EVALUATION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS AN OVERVIEW

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Abstract:
Background: Governments seek to keep pace with technological development and digital transformation in institutions and public sector organizations by adopting systems that facilitate office work and ensure smooth communication between units, and one of these systems is the electronic document management system (EDMS). However, the large number available in the software market of this type of systems differ in quality and capabilities, and the lack of specific fixed adoption criteria makes the process of evaluating these complex systems difficult. Also, choosing a system that does not meet the needs or does not provide the maximum desired benefit leads to a loss of time, effort and expenses.
Objective: This paper aims to shed light on the electronic document management system and analyze the studies that dealt with its evaluation and selection process to identify the techniques, mechanisms and methodologies used in the evaluation and selection process for the purpose of assisting managers and decision-makers in the process of selecting the appropriate system.
Method: To achieve the aim, a systematic review was conducted to gain deeper insight into **EDMS:** what is EDMS?, what constitutes an EDMS, How is useful to organizations?, and what is the research status used in the evaluation and selection process, particularly for EDMS?
Results: The Multi-criteria decision-making techniques provide a clear and accurate consistent methodology that can be used to evaluate and select EDMS according to various conflicting criteria, and a number of experts can be involved in decision-making.

Keywords: Electronic Document Management Systems; EDMS; System evaluation; selection process; decision-makers.
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1. Introduction

Managers and decision-makers in government organizations realized that dealing with traditional paper documents increases workload, wastes time, and causes many problems during the life cycle of the document [1, 2].

This prompted many organizations to search for solutions that contribute to the conversion from management based on paper documents to electronic forms that are provided by

Electronic Document Management Systems (EDMS) [3], Governments' endeavour to provide services through E-government systems also contributed to raising the importance of EDMS, which are considered among the most popular E-government systems and the most important means of digital transformation[4].

Implementing EDMS is a complex and not easy task and the process of selecting a suitable EDMS for an organization is a sensitive and critical issue involving technological and organizational factors[3, 5, 6].

Although there are a large number of EDMSs in the Information and Communication Technology (ICT) systems market [1, 7, 8] , not any EDMS can be implemented successfully in a particular organization, and choosing an inappropriate system that does not meet all the requirements of the organization results in a loss of time, money, and effort [9]. This problem may occur in governmental organizations or public institutions as a result of managers and decision-makers taking decisions through linguistic expressions instead of proven methodology and scientific techniques as a result of a lack of experience or a tight schedule[2, 10].

This paper aims to shed light on previous studies that dealt with the process of selecting EDMS according to scientific methodologies or techniques in public institutions and organizations through their evaluation and selection of the most suitable for implementation and operation.

The paper is organized as follows: Section 2 Background; Section 3 brings light to Current EDMSs; Section 4 Reviews previous studies on the Evaluation and Selection Process of EDMS; Section 5 Methodology; Section 6 presents the Discussion followed by the Conclusion in Section 7.

2. Background

This section provides the basic concepts associated with documents management and methods of evaluation and selection of the most appropriate electronic document management systems in government institutions and organizations.

a. Documents Life Cycle:

The document provides a formalized method that organizations use for writing down and recording that is of an official nature. Its purpose is to preserve and transfer information, data, and orders according to a specific and organized work context using an element that can be accessed by the concerned persons in order to achieve management goals such as remembering, directing and planning, informing, and issuing certificate, documents are divided in terms of their nature into two forms: A. Paper documents circulated in institutions in a traditional routine manner; B. Electronic documents represented in digital form and dealt with by computers.
[11, 12].

in general, the document in any institution passes through several stages according to the workflow and the management process as shown in Figure 1), starting from creation, then approval by ratification, then distribution or participation, then preservation and archiving, retrieval, and ending with obsolescence or destruction[8].

Figure 1:Document Life Cycle

b. Document Digitization:

In order to take advantage of the advantages offered by computers represented in accelerating and facilitating work and their abundant storage capacity, institutions convert paper documents into a digital form that can be handled by a computer by scanning them and storing them digitally with extensions in the form of images or extracting texts from them using artificial intelligence techniques [13].

c. Digital Transformation:

It has become known to decision-makers and managers in governments that administrative processes and correspondence in public institutions using the traditional paper-based management system are time-consuming activities that increase workload and expenses. Therefore, the goal of governments has become digital transformation which represents an effective step towards the transition to e-government, Through the use of computer systems and software that simulate the document life cycle in a digital environment provides paperless management, where these systems use Information and Communication Technology (ICT) to offer radical solutions that contribute positively to developing and facilitating the work of institutions and public sector organizations [4, 10].

