COMPILATION OF AN EXPANDED SET OF CRITERIA FOR EVALUATING ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS

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Abstract:

Electronic document management systems (EDMS) have gained great importance in recent years, and managers and decision makers have realized the importance of using them as a step towards digital transformation. However, there is still little research on the field of adopting and choosing them for state institutions and public sector organizations. These systems are not simple programs and their evaluation process is complex because they include various aspects. In addition, there is no legal framework that regulates the process of adopting and adopting them in the government sector. Therefore, in this paper, we conducted a review of the literature to search for criteria for evaluating these systems, the set of criteria extracted from the literature was presented to 20 experts through an interview to verify the adequacy and appropriateness of the criteria for conducting the EDMS evaluation process, as a result, we reached to extract 7 main criteria that branch out into 27 sub-criteria covers evaluation process of EDMS from various aspects.

Keywords: (Electronic Document Management System (EDMS); Criteria; Adoption Criteria; evaluating and selecting Criteria) .

1. Introduction:

The tremendous technical development in the field of Information and Communication Technology (ICT) contributes to solutions to the problems facing government departments [1, 2]. In turn, governments aspire to increase the use of technology to complete digital transformation in various institutions and on a large scale [3-6].

Some of the solutions came in the form of computerized systems prepared for operation in various fields of administrative work [7], to enable the government to transform into electronic management and digitize office work [8, 9], and provide automation of the workflow of the enterprise [10, 11], within a single concept and single system [7, 12]. These systems have proven successful in working in various fields such as health, education, banking, transportation and many government bodies [13].

These systems, in their different forms and functions, are known as part of the e-government [4, 14, 15].

This rapid and continuous development has led to the availability of a large number of systems that either facilitate the work of employees and the management of institutions or contribute to the delivery of government services to citizens [3, 7, 16].

One of these ICT systems is the Electronic Document Management System (EDMS), which is a collaborative group of IT devices equipped with appropriate software that contributes to achieving the assumed goals of office and administrative work [3, 6, 7, 14, 17].

This system allows the processing, storage, sending and receiving of data through the use of appropriate peripheral equipment and available communication networks [11, 12, 18-20].

It has become known to managers and decision-makers in public governmental organizations and institutions that dealing with the traditional paperwork system in office work and correspondence is a time-consuming activity and increases the workload [10, 16, 21].

Therefore, the importance of digital transformation has been achieved and has become a necessity for governments as the shift to the use of EDMS contributes to the smooth flow of information, achieves effective management of the institution, and takes a step towards complete digital transformation[10, 22].

EDMS is more than a simple technological system, which makes evaluation of such a complex system difficult [3, 17]. Also, the unrestricted market for available ICT systems has a negative impact on interoperability [11, 23], In addition to the lack of a clear legal framework for implementing or adopting electronic systems, and managers may be inexperienced, and most importantly, the absence of unified criteria for choosing systems [24]. Without criteria, it is impossible to make a proper selection process, so not every EDMS can be successfully implemented despite the presence of a large number of EDMS.This makes the problem of selecting an EDMS not an easy task and implementation of an appropriate EDMS program for an organization is a complex and critical issue involving technological, organizational and user factors [3, 6, 10, 18].

The aim of this paper is to identify and define the necessary criteria for evaluating EDMSs, for the purpose of making a decision to choose the best commercial EDMS available in the software market and the most suitable for work in a particular government institution or organization.

Therefore, we conducted a Systematic Literature Review (SLR) to collect all possible criteria for evaluating and selecting EDMS. Then, the extracted set of standards was presented to a group of experts for revision and confirmation for the purpose of future use in formulating a framework

for selecting the best system for educational institutions in developing countries using Multi-Criteria Decision-Making (MCDM) techniques.

2. Background:

This section sheds light on the definition of the electronic document management system and reviews its characteristics, capabilities and possible criteria for evaluation.

