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EXPLORING THE COMMON FACTORS INFLUENCING ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS (EDMS) IMPLEMENTATION IN GOVERNMENT

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ABSTRACT

Many governments today have implemented Electronic Document Management Systems (EDMS). The employment of EDMS systems has increased the operational (e.g. document storage and retrieval, auditing, workflow facilities, searching and publishing) effectiveness of governments on daily basis. However, not many studies had been undertaken into the implementation process of EDMS in the government context. Given the complexity of the process of EDMS implementation which involves a combination of technological, organizational and users factors, it is now of vital importance to look from the literature to see if there are common factors that may influence the EDMS implementation projects in government. Based on the content analysis approach, this paper investigates the development of EDMS implementation studies. This study shows that there are fourteen (14) common factors found from the existing studies related to the EDMS implementation process. The identification of these factors, particularly, helpful for further research on EDMS related issues, since this study demonstrates that there are enormous amounts of factors influencing EDMS implementation available in the literature with non division of factors (i.e., technological, organizational and users factors) more dominant to one another.

Keywords: electronic document management systems, implementation, EDMS implementation, implementation process, content analysis.

INTRODUCTION

Electronic Document Management Systems (EDMS) has been identified globally as one of the key development strategies in e-Government and as such, has influenced many governments to implement it. For instance, the German government has successfully implemented a system called Document Management and Electronic Archiving (DOMEA) to attain a paperless office at all the three levels administrative in the country [1]. In another example, the government of the Republic of Korea has implemented EDMS through integrated portal websites that has enabled its citizens access government services at all levels from the comforts of their homes and offices [2]. From these examples, it is obvious that many governments have had a common objective of ensuring a better quality of keeping good records in their organizations through EDMS implementation project.

Nevertheless, despite the interest shown by many developed countries to implement EDMS, not many success stories have been reported from developing countries on EDMS implementation. For instance, research on the management of financial documents and records in Namibia exposed weaknesses in the systems' capability to manage financial records [3] in the country. [4] proposes that EDMS in Africa generally have either collapsed or are in a state of disarray. In another example, the Iraqi government has also commenced the implementation of e-Government (in 2003) which includes the EDMS application with the help of the Italian government due to the fact that the government of Italian wanted to provide the equipment and techniques necessary to establish ICTs in the country [5]. However, despite the

training and support offered by the Italian government, the e-Government implementation project in Iraq ended up to a complete failure [6]. As a result, success of EDMS implementation has become a great challenge to the Iraqi government.

[1] suggested that to overcome failure on IS development; one should understand the issues underlying on its implementation first. Therefore, to ensure the full potential of EDMS process implementation to be implemented in any governments from developing countries, there is a need for an understanding of the EDMS implementation projects. This understanding is necessary to help governments' EDMS implementers realize what must be carried out to achieve success and avoid failure. This may include the identification of a set of factors (a combination of technical, organizational, and user solutions) that may influence the process of EDMS implementation. Thus, this study aims to explore related factors that are significant to the process of implementing EDMS systems.

This paper is structured as follows: the following section presents the reviews of EDMS implementation research. The third section then continues with the discussion of the content analysis method used. It is then followed by a discussion of the common factors that influence the EDMS implementation. The final section discusses the main issues that need to be considered for further study on EDMS implementation process.

SIMULATIONS SET UP

This section attempts to review the prior research on EDMS implementation studies. There are three

divisions of studies that have been given attention by many researchers in the field: (1) adoption model; (2) the system's applications; and (3) the benefit of EDMS implementation.

The first division is the adoption model which describes the acceptance of a new product or innovation, according to the demographic and psychological characteristics of defined adopter groups. For instance, [7] established an adoption model that demonstrated a strong correlation between EDMS efficiency with four areas, team efficiency, decision making, technology acceptance and team adaptiveness are significant for the case in Swedish government. Research shows that team effectiveness is dependent on organization environment. The team needs to understand legislative and structure in order to be capable of accessing relevant records and to upload records to correct places. A lack of understanding of organization circumstances can result in misunderstandings and make EDMS systems hard to utilize in an efficient way [8]. Another factor for a successful implementation of an EDMS is that the senior manager does not look upon the staff as a similar group they are paying attention to difference regarding aspects as IT skills and attitudes towards the system [7]. In another study, [9] has proposed adoption model for Australian government public sector aiming to implement centralized electronic records management manner at different level in the country. The study had clarified the ultimate goal of EDMS implementation occurred when widespread employee adopted the new system. Nine success factors have been identified in this adoption model, namely top management support, clear business vision, enhance recordkeeping awareness, well-designed file plan, good project management, great implementation team, adequate training, and system performance are important for the EDMS implementation.