This has increased the need to choose and implement an appropriate EDMS in government organizations and institutions that support them systematically in managing the documents they produce [14].

d. Electronic Document Management Systems (EDMS):

Before ICT reached today's familiar development, institutional management systems had a different concept of dealing with documents, technology has changed and revolutionized how traditional document management systems work In light of this development and the widespread of technology since the nineties of the twentieth century, the idea of establishing a computer-based system that can be used in institutions to manage documents without the need to use paper arose, which is known as EDMS [15-17].

EDMS is One of the most popular e-government applications[5, 6, 10, 18-20], that provide e-administration and Office work digitization and automation and ensure smooth communication between different departments, through using ICT solutions [3, 4, 21-23].

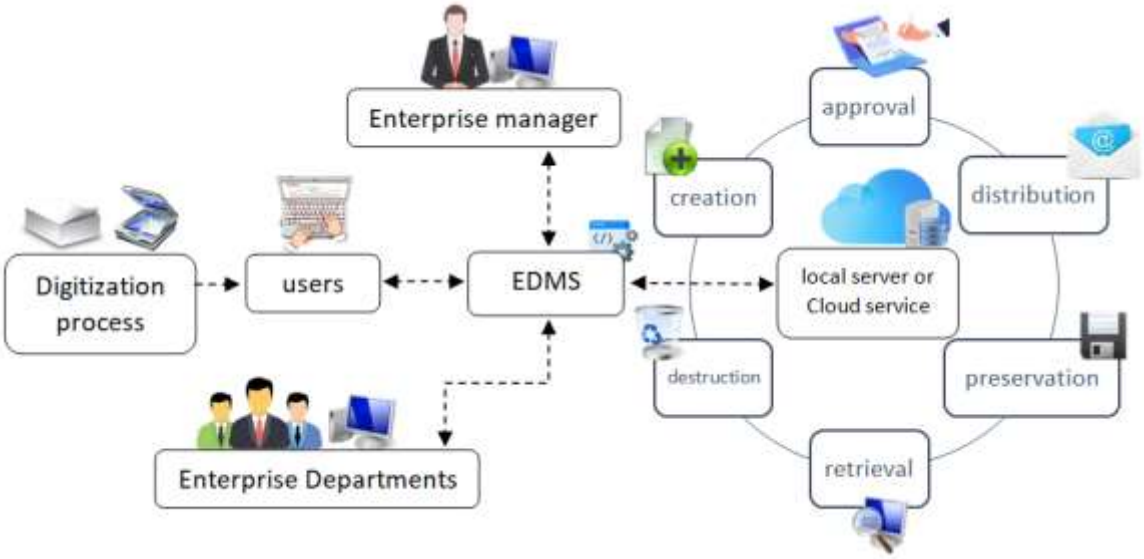

Figure 2: EDMS Working mechanism and their general capabilities

Through this system as shown in the (**Error! Reference source not found.**), employees can deal with the organization's documents, which are either paper documents that are converted into a digital format for the purpose of entering them into the system, or a previous electronic document, or that create within the system. The system also provides effective communication between employees and managers [4], and links the organization's units with each other through using a local server or cloud services and allows access control [24] , as well, the system allows conducting the various works that take place during the life cycle of the document by office work automation and workflow control, and the system provides the issuance of reports and statistics on the work of the institution and its employees [22, 25].

This information system allows creating, modifying, retrieving, displaying, distributing, Sharing, filing, storing, searching, destroying, and archiving documents[1-3, 26], to achieve the goal of digital transformation and paperless offices by converting the document life cycle from the physical environment to the digital environment provided by EDMS[4, 10, 15, 27-29].