2.1 Electronic Document Management System (EDMS):

Documents can be defined as a means of codification and recording in a formal nature used by institutions to preserve and transmit information, orders and data according to a specific work context in an organized manner using an element that can be accessed by involved people in order to achieve management goals such as remembering, certification, informing, directing and planning, in other words, in a simplified way, documents are the stored memory of an organization, in which information about work and employees is recorded [1, 9, 17, 19].

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 [19, 21, 24].

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 [9, 14, 25].

EDMS is One of the most popular e-government applications [1, 6, 10, 17, 26], that provide e-administration and Office work digitization and automation and ensure smooth communication between different departments, through using ICT solutions [3, 4, 27-29].This information system allows creating, modifying, retrieving, displaying, distributing, Sharing, filing, storing, searching, destroying, and archiving documents[2, 3, 16, 30], to achieve the goal of digital transformation and paperless offices [4, 9, 10, 12, 20, 31].

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, combating corruption, increasing security, privacy, cooperation and systems integration [3, 6, 12, 14, 18, 32].

2.2 General Characteristics and capabilities of EDMS

As defined in the previous section, the Electronic Document Management System (EDMS) is a software system used to create, store, manage, and retrieve digital documents and files.

The degree to which these characteristics are covered and offered may vary depending on the specific EDMS solution as different vendors may offer additional features or functionality specific to their product.

Below are some common characteristics of EDMS:

User Interface: The user interface (UI) of the Electronic Document Management System (EDMS) plays an important role in the ease of use of the system and the user experience. It represents the system window that allows the user to enter instructions and data and monitor processes and results[29].

The EDMS system can realize its full potential when each individual user of the system can handle the functionality of the software with ease. This is especially important because some people may not be tech-savvy. So, everyone should be able to operate the system easily and without confusion [33].

A well-designed, intuitive, and clear user interface in which each button is conveniently located and provides the functionality it contains can simplify user interaction with the system, minimizing user errors, and reduce time when using system features [32].

Document Creation and Capture: An EDMS provides tools and functionalities to capture and create electronic documents. This can include scanning physical documents, importing digital files from other applications or emails, or creating new documents within the system [10, 18, 20].

Document Storage and Organize: One of the important functions of document management is document archiving. The EDMS offers a centralized repository for storing and organizing documents. It provides a structured folder hierarchy or metadata-based tagging system to categorize and classify documents for easy retrieval[7, 12, 24, 34].

Version Control: Version control is a crucial feature of an EDMS. It allows multiple versions of a document to be stored and tracked, enabling users to access and review previous versions, track changes, and collaborate effectively [18, 32, 35].

Security and Access Control: EDMS systems ensure document security through access control mechanisms. Administrators can define user roles, permissions, and restrictions to

control who can view, edit, and delete documents. This helps protect sensitive or confidential information[8, 14].

Searching for Document and Information: An EDMS typically includes robust search capabilities that allow users to find documents or Information based on keywords, metadata, or full-text search. Indexing and search functionalities make it easier to locate specific documents quickl[2, 7, 11]. EDMS can also be equipped with Optical Character Recognition (OCR) technology, which allows it to extract text from paper documents that are scanned, enabling easy full-text searching for this type of documents[24, 28].

Document and Information Distribution and Retrieval: EDMS enables authorized users to distribute and retrieve documents that they can download or share internally or externally based on their access rights. EDMS can distribute them automatically according to defined workflow rules or manually to responsible employees in different departments of the organization[5, 10, 18, 20, 24].

Workflow and Collaboration: Workflow refers to the sequence of operations and procedures to accomplish a specific work, task, or duty. The completion of an achievement is related to a number of employees at different levels in the hierarchical structure within the organization. EDMS often incorporates workflow features that enable document routing and approval processes. It allows users to collaborate on completion documents, assign tasks, set deadlines, and track progress throughout the document lifecycle. The workflow process can be automated once a new document is created or imported, then sends a notification to every user associated with that task[3, 18, 22, 36].

history log: EDMS maintains an audit trail that records actions performed on documents, including creation, modification, and deletion. This feature ensures transparency and accountability and helps meet regulatory compliance requirements[33].