EDMS implementation studies also discusses the system's application as most of them proposed that the EDMS need to be integrated [10-16].These studies have confirmed that the   EDMS   needs integration. For example, a study by [15] recommended that all potential services should be obligatory in construction industry sector through integrating Web-based DMS. They argue that exchangeable data will have simplicity and will remove certain obstacles and barriers in implementing collaboration systems, especially the training on the system coding. Also, their emphasis is placed on taking serious steps from managers to ensure the benefits of adopting these systems and also assuring that they are carefully communicated to their employees as well as other project team members. Likewise, [13] explained that Malaysia Generic Office Environment-Electronic Government Document Management System has been developed based on the web and client server It has three key components: first, Document Management – storage, controlling, searching and accessing the documents; second, Messaging/Communication – easy to receive and send the documents through fax or email; Third,

Collaboration- improving disseminating and sharing of information through job identification and meeting.

There are also cited implementation studies on the issues of benefits from EDMS deployment. EDMS supports the government to improve work process and forms publication, an easier search of governmental records, cost saving from low use of materials (e.g., paper) [17]. Furthermore, government organizations can access information in a faster and easier way, higher employee turnover or productivity. They improve citizen satisfaction and relations management as well [4]. EDMS implementation also provides better security measures in government document processing procedures [18] and delivers accountability and transparency that are main requirements for effective corporate governance [19].

The discussion above from the EDMS implementation studies raises the question of "What are the common factors influencing implementation of EDMS processes?" The exploration of factors affecting implementation of EDMS in government is discussed in next section with the help of having a perspective of literature. Before proceeding with this exploration, the following section will describe the method used in detail.

RESEARCH METHODOLOGY

The goal of this study requires a complete review of the factors influencing the EDMS projects implementation in government research that have been relevant to practice. The articles have been analyzed with the help of content analysis method. The method is a procedure for the categorization behavioral or verbal data for the purpose of cataloging, recapitulation and tabulation [20]. Thus, the main keywords used during the searching were restricted to: (1) Electronic document management and (2) EDMS implementation. While to determine the relevant literature on EDMS implementation, a search was performed using the Google Scholar, Elsevier and Emerald databases. The Google Scholar database encloses most peer-reviewed online journals of America and Europe's largest scholarly publishers plus scholarly books and other non-peer reviewed journals Moreover, Elsevier and Emerald databases the owner of Scopus are also the main international publishers of scientific journals.

In doing so, peer-reviewed articles that most related to the research theme were considered for this study. Titles, abstracts and conclusions of conference papers were also reviewed. In total, 632 articles were retrieved at this non-filtering stage: 371 from Google Scholars, 132 from Emerald and 129 from Elsevier databases. All 632 articles were then filtered according to the employment of exclusion and inclusion criteria, as shown in Table-1.

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Table-1. Criteria used in the study.

Criteria	Inclusion criteria	Exclusion criteria
Language	English	Non-English
Publication Year	Publication date 2000 and 2015	Published pre-2000.
Report type	Full-text articles	Published abstracts
Nature of studies	Behavioral studies - conceptual model and hypothesis of EDMS	Technical studies on EDMS
Duplication	N.A	Publication is a duplicate

From these 632 articles, 457 articles were then omitted at the title filtering stages: 307 at title-filtering, 112 at abstract-filtering, and 38 at full-text filtering. After having read the text exhaustively, 175 articles were only chosen for this study. Later, these 175 articles were scanned for the intended of implementation factors; the process then yielded 37 factors. In order to reduce these initial factors, the study has applied that any duplicate factors (i.e., based on their meaning) need to be merged. In other word, any factors that share the same meaning and definition as others are treated as the similar one. At the end of this process, the study has identified fourteen (14) implementation factors that may effect on EDMS implementation (see **Table-2**). It is believed that the factors found are the most common ones that should be considered when implementing EDMS in government.

Table-2. Summary of factors extraction.