Sometimes confusion occurs between EDMS and other types of institutional business management systems. Although they share some basic concepts, each system has different objectives, the most prominent of which are these systems:

- Electronic Records Management System (ERMS): It refers to computer software or a suite of applications designed to manage e-record as a restriction in the database, It allows the possibility of storing and tracking records and related meta-data, and separating and gathering and restructuring the data according to any required classification method [30].
- Enterprise Content Management (ECM): Defined as strategies and tools that allow an organization to analyze, manage and automate the processing of all its information assets (regardless of type) during their life cycle. The ECM system can capture, process, access, measure, combine and store all of this information, regardless of whether it is structured (databases), unstructured (eg email, word, spreadsheet, image, audio or video) or in hard copy [31].
- Content Management Systems (CMS): is a Server software that aims to facilitate the management of the content of web pages and websites by separating the content from the visual presentation and storing the content in a database to facilitate its change without the need to redesign or change the site's source code. It provides capabilities for authoring, compiling, reformatting, storing, publishing, archiving, and content search [32].

e. Benefit of using Electronic Document Management Systems (EDMS):

EDMS has helped many organizations and institutions, whether in the government or private sectors and in various business fields, and has also directly contributed to supporting management strategy, reducing costs, minimizing errors, increasing transparency and combating corruption, increasing security, privacy, systems integration and employees cooperation[3, 5, 6, 12, 13, 16, 27, 33]. In addition to the environmental benefits resulting from reducing the waste of paper and inks, which is reflected positively in reducing the excessive cutting of forests and carbon emissions [10].

3. Current Electronic Document Management Systems (EDMS)

Reports indicate that the global market value of electronic document management systems has reached US $ 5.51 billion in 2020, and it is in a state of increasing growth, as expectations indicate that it may reach about US $ 11.47 billion by 2026, at an estimated annual growth rate of 13.05% [34].

The market for electronic document management systems is constantly changing affected by the need to increase efficiency in the workplace. As it is expected that the improvement and development of technologies and the effective implementation on a large scale of the electronic document management system will contribute to the gradual elimination concept of traditional paper files. This led to the market gaining a competitive advantage in recent years, as several major players emerge in terms of market share, however, the production and launch of new systems from emerging companies are increasing, due to the increasing demand for digital transformation in various sectors, also many leading companies are working on Updating and increasing the efficiency and quality of its systems and expanding its deployment in the market by securing new contracts and operating its systems in new work sectors [35].

There are a large number of EDMSs [1, 7, 8], offered through the software markets at the present time, this can be seen by conducting a search in a search engine such as "Google" to access the websites of the companies producing these systems or visiting any site concerned with reviewing computer systems and software and showing their compatibility and making comparisons, such as "Capterra", "Software Advice", "G2.com", "TrustRadius", "GetApp.com", "SoftwareSuggest", "SourceForge", " FinancesOnline" or " GoodFirms" etc. Also, some of the literature reviewed in this paper mentions the names of a number of the most famous EDMSs.

The Table 1 shows examples of EDMSs that were mentioned in the literature and some of the systems that got the highest ratings on software evaluation sites or were found by searching, arranged in alphabetical order and not related to the quality or popularity of any system or software

More than 100 websites of companies producing electronic document management systems have been reviewed. These systems are compatible in terms of purpose and share the same concepts, but the difference seems to be clear in prices, the system trying possibility, system architecture, features and capabilities available, specific field of work (Scope) such as: Health Care, Banking and Financial Services, Education, Transportation and Aviation, Construction, Manufacturing, Engineering offices, or Law Firms.

Nevertheless, the main point that must be emphasized is that not every EDMS is able to be successful implementation in government institutions and public sector organizations[9, 36]. As EDMSs differ in several aspects, such as scope, degree of adjustment, and operational capacity, on the other hand, they can be classified according to the data storage topology into local or distributed; or classified according to working technologies into client-server or web-technologies and cloud serves [8].

In recent years, along with digitization and the implementation of e-government applications, the importance of EDMS has increased for governments, as some developed countries have successfully implemented it in various sectors [4, 5].