Backup and Disaster Recovery: EDMS often includes backup and disaster recovery mechanisms to ensure data integrity and availability. Regular backups and redundant storage systems protect against data loss or system failures[8, 20].

Integration and Scalability: EDMS systems can integrate with other enterprise software, such as customer relationship management (CRM), enterprise resource planning (ERP), or project management tools[6, 18]. They should also be scalable to accommodate increasing document volumes and user demands[11].

2.3 Structure and definitions of the main and sub-criteria for evaluation of EDMS

The literature has extensively discussed how to build and optimize these systems, their specifications, and their capabilities, as summarized in the points made in the previous section.

On the other hand, the researchers measured the factors affecting the success of EDMS adoption and identified critical success factors as well as some papers that directly contributed to the selection and evaluation of EDMS for government institutions such as universities [2] and municipal departments such as [17, 37] using MCDM techniques such as AHP , TOPSIS and SWARA.

According to the hypotheses of this research explained in Section 3.6, which aims at diversifying the sources in order to understand the vision from various aspects, the criteria were elicitation or derived from previous studies, as in the Table 1 detailing the division of the main and sub-criteria and their definitions.

Table 1: Explanation of criteria for evaluating electronic document management systems

main criteria	Sub-criteria	brief definition	source
System Quality	**Usability**	EDMS should be easy to operate, easy to learn so that the system commands are easy to understand and remember. The user interface should have a consistent and attractive design with suitable multimedia and allow navigation and smooth and effective access to documents, data and information. EDMS should provide ease of customization, ease of archiving and reporting, user interface in multiple languages, online help, and protection from user errors.	[2, 3, 5, 12, 15, 18, 19, 23, 27, 28, 33, 38-44], ISO/IEC25010:2011
	Functionality Effectiveness	EDMS function: degree of coverage of operations (create, modify, view, distribute, share, save, store, search, archive, document retrieval, and destroy); Workflow management: managing the sequence of activities necessary to complete a specific task or project. It includes the totality of processes, steps and tasks that are organized in a logical and effective way to achieve specific goals; Service automation, support for office automation: (the possibility of collecting statistics, evaluating the work of employees, managing attendance, absences, leaves, salaries and incentives)	[3, 11, 17, 18, 20, 36, 43, 45], ISO/IEC25010:2011 ISO 12651-2:2014
	Performance	The performance criterion refers to how efficient the application, program, or system performing in terms of speed, responsiveness, stability, and resource utilization. Performance directly affects the user experience and the effectiveness of the software in achieving its intended purpose.	[3, 34, 38, 43, 46], ISO/IEC25010:2011

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	System reliability (Security, Privacy, and Access control)	Reliability in EDMS refers to the security and measures taken to protect software systems and data from security threats and vulnerabilities through: encryption of documents during transmission and storage; Achieving system and data privacy by controlling access and performing the authentication process (restricting access to the system and data and making it available to authorized persons only); Provide electronic signature and marking mechanism to achieve non-repudiation; And recovery after attacks and failures.	[2, 6, 10, 14, 17, 20, 26, 34, 35, 38, 39, 41, 45, 47], ISO/IEC25010:2011
	Flexibility	Adaptability and Replaceability: the ability of the system to support different file formats as input or output such as (.XML, .PDF, .DOC, .XLS, .JPEG, .TIFF, etc.) this allows the system to be upgraded or changed without losing input and the ability of the system to adapt to media degradation, hardware replacement and format obsolescence; Personalization: Enable the user to customize system interfaces; Degree of adjustment: The possibility of adding new enterprise units/modules to the system or upgrading the old ones should be provided.	[2, 10, 12, 28]
	Software Properties and Capabilities	The capabilities of EDMDs vary in terms of: Provides archive records, management and provision of statistics and reports, supports electronic signature, supports document status and tracking of documents through audit log, processing of several documents at different stages of processing in parallel mode, support for documents with multiple attachments and bonding between documents, and provides the possibility of automatic separation of documents , support for analysis and classification of documents, backup and user notification, support for interactive communication between employees, support for text recognition by OCR technology, search methods provided by the system: (search by browsing documents, regular search using keywords, advanced search by during multi-keyword queries and closed time periods).	[40, 46]
System strategy	**System Model (Local, server-client, web application)**	This indicates the type of system architecture that will be used, such as (local system, client-server, or web application). Each model has its benefits and limitations which must be carefully evaluated and the most appropriate model chosen for the organization.	[11, 46]
	Storage strategy (Local, server, cloud, hybrid)	This includes considering the type of storage technology that will be used, such as(local storage, server storage, cloud storage, or a hybrid model) that combines multiple storage options.	[8, 11, 20]
	available storage capacity	This criterion refers to the storage space provided by the system where the required and available storage capacity must be considered to ensure that it meets the needs of the organization.	[12, 20, 46]
	Integration and Compatibility	The EDMS must be able to integrate with other existing systems used by the organization. Compatibility with various software, must be evaluated to ensure seamless integration.	[2, 3, 10, 37, 43], ISO/IEC25010:2011
	ICT infrastructure readiness	This includes evaluating the ability of the EDMS to work according to the capabilities of the current ICT infrastructure in the organization to ensure its ability to support it. It also includes identifying any necessary upgrades or modifications to the infrastructure.	[3, 18, 43, 44]