No	Final Factors	Initial Factors
1.	Top management support	CEOs support and commitment, CEOs desire for implementation growth, Management support, Familiarity with administration
2.	Strategic planning	Effective change management strategy, Clear agenda, Policies and guidelines, Project schedule and plans
3.	Collaboration	Communication, Sharing of expertise, Knowledge sharing
4.	IT implementation team	Implementation staff, Knowledge team, IT staff skills, Knowledge of IT
5.	User requirements	User satisfaction, System performance, Usability, Simple to use, System friendliness
6.	Data quality	Good system design, Product standards, Utility of full system functionality
7.	System integration	Integration with current/legacy technologies, Interfacing with other systems
8.	Awareness	Organizational culture, Culture or record staff awareness, Record keeping awareness and practice
9.	Staff training	Training program, Training and education, Training and support for users
10.	Resistance to change	Users' attitudes and opinions towards IT, User's resistance
11.	Budget/Cost	Budget/Cost
12.	Legislation environment	Legislation environment
13.	ICT infrastructure	ICT infrastructure
14	Security and Privacy/Trust	Security and Privacy/Trust

The common factors of EDMS implementation

EDMS implementation is a complex issue that involves organizational, technological and user-related divisions [21]. Organizational factors are in regards with processes, procedures and rules. For instance, [22] clarified that the implementation of EDMS can be negatively influenced by the lack of basic legislative regulations on the state level and unadjusted rules and regulations inside the organization. Meanwhile, Technical factors related with software design, security, data quality and so forth. For instance, [23] stated that poor electronic records management could lead to costly legal liabilities while [24] mentioned that maintaining the security of digital records over time is a big challenge to many governments. In addition, [25] emphasis that electronic record must be secure from unauthorized and undocumented alteration or misuse. The Users factors, on the other hands, related with training, resistance to change, culture, barriers, and drivers. For instance, [26] claimed for any enterprise as the users' resistance is the major hurdle for the implementation of wide information systems like EDMS uptake. Furthermore, sufficient continuous training and support ensure the staff awareness in maintaining their commitment to the system that is the ultimate goal of such project [22]

Table-3 shows all the three division with their common factors in the EDMS implementation studies. Factors such as top management support, budget/cost, strategic planning, legislation environment and collaboration were considered as organizational factors whilst ICT infrastructure, IT implementation team, security and privacy/ trust, user requirements, data quality and system integration were considered as technical factors. In addition, awareness, staff training and resistance to change were considered as user factors. The explanation of each factor is described as follows:

1) **Top management support:** The complexity and scale of the changes that will take place during the EDMS implementation made it evident that involvement of a leadership is highly required. Thus, effective leadership is one of the major factors

contributing to success EDMS [9, 21, 27]. [9] mentioned that the role of the leadership becomes the most important issue especially in the first phase of EDMS implementation. Strong leadership must control and support the projects at all levels of EDMS from the bottom to the highest level. Leadership should help in reducing change resistance [28,29,30,31,32]

2) **Budget/cost:** A sufficient budgetary foundation is considered an evidently important factor to EDMS implementation [33,24,35]. EDMS project needs to spend large amounts of money to establish and train staff [21]. Although early phase of EDMS do not require a huge amount of money; however, this is not true for the latter phases. According to [24] EDMS program was successfully implemented because over 80 percent of the budget was dedicated to staff training alone. However, the funds for every EDMS implementation must be discussed and agreed by the political and technical stakeholders before the implementation stages start.

3) **Strategic planning**: A clear business plan and vision assists organizations identify their goals and justify their implementation of EDMS [9, 18]. Without clear information strategy and a series of related (funded) plans an EDMS project should not be attempted [36, 37]. In other words, without a solid understanding of the organisation's strategy and how the EDM system aligns with that strategy [28], there will be no commitment from management, the board or from the staff.

4) **Legislation environment:** The public sector is a specific branch that has a large number of legislative documents both on the state and individual institution level. Document management can be regulated by record keeping rules, job responsibilities description, document circulation regulations, etc. Such regulation make public sector very thorough and do not wish to change their habits [31]. Respectively, EDMS implementation can be negatively affected by the lack of legislation environment.