Table 1: examples of current electronic document management systems

No.	EDMS Name's	No.	EDMS Name's	No.	EDMS Name's	No.	EDMS Name's	No.	EDMS Name's
1.	Accruent	24.	DEVONthink	47.	fileago	70.	Mayan-EDMS	93.	PandaDoc
2.	Ademero	25.	Dmacq-dms	48.	FileCenter DMS	71.	Megapolis. DocNet	94.	papermerge
3.	Advanced docman	26.	Doc Prof	49.	filehold	72.	M-Files	95.	pCloud - Business
4.	Agiloft	27.	DocFlow Creatio	50.	folderit	73.	Microsoft SharePoint Online	96.	Pericent docEdge DMS
5.	Alfresco	28.	Docflow.CO	51.	formkiq	74.	Monday.com	97.	powerDMS
6.	Altirnao Inc (Aodocs)	29.	docmoto	52.	FossDoc	75.	Montrium RegDocs	98.	recordnations
7.	Alwusool DMS	30.	DocStar	53.	Globodox	76.	Montrium sop-connect	99.	RICOH Document Management Solution
8.	ArcMate-enterprise	31.	docsuite	54.	greenwichregistrars	77.	Nanonets	100	RMG-sa
9.	askod	32.	document-genetics	55.	GRMcontroldocument	78.	NAUDOC docsvision	101	SEED-dms
10.	assai-software	33.	DocuPhase	56.	Hyland EDMS	79.	NAUMEN	102	sfax
11.	ATLASSIAN Confluence	34.	docupile	57.	Hyland OnBase	80.	Neat.com	103	sipas
12.	BafDoc	35.	docuvantage	58.	IBM FileNet	81.	newgensoft	104	Skytizens
13.	BAS Document Management KORP	36.	DocuWare	59.	iDOXsoft	82.	nintex	105	smartsheet
14.	Benchmark Gensuite	37.	DOKMEE	60.	isoTracker	83.	NUXEO	106	SpringCM DocuSign
15.	bitfarm-archiv	38.	Dropbox Business	61.	Kofax PaperPort	84.	odoo	107	synergis
16.	bitrix24	39.	EagleFiler	62.	Krystal DMS	85.	ONLYOFFICE	108	Teamwork-Spaces
17.	Blue Ocean	40.	ecoDMS	63.	KYOCERA	86.	Open Text	109	TeedyDocs

	DMS				Document Solutions				
18.	BossReferent	41.	e-Docs Solution	64.	Laserfiche	87.	OpenBee	110	webmanuals
19.	CANON Document Management and Process Automation	42.	e-filecabinet rubex	65.	Legito	88.	OpenDocMan	111	Worldox
20.	citeck	43.	eisodX	66.	LogicalDOC	89.	openkm	112	Xerox SMARTdocument Travel
21.	ClickUp	44.	envision.infofort	67.	luminess	90.	Optima-workflow	113	Yubik docflow
22.	Cognidox LEAN DMS	45.	EUFRATS-Document Managemen	68.	Mariner software - paperless	91.	Oracle Documaker	114	ZenDMS
23.	CORDIS.us	46.	Feng-office	69.	MasterControl	92.	Oracle Enterprise Data Managemen	115	ZOHO Workplace

4. Evaluation and Selection Process of EDMS

The need to choose and implement an efficient, secure, flexible, adaptable, easy to use, and high-quality EDMS is a necessity in order to deal with the modern challenges facing government institutions and public sector organizations that seek digital transformation in a clear direction [4].

EDMS is more than a simple technological system, and the evaluation of such a complex system is difficult also Selecting and implementing most suitable EDMS software from many competing alternatives is a critical complex issue and entails comprises technological, organizational and user-related factors [3, 5, 10, 12, 20]. The problem of ICT system selection, the one point that must be underlined is that it is not an easy task, Because the relatively unrestricted market of available ICT systems negatively impacts interoperability [7, 8].

Those concerned in the field of management and decision-making in the government may use routine procedures such as conducting tenders and accepting the lowest bids or individual

decisions or accepting marketing offers with embellished language expressions instead of scientific techniques in the process of selecting EDMS [20]. The use of these conventional procedures may result in the selection of an EDMS that is ineffective or does not meet actual needs causes losing money, effort and time [2], because not every EDMS can be successfully implemented [9, 36], Furthermore it the failure of implementation has a negative impact on the functioning of the institution [37].

Therefore, the decision to choose EDMS for the institution should be made according to scientific techniques rather than conventional or routine procedures. For that reason, Evaluation models are often a good way of discovering if a system meets requirements [10, 38] , therefore, the most important thing to do is to prepare the appropriate technical specifications required and determine acceptance and selection criteria [4, 5, 39].

A number of previous studies dealt with the process of evaluating and selecting the appropriate electronic document management system for work in government sector institutions,

Table *2* described these studies for the purpose of identifying the mechanisms, techniques and methodologies used.