	minimum number of workstations	EDMSs can be divided into categories: enterprise systems, wide area distributed interregional systems, and ultra-large distributed interregional systems covering many companies located in several countries or continents. The minimum number of workstations indicator helps the organization to choose the appropriate solution that provides the required number of workstations without exaggeration or waste of resources.	[11]
Data and Information Quality	**Document image resolution**	This refers to the level of detail and quality of the document images that will be stored in the EDMS. It is important to consider the intended use of the documents and the required image resolution.	[5, 6, 14, 15, 34, 41], ISO 12651-1:2014
	Data compression type	Indicates the compression technique that will be used to reduce the size of the stored data (lossy, lossless). The type of compression used can affect system performance and the quality of stored documents.	ISO14641:2018
Scope of EDMS	–	The purpose of this criterion is to specify the required field of work, as some of the systems direct to work within specific fields such as health care, banking, education, transportation, aviation, Industry, and other fields. This criterion contributes to selecting EDMS better fit with organizational structure, fits well for the specific task	[3, 9, 11, 23, 43, 45]
COST	–	The total amount of money that the organization will spend in order to complete the process of implementing and operating the system and continuing its work. This criterion includes: purchase cost, annual costs, operating expenses, consulting and training costs, maintenance costs, hardware costs, and any other related costs. The total cost should be evaluated to ensure that the EDMS fits within the organization's budget.	[2, 6, 10, 14, 19, 37, 40, 42, 44-46]
Vendor (Service Provider)	**Business Domain of the vendor**	The vendor's specialization between software solutions companies and companies specialized in managing the digital transformation process affects the level of service provided. Also, some providers are third parties, and this affects the support speed.	[45]
	Country of origin	EDMS can be classified according to the country of origin of the system, this criterion is a factor affecting the quality of the software as well as the cost and delivery of EDMS support. There is a clear difference between local and foreign EDMSs. This puts the beneficiary in front of two approaches, either supporting the national product or searching for high-quality performance.	[11]
	Vendor reputation	This criterion sheds light on the market position of the Vendor (the company's position in the market, the company's technical ability, and the company's financial position). These variables affect the level of trust and can be considered as indicators of project sustainability.	[17, 42, 45]
Service Level Agreement	**Possibility of Piloting and testing the**	Trial and testing the system before full implementation enables the beneficiaries to evaluate it and helps in identifying and addressing any problems or challenges that may arise.	[3, 18, 43]

