. Hung, K. Tang, C. Chang, and C. Ke, "An example of electronic document management system". *Government Information Quarterly*, Vol. 26, No.2, 2009, pp. 387-397.

[12] R. H. Sprague, "Electronic document management – challenges and opportunities for information systems managers", *MIS Quarterly*, Vol. 19, No.1, 1995, pp. 29-49.

[13] D. M. West, "Global e-government full report", Centre for Public Policy, Brown University, Retreieved from http://www.insidepolitics.org/egov07int.pdf, 2015.

[14] J. McLeod, and C. Hare, "Development of RMJ: A mirror of the development of the profession and discipline of records management". *Records Management Journal,* Vol. 20, No. 1, 2010, pp. 9-40.

[15] L. T. Nguyen, "Towards a Theoretical Framework for Effective Implementation of Electronic Document and Records Management Systems (EDRMS) within the Australian Public Sector", *PhD Thesis*, School of Computer and Information Science, University Of South Australia, 2011.

[16] M. Al-Dabbagh, "Electronic Government in Iraq: Challenges of Development and Implementation", *Swedish Business School, Örebro University*, 2013.

[17] M, Shehab, "The capability of electronic management application as the opinions of secondary school headmasters in Nineveh state center schools", *Journal of Education and Science,* Vol. 20, No.10, 2013.

[18] A. Hasan, H. Ali, "The Availability of Some Requirements of Strategic Readiness for Transformation toward E-Management: A Case Study in the General Directorate of Nineveh Governorate of Education", *Rafidain Development Journal,* Vol. 104, No. 33, 2011, pp 53-75.

[19] H. Abdulkadhim, M. Bahari, A. Bakri and H. Hashim, "Exploring the common factors influencing electronic document management system (EDMS) implementation in government", *ARPN Journal of Engineering and Applied Sciences*, Vol. 10, No. 23, 2015.

[20] R. A. Yaacob and S. R. Mapong. "Electronic Records Management in Malaysia: A case study in one government agency". Asia Pacific Conference Library & Information Education & Practice. 2011

[21] L. T. Nguyen, P. Swatman and B. Fraunholz. Australian public sector adoption of EDRMS: a preliminary survey. In ACIS2008: Creating the future: transforming research into practice: *Proceedings of the 19th Australasian Conference on Information Systems*. 2008, pp. 700-709.

[22] T. Leikums. "Managing human factors in implementing electronic document system in the public sector, *Challenges of the Knowledge Society*, 2012. pp. 2046-2053.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[23] M. Grange and M. Scott, "An Investigation into the Affect of Poor End User Involvement on Electronic Document Management System (EDMS) Implementation", Retreieved from http://nrl.northumbria.ac.uk/6962/3/M_Grange EDMS.pdf. 2015

[24] L. Downing, "Implementind EDMS: Putting People First", *Information Management Journal*, Vol. 40, No. 4, 2006.

[25] J. McLeod, S. Childs and R. Hardiman, "Accelerating positive change in electronic records management: headline findings from a major research project", *Archives and Manuscripts*, Vol. 39, No. 2, 2011, pp. 66-94.

[26] F. Hosseinzadeh, R.Fallahnejad and N.Navidi, "Ranking efficient units in DEA by using TOPSIS method", *Applied Mathematical Sciences*, Vol. 5, No. 17, 2011, pp. 805-815.

[27] Z. Yue. "An extended TOPSIS for determining weights of decision makers with interval numbers". *Knowledge-Based Systems,* Vol. 24, No.1, 2011, pp. 146-153.

[28] C.L. Hwang and K. Yoon, "Multiple attribute decision making". In: *Lecture Notes in Economics and Mathematical Systems*. Springer-Verlag, Berlin, 1981

[29] S. Opricovic and G-T. Tzeng, "Compromise solution by MCDM methods: a comparative analysis of VIKOR and TOPSIS", *European Journal of Operational Research*, Vol. 156, No. 2, 2004, pp. 445-455.

[30] S. Nasirin and M. Bahari, "A system developer's perspective of managing CiRM implementation in local governments: lessons from Malaysia', *PACIS 2012 Proceedings*, 2012, Paper 114.

[31] M. Bahari and S. Nasirin, "Organizational determinants influencing Citizen Relationship management (CiRM) implementation in the British local governments", *AMCIS 2010 Proceedings*, 2010, Paper 33.