Table 2: Previous studies that dealt with the evaluation and selection of EDMS

No.	Authors/Year	Purpose of the study	Methods and tools
1.	[36]Oskar Sek and Ireneusz Czarnowski (**2022**)	Selection of EDMS to operate in Polish municipalities, by evaluating two state-made systems: EZD PUW and EZD RP.	Multi-criteria decision-making (MCDM): • Analytical hierarchy process (AHP)
2.	[10] Leyla Özgür Polat (**2022**)	Conducting the EDMS selection process for a Turkish university by evaluating three systems from the local software market	MCDM: • fuzzy Analytical hierarchy process (fuzzy-AHP)
3.	[40] Alyssa Marie B. Almacen , Alan Y. Cabaluna (**2021**)	Discuss the implications of the future of digital transformation in healthcare in the Philippines by implementing (EDMS)	The study proposes an approach to the selection process, implementation and operation of EDMS, where the selection process includes steps: 1- Gather and analyze requirements and long-term criteria for reliability, robustness, accessibility, and legal acceptability. 2- Selecting suitable EDMS vendors

			(service providers) and requesting bids according to the specified requirements and criteria.
4.	[11],Hansi Fernando, Thathsarani Hewavitharana, Asoka Perera (**2019**)	This research aims to investigate the possibility of generalizing the application of the "Aconex EDMS" system in the Sri Lankan construction industry. By evaluating the functioning of the system implemented on a large construction industry project to determine the requirements, challenges and benefits	The method "case study" is used for the evaluation due to fewer companies were using EDMS. A semi-structured interview with a questionnaire was used in the study. Focus was placed on the depth of the studied points despite the limited sample size.
5.	[20] Engin ÇAKIR (**2018**)	EDMS selection for one of the Turkish municipalities by evaluating five systems from the local software market	MCDM: • Stepwise Weight Assessment Ratio Analysis (SWARA) Method to determine selection Criterion Weights • Evaluation Distance from Average Solution (EDAS) to evaluate the alternatives
6.	[35] Chaikovska, Olena Stolyarchuk, Irina (**2018**)	The study aims to the analysis of implementation features and development trends of EDMSs in the Ukrainian market. The study concluded by compiling a list of basic criteria compatible with recent trends in the development of the information technology market, taking into account the Ukrainian national specifications	The study described the algorithm that can be followed by Ukrainian institutions or companies for the purpose of selecting an effective EDMS.
7.	[2], Abdulkadir YALDIR and Leyla ÖZGÜR POLAT (**2016**)	selection of an EDMS for the University of Pamukkale / Turkey, through the evaluation of three systems	MCDM: • Fuzzy AHP Method to determine selection Criterion Weights • Technique for Order of Preference by

		from the local market	Similarity to Ideal Solution (TOPSIS) to evaluate the alternatives
8.	[41] Olga V. Ruzakova, Sergey V. Uvarov (**2011**)	The article reveals a proposed methodology for the institution to select EDMS during the post-crisis economic development phase, the authors set out their recommendations for reducing financial costs in the EDMS selection and introduction process.	The study recommends purchasing a product that is available in the market and ready to use and is actually applied, where it is possible to see the system working in the real world environment and explore positive and negative comments on the performance of the offered product and then check some technical and organizational issues such as quality, price, ease of use, etc.
9.	[42] CHRISTOPHER S WISNIEWSKI, TARA L PUMMER, AND EDWARD P KRENZELOK (**2010**)	The study described a method for selecting and operating an EDMS in a drug information Centre by reviewing 12 EDMS with different specifications and capabilities	A comparison was made between the declared capabilities of the systems in terms of their ability to search for keywords and full text, the possibility of remote access, the maximum user limits and the cost of implementation and maintenance. However, the selection process was based on choosing the solution with the lowest costs

Despite the importance of reducing wasteful spending, making a selection process for an electronic document management system according to the lowest costs only as [42] suggested without taking the rest of the aspects and criteria into account (such as security, ease of use, and system quality) may do not inevitably lead to obtaining the best and most efficient solutions. Where [11] indicates that the high cost cannot be accepted as a challenge to the process of applying an electronic document management system. It also stresses [12] that the benefits resulting from the use of an electronic document management system are many, despite the high cost.