	system		
	Implementation time (Project Duration)	The time required to implement an EDMS must be carefully evaluated and planned	[19, 37, 40, 45]
	Provide appropriate Users training	Users must be trained on how to use the EDMS to ensure that it is used effectively and efficiently	[3, 6, 9, 14, 15, 18, 19, 23, 27, 35-37, 39, 43, 48]
	After Sales Service	The vendor must provide after-sales service and support to ensure that the EDMS works optimally	[2, 9, 10, 12, 19, 27, 40, 45, 48]
	Online Advisory	The vendor must provide online consulting services to assist users with any challenges that may arise.	[47]
	Support Speed	The speed and responsiveness of vendor support services must be evaluated to ensure that users receive timely assistance.	[17]
	System Updating and Software enhancement	Vendor must provide regular system updates and software Enhancement and Scalability to ensure that the EDMS remains up-to-date, efficient, and scalability.	[42, 48]
	Assurance, Ensure Efficiency	Assurance, Efficiency Ensuring: EDM system assurance must cover its efficient and effective operation while meeting the organization's needs and objectives.	[3, 9, 41, 43]

3. Methodology

The methodology of this research involves two stages:

The first stage is the compilation of EDMS evaluation criteria, by detecting and understanding relevant research in the evaluation, selection, adoption or implementation of EDMS Thus, lead to extraction the criteria that can be used for evaluation and selection of EDMS Convenient to work in government institutions and organizations. This stage was done by conducting A Systematic Literature Review (SLR) based on the review protocol proposed by Kitchenham [38]. This methodology is based on the most accepted recommendations in the SLR and mainly focuses on determining why and how to obtain resources for the study [3].

The second stage is to check the suitability and adequacy of the EDMS evaluation criteria that were compiled in the first stage. Through conducting face-to-face interviews with experts in the field of information and communication technology, experienced managers and employees in the active joints of the institutions.

3.1 Research Questions (RQ)

Each SLR must have a set of questions that investigate the results of studies and not their classifications. In order to achieve the purpose of this study, the following research questions were formulated

1. RQ1: What are the necessary basic standards that must be met in an EDMS and what are the extra specifications available?
2. RQ2: What are the criteria for evaluating or selecting an EDMS?

By finding appropriate answers to these questions, we can achieve the objectives of this research characterized by identifying criteria that can be used to evaluate and select an EDMS for government institution or organization

3.2   Search strategy

At the beginning, when starting the search, the key terms "Electronic Document Management System" and "Multi Criteria Decision Making" were used to check that the analysis can cover as much of the most relevant research papers as possible that are most relevant to the themes of this study.

In order to complete the construction of the research string (query) and put the final touches, Following the approach of Kitchenham [49], the researcher took these steps:

- Conduct primary research using the key terms of the research questions to identify key concepts.
- Check any relevant papers to find out the keywords used and determine its relevance to the subject of research in this paper.
- Use the Boolean OR to link abbreviations, synonyms, and alternate spellings.
- Use Boolean AND to link the key words that represent the main research area.

The final form of the search string (query):

("Electronic Document Management System" OR EDMS) AND (Evaluation OR Selection OR Choosing OR Adoption OR Implementations) AND ("Multi Criteria Decision Making" OR MCDM)