5) **Collaboration:** The cooperation between stakeholders is very important in every phase of the EDMS implementation. Organizational and Political stakeholders must collaborate with the IT staff in order to successfully implement the EDMS. Collaboration has been defined as the degree to which individuals in the group actively help and support one another [38]. An optimal implementation team must be a balanced combination of records creators, records managers and IT people [39,40] and should share with a member of the Board [39]. Records creators will provide data about end user requests from the system; while the IT unit personnel's knowledge provide a complement to more business

focused abilities of the records managers [41]. The internal project manager will play the part of Administrator for the smooth performance of the team [29].

6) **ICT infrastructure:** ICT infrastructure is a major requirement that serves as the backbone of EDMS, thus, it becomes an important factor [5,18]. This factor should composed of application server, data and content management tools, application development tools, operating systems and hardware [21].

7) **IT implementation team**: IT staff is a group who is in charge of establish/develop the e-Government project. Most defiantly a well-qualified team is at most importance when it comes to the implementation of EDMS; therefore technical expertise is considered as one of the main success factors that play an important role in the EDMS implementation [9,14,18].

8) **Security and privacy/trust:** Security and privacy issues are key concerns when implementing EDMS [25]. High security and authentication give confidence to employees to use the system. Trust also can positively affect the implementation of EDMS [18]. In fact, internal and external stakeholders are in favor of using electronic services if they feel their information is at high security. According to [24] securing organization information against unauthorized user is one of the significant factors in EDMS implementation. Privacy and security are the duty of the IT staff and must be accomplished at the post implementation phase.

9) **User requirements:** User requirement describes what the user expects the software to be able to do [42]. A well functional EDMS system can be one of the main causes for bringing user requirements[34, 25]. Thus, any organization needs to address its requirements and clear policy to meet their requirements [6, 21, 48].

Data quality: Data quality is an important factor in the success to any end-user developed information systems [21]. [43] Argue that within an institute, data quality is vital to transactional and operational processes and to the steadfastness of business analytics and business intelligence reporting. Data quality is influenced by the techniques used to enter and store. Data quality assurance is the process of verifying the effectiveness and reliability of data [35]. In general, high data quality is one of the major contributors that push forward any ICT implementation [41].

Table-3. Summary of the common factors for the EDMS implementation.

Division	Factors	Description	Authors
Organizational	Top Management Support	Top management support means to devote time to the EDMS project in proportion to its budget and potential, reviewing strategy, following up on the result.	[29]; [30]; [32]; [31]; [21]; [27]; [28]
	Budget/Cost	A budget means strategic plans of organizations, business units, events or activities in measurable terms for implementing EDMS	[33]; [34];[35]; [27]; [24]
	Strategic planning	Strategic planning means a planning process which is undertaken to make thoughtful decisions about an organization's future in order to guarantee its success from the EDMS project.	[36]; [37]; [9]; [18]; [28]; [4]
	Legislation environment	Legislation of EDMS includes document circulation regulations, recordkeeping rules, safety policy and job responsibilities and description	[18]; [31]; [28]; [14]
	Collaboration	Collaboration means the degree to which individuals in the group actively support and help one another throughout the EDMS project	[39];[40]; [28]
Technical	ICT infrastructure	ICT infrastructure offers a range of tools (e.g., hardware, software, networking) to support organizations in running proficiently where they are necessary to everyday mechanics of an organization and integral to effective service delivery of EDMS .	[21]; [18]; [5]
	IT implementation team	The best staff is allocated to EDMS project because of the necessity for multiple skills functional, technical and inter-personal areas.	[32];[18] ; [28]; [14]
	Security and Privacy/Trust	Digital records in EDMS project must be secured from unauthorized and undocumented alteration or misuse. This is because records produced and maintained in electronic form are continually at risk of inadvertent or intentional damages.	[18]; [25]; [24]
	User Requirements	User requirement is referred as specification, and validation of digital documents through the real needs of users that affected with the EDMS project.	[34]; [21]; [25];[42]; [6]
	Data quality	Data quality assurance is the process of verifying the reliability and effectiveness of data in the EDMS project.	[41]; [21];[35]
	System Integration	The integration must better communicate and inter-connect as coherent system and all systems parameters should interfere in order to guarantee compatibility and collective interoperability with the EDMS	[21]; [22]
User	Awareness	Awareness means an understanding created through the interaction of an agent and its environment (i.e., knowing what is going on) towards the EDMS project.	[45]; [9],[21]; [25] [27]; [24]
	Staff Training	It is important to provide training to staff of the organization to enhance their awareness in dealing with the digital record of EDMS in a positive manner.	[45] ; [34]; [9]; [25]; [14], [4]
	Resistance to Change	Resistance of the staff means unwillingness to change the accustomed ways of work (i.e., paper format document circulation) from the implementation of EDMS.	[47]; [21]; [14]