As for [41], also focuses on reducing costs in the process of selecting EDMS by exploring a group of commercial EDMS actually applied in companies or institutions and conducting verification of issues of quality, price, ease of use, knowing the pros and cons of performance, and thus choosing EDMS that has proven successful implementation previously. Also [11] agrees with the generalization approach of successful experiences by conducting a case study where to evaluate the performance of the "Aconex EDMS" system actually implemented in a company for the purpose of determining the possibility of generalizing its application in the Sri Lankan construction industry. This method cannot be followed in countries where the application of EDMS in its governmental institutions and public organizations is still scarce and rare, as it is not

possible to find various solutions or compare many options. Moreover, some EDMSs are directed to a specific field of work (Scope), such as Government, Health Care, Banking and Financial Services, Education, Aviation, Construction, Manufacturing, Engineering offices, or Law Firms, therefore it is not easily possible to generalize a successful EDMS in a specific field to work in other fields.

[35] and [40] agree that the selection should be based on a set of criteria despite their disagreement on a specific set of criteria, where [35] defined criteria that correspond to the Ukrainian national specifications and mentioned a number of local and international EDMS, while [40] developed a process Collecting and analyzing requirements and criteria as the first step in the selection process, followed by the bidding process according to the established criteria.

On the other hand Studies [2, 10, 20, 36] agreed on the use of MCDM as a methodology in the process of selecting EDMS, although each study used different MCDM techniques shown in Table 3 , also there was no unification on a specific set of criteria, despite these differences, the MCDM methodology has proven successful in solving problems in a variety field especially when need to choose the best among multiple alternatives [43], for this it shows high applicability with the problem of selecting EDMS, whether these systems are state-made, global commercial, or locally developed. Where systems are evaluated by taking into account many different conflicting criteria that are consistent with the requirements and aspirations of institutions aspiring to choose a system.

The development, identification and preparation of these criteria carefully are considered sensitive and extremely important for the purpose of covering various aspects that can contribute to the success of EDMS implementation [2, 4].

Table 3 : MCDM techniques used in the process of evaluating and selecting EDMS systems

MCDM method	Inventor/Year	Method definition	Merits	Demerits
AHP Analytical hierarchy process (AHP)	Thomas Saaty(1970)	AHP is a common method of multi-MCDM It has a simple structure that is able to tackle the appropriate complexity of a real-life problem. use for the evaluation of criteria and	•It does not require additional tool for criteria weight determination •AHP is widely useful when a decision problem has linear hierarchies.	•The technique becomes more complicated and time consuming as criteria and alternatives increase •AHP needs reliable data based on experience and knowledge and does

		alternatives that involve uncertain data. AHP is used to capture the expert's knowledge in general but cannot reflect human thinking and preferences. AHP importance and strength lies in the implementation of the decision-making process based on the consensus on the various evaluation factors and the setting of priorities in general	•AHP's hierarchical structure provides an intuitive appeal and a way to better understand the complexity of a problem and can be easily combined with other quantitative and qualitative methods.	not take into account uncertainty In addition, it is sometimes difficult to obtain a consensus on the opinions of experts •AHP cannot handle non-linear relationships between criteria
fuzzy Analytical hierarchy process (fuzzy-AHP)	Yager (1978)	Fuzzy set theory is used resembling human reasoning in its use of approximate information and uncertainty to generate decisions. The Fuzzy AHP has proven to be a valuable approach for diverse decision-making tasks. This method integrates trigonometric and trapezoidal fuzzy numbers into the pairwise comparisons of the AHP.	• Provides a solution to the problem of uncertainty in the subjective opinions of the decision maker	•In certain scenarios, computations may not be feasible due to the resultant weight total derived from the Fuzzy AHP vector. The weight values for certain parameters are zero, which results in an indeterminate outcome during the calculation of the consistency index. This occurs due to division by zero.

Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS)	Hwang and Yoon:1981	The TOPSIS technique operates under the principle that the optimal alternative is characterized by the shortest geometric distance from a positive-ideal solution while being farthest away from any negative-ideal solution. as a result, the alternatives are ranked based on their resemblance to an ideal solution.	•The process is relatively straightforward, and the solution methodology remains consistent regardless of the number of decision criteria or alternatives involved.	•When employing the Euclidean distance metric for evaluation, the correlation among criteria is disregarded. Moreover, in addressing multidimensional issues, normalization of vectors may be necessary.
Stepwise Weight Assessment Ratio Analysis (SWARA)	Kersuliene, Zavadskas, and Turskis (2010)	The SWARA technique entails a significantly reduced number of pairwise comparisons and boasts an easy to use compared to other prevalent methodologies such as AHP. Its main function is to determine the relative weights of various criteria utilized in evaluating alternative solutions.	• Reduces transaction costs due to fewer comparisons between weighting criteria • SWARA saves time by making it easier for different experts to work together for one purpose at the same time	• In certain cases ratio analysis might prove to be misleading with regard to profits. • A single ratio may not convey much information. • SWARA helps to determine an initial decision matrix. It is necessary to use other MCDM approach for evaluating decision matrix and deriving final priorities.
Evaluation Distance from	Keshavarz Ghorabaee, Zavadskas,	The EDAS method is similar to other MCDM methods	•The EDAS method does not require the calculation of	•Qualitative attributes must be converted into

Average Solution (EDAS)	Olfat, and Turskis (2015)	like TOPSIS in terms of trying to find a solution based on distance the best alternative is found by calculating the average solution distances of the alternatives according to each criterion	the best and worst values •EDAS method is very practical in conditions with paradoxical attributes	quantitative attributes.

5. Methodology

To achieve the objectives of this review represented to gain deeper insight into EDMS: what is EDMS?, what constitutes an EDMS?, How is useful to organizations?, and what is the research status used in the evaluation and selection process, particularly for EDMS?, In this regard, a systematic review was conducted to identify the techniques, mechanisms and methodologies used in the process of evaluating and selecting an EDMS to work in government institutions and organizations.

The protocol used describes the method and processes that are performed during the literature collection process where the main focus of the protocol is to determine why and how to obtain study sources [44].

The following are the steps considered during a systematic literature review:

a. Review questions:

The first step of a systematic literature review is to formulate a set of Review Questions (RQ). These questions will guide the research path and determine the objectives [3]. The research questions were formulated as follows:

RQ.1- What are the current Electronic Document Management Systems (EDMSs)?

RQ.2- How can government institutions and public sector organizations evaluate CURRENT EDMSs and select the most appropriate system?

RQ.3- What are the techniques, mechanisms or methodologies used that have proven successful in the process of selecting EDMS to work in government institutions and organizations?

b. Search strategy and data collection sources:

In the beginning, keywords and general terms were used to ensure that the search process covered the most relevant research papers. A preliminary search was done using the terms ("Electronic Document Management System", "EDMS", Selection, Evaluation) as keywords.

To formulate the research series (query) in its final form, the following steps were followed as suggested by Kitchenham [44]:

- Search using the key terms contained in the research questions to determine the basic concepts.
- Check for keywords in any relevant papers.
- Identify synonyms, alternative spellings, and abbreviations for keywords related to the search string (query).
- Use Boolean OR to add alternate spellings.
- Use Boolean AND to link key terms.

The use of the abbreviation EDMS in the research process shows results that are far from the field of study due to the existence of similarities with similar abbreviations with other terms such as: Energy Data Management Systems, Electrical Discharge Machining, Educational Data Mining, Error Detection Mechanisms, Electronic Distance Measurement, Equivalent Dipole Moment, Emergency Decision Making. so it was not included in the construction of the search string (queer)

After completing the steps of building the search string (query) shown in Table 4) and putting the final touches, the search was implemented in several online libraries and bibliographic databases such as: Google Scholar, Science Direct, Springer Link, IEEE Xplore, Taylor & Francis, DOAJ, Wiley Online Library, ACM Digital Library.

c. Data collection stages and Criteria of inclusion and exclusion:

The literature review process involved three phases:

1. At the beginning, an initial review was conducted based on standard information and the inclusion and exclusion criteria shown in Table 4 During this stage, the literature titles and abstracts were reviewed, and papers that meet the inclusion criteria were initially included.
2. A more careful review was then carried out on each of the papers that were included, to determine the answers to the research questions. In this stage, 149 articles that were included from the previous stage were viewed. The review in this stage includes reviewing the summary, results and discussion, and the papers most relevant to the field of research were identified. Examination of a section of the papers also contributed to the definition of EDMS and the identification of the benefits it provides, challenges and factors for the success of implementation.
3. Finally, in the third round of the review, we identified the research papers that contributed positively to answering the research questions through full-text analysis that included 45 articles. Finally, we identified 9 articles that were fully consistent with the objectives of this research, as they were analyzed in **Error! Reference source not found.**).