10) **System integration:** Today, the Integration is essential for any organization on the grounds that there are many separate systems which involve long time and high fund to matching information. The integrated systems must inter-communicate and inter-connect. In fact, systems integration is an effort consuming necessary; it is a complex and difficult process. However, successful integration with existing infrastructure environments and business is one of the main contributors to successful implementation of EDMS [21, 22]

11) **Awareness:** Staff must be made well aware of the importance of recordkeeping and their recordkeeping practices in the enhancement to accommodate the changes brought about by the new technology [9, 14, 21, 25, 45]. According to [27] and [24], EDMS success depends highly on the awareness of the program. Awareness is directly dependent on top management support [44].

12) **Staff training:** Training the employees on the IT skills to adopt the new service plays a pivotal role. The rates of EDMS failure are greatly affected by the

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lack of training skills [9, 25]. According to [34] it is argued that training at individual level plays is crucial in the success of an EDMS. Additionally, [14] and [21] stated training courses for the staff must be considered to enhance their awareness in dealing with the EDMS in a positive manner.

13) **Resistance to change:** Several studies in the literature referred that resisting change among staff from all levels is common in EDMS implementation. Resistance is the force taken by individuals and groups when they feel that a change that is happening is a risk to them. According to [46] "employee behavior that seeks to challenge, disrupt, or invert prevailing assumptions, discourses, and power relations" is deemed as resistance. Resistance to change during EDMS implementation is considered as one of the main challenges [21, 47]. EDMS project makes a lot of changes at all levels of organizations and departments, divisions and even the tasks which require a change in management employees and leadership. Thus, there will be resistance to change, and this change applies to all levels of the organization and will grow up if not monitored [14].

DISCUSSION AND CONCLUSION

EDMS implementation is a complex issue that comprises technological, organizational and user factors. The main contribution of this paper is to prioritize a set of factors affecting EDMS implementation from the literature review, according to these three divisions. Technical factors are in regards to ICT infrastructure such as hardware, advance software and so forth. Organizational factors related with recordkeeping culture and individual working habits and responsibilities are mandatory. Meanwhile, the Users factors are related to user's awareness and interaction with the system. So, the division may provide a baseline for other researchers investigating similar phenomenon around the world.

This paper has proposed a set of 14 factors which is believed to be more suitable for organization implementing EDMS. The study found that top management support, funds, ICT infrastructure and IT staff/implementing team have been frequently recognized as critical factors by many researchers in the literature in terms of the degree of importance. Top Management supports a corporate approach that focuses collaboration, consciousness and knowledge sharing across the organization. A budget factor was dedicated to establishing EDMS and staff training. ICT infrastructure factor is deemed as an absolute answer to EDMS, since it is infrastructure necessary for the achievement of EDMS initiatives. IT implementation team is responsible to establish/develop the electronic service. Finally, strategy and plan supports describe and explain the business organization in pursuing EDMS. It offers the important focus, as well as values for every person in the organization. Trust relies on security, user requirement,

and data quality. Thus, it is somewhat not surprising to find out that in the literature security, user requirement and data quality were identified as an important critical success factor. In addition, legislation environment, training programs and awareness factors can reduce the resistance received and had a low ranking of importance. Also, collaboration and integration received a low ranking of importance.

Even though this study attempts to capture the essence of key factors regarding successful implementation of EDMS system, it falls short on a few things. This is because the study was restricted by time, since the confirmation of real world problem requires in depth interview to get a full understanding of the phenomena being studied. Secondly, this study heavily relies on prior researches that have been done in the area; however, few studies have been reported from developing countries setting, especially from gulf-countries (e.g., Iraq, Arab Saudi and Oman). As a result, applying all the identified factors directly to a particular government agency in the selected country would be possible without conducting a case study series. Therefore, there is an urge of a detailed study of the interrelationships between each factor in EDMS implementation at government level for future.

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