Table 4*:* Search tools and their parameters

search string (query):	("Electronic Document Management System") AND (selection OR chosen OR Evaluation) AND (organizations OR institutions OR "Public sector" OR Government)
Inclusion and exclusion criteria	1. The accepted language during the research phase is English, the title and abstract must be in English. 2. Access to the full text is available online. 3. The selected literature should be research papers published in peer-reviewed scientific journals or conferences. Books, encyclopedias, notes and presentations are not accepted. 4. The literature used should address EDMS as the primary or secondary area of the research. 5. The activities described in the literature are not relevant to the evaluation or selection or implementation process of EDMS.
standard information	Title, Authors, Publication year, Journal or Conference name, Abstract, keywords

Although the accepted language during the research phase is English. However, two papers were accepted in Turkish and one paper in Ukrainian, as the title and abstract of these papers were published in English and showed a high degree of conformity with the objectives of this research and met other inclusion criteria, so the full text of these papers was translated using Google Translate.

d. data extraction strategy:

After the standard information described in Table 4 was extracted for each included study, a full-text analysis was conducted for the studies that aimed to conduct the EDMS selection process for work in government institutions or public sector organizations, and for the purpose of answering the research questions, the methods and mechanisms used in each study were determined as shown in **Error! Reference source not found.**.

6. Discussion

Governments around the world are seeking to move towards increasing the adoption of e-government applications to keep pace with the continuous technical development and try to benefit from the solutions provided by information and communication technologies,

One of the most important of these solutions and the most influential on the digital transformation process is the electronic document management system, which increases the

efficiency and flow of work in government institutions and organizations and achieves smooth communication between units.

Because of this importance and the increased demand for EDMS, many technology and software companies have presented their systems that carry different specifications and capabilities. So, there are a large number of EDMS offered in the software market currently, but not all of these systems are workable in public government institutions. The factor of quality, efficiency, services provided, scope of work specialization, and cost varies between EDMSs.

The problem arises when government institutions need to choose the most suitable EDMS software among many competing alternatives. This issue is complex and crucial because the evaluation of such a complex system is difficult. In addition, there is no formal evaluation system or fixed set of criteria

The implementation of an inappropriate system that does not meet the requirements results in a loss of time, costs and effort

This may happen as a result of the lack of experience or technological knowledge of managers and decision-makers or the tightness of the timetable, as they make choices based on advertising marketing expressions, individual decisions, or tenders instead of conducting a systematic study.

Despite the scarcity of studies related to the EDMS selection process, a number of researchers concluded that the solutions provided by multi-criteria decision-making techniques are consistent with the nature of this process, which requires the involvement of evaluating experts and conflicting selection criteria with varying impact. This contributes to avoiding the problems resulting from the wrong choice of EDMS.

7. Conclusion

The need to use EDMS has become urgent in government institutions and public sector organizations due to the benefits it provides that contribute to facilitating work management, reducing expenses, effort, time and errors, increasing the accuracy of work and production, providing transparency, protection and automating office work. Moreover, as a step towards digital transformation and eliminating waste the use of paper. Therefore, the need and demand to choose the best available solutions have increased. Although there are a large number of EDMS, they differ in specifications and capabilities, and not all systems are workable and successfully implemented in government institutions and public sector organizations. Also, the process of choosing the system is not easy, and conducting it by traditional, routine methods is fraught with risks and may lead to loss of time, effort and money. Therefore, the selection process must be carried out according to scientific techniques and methodologies

Multi-criteria decision-making techniques provide a clear and accurate consistent methodology that can be used to evaluate and select EDMS according to various conflicting criteria, and a number of experts can be involved in decision-making.

Nevertheless, it remains to reach the best results in the selection process associated with the type and number of criteria and sub-criteria necessary for the evaluation process, which determines whether EDMS is easy to use, safe, fast, flexible, effective, and achieves the highest degrees of sustainability among the alternatives. However, when examining the relevant literature, it can be seen that the process of selecting an appropriate EDMS for work in institutions and public sector organizations is not adequately addressed, although some studies used MCDM techniques, they did not conform to a unified set of criteria.

And the process of determining the most appropriate selection criteria requires more research and diversity in the sources of obtaining them because the successful implementation of the EDMS does not depend only on the quality of the system or its compatibility with the requirements of the institution only. Therefore, an attempt should be made in future work to define selection criteria that cover most of the factors that would make the implementation successful.

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