To find the most relevant literature and gather high-quality data, Keywords and research strings ran through several online libraries and bibliographic databases such as: Science Direct, Springer Link, IEEE Xplore, Google Scholar, Taylor & Francis, DOAJ, Wiley Online Library, ACM Digital Library.
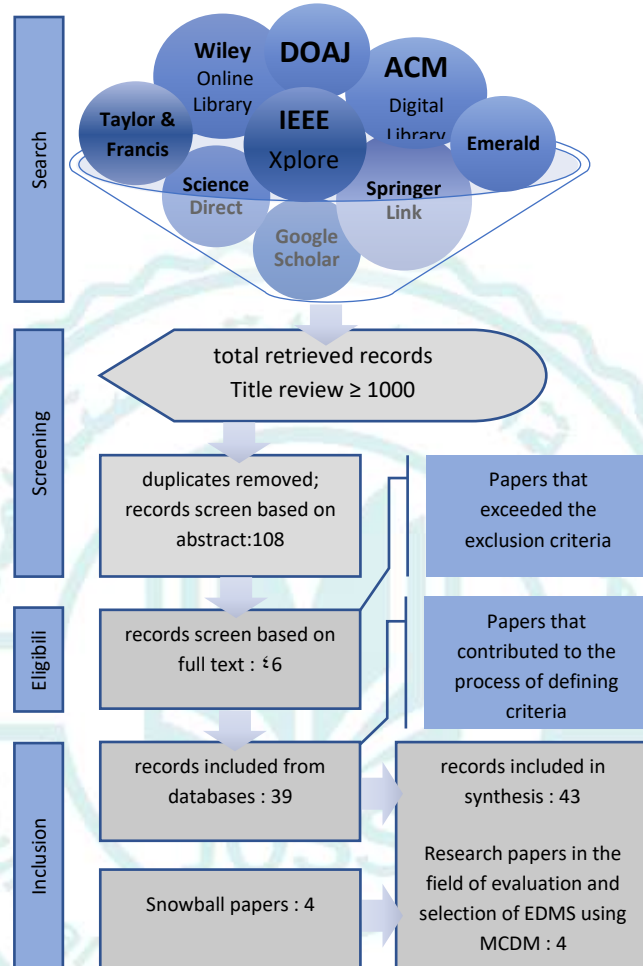
Fig. ١. Flowchart, showing the research stages and indicating the amount of papers during each stage

3.3   Criteria for inclusion and exclusion

1. In general, 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.
2. Access to the full text is available online.

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3. The selected literature should be research papers published in peer-reviewed scientific journals. Books, encyclopedias, notes and presentations are not accepted.
4. the literature used should address EDMS as the primary or secondary area of the research or describe the process of selecting software systems using MCDM techniques.
5. The activities described in the literature are not relevant to the evaluation or selection or implementation process of EDMS or do not do not explain the characteristics and specifications Or diagnose the reasons and factors for the success of implementation of EDMS.
6. combine EDMS with MCDM.

3.4 data collection stages:

The data extraction process from the literature took place in four steps shown in Fig. 1 and the details as follows:

1. Literature collection stage: involved searching using keywords or queries through online libraries and bibliographic databases previously mentioned. where it is noted that the use of keywords individually in the search ensures finding the largest possible number of research papers.
2. The application of inclusion and exclusion criteria: By reviewing the title of the study and/or its keywords, abstract. then applying the first four inclusion and exclusion criteria mentioned earlier, if the conditions are met, the study is initially accepted for the purpose of viewing the full text and then applying the other inclusion and exclusion criteria during the next stage
3. Verification of included/accepted papers: At this stage, after a group of papers passed the inclusion/exclusion criteria, a more accurate review of the papers was conducted as they are examined more comprehensively by diagnosing the objectives, problem statement, tools used in the research, challenges, results and recommendations. Thus, trying to find answers in these papers to the questions of this research
4. We distinguished the papers that contributed directly to the definition of criteria for evaluation, and its main objective was to conduct a selection process for the EDMS in specific institutions using MCDM techniques.

3.5 Collection of the Literature Body:

The Work to conduct this systematic literature review began at the end of June 2022, following the protocol suggested by Kitchenham [38] to obtain the literature for this review . During the first step of the literature collection, the results of the search in various libraries showed large numbers of results shown in the Table 2 most of these results were not related to the field of

this research, the reason may be mostly due to the similarity between the abbreviation (EDMS) or (EDM) with the abbreviations of keywords for the terms shown in the Table 3.

Table 2 :Preliminary results of the research process and the number of accepted papers

Database	research method	initial results	Papers accepted by reading the title	Accepted papers by reading the abstract and keywords	Number of included papers
Science Direct	Query	136	54	16	6
Springer Link	Query	353	47	28	8
IEEE Xplore	Query & Key words	433	49	22	15
Google Scholar	Query	102	36	12	11
Emerald insight	Query & Key words	38	9	4	2
Taylor & Francis	Query & Key words	45	3	1	1
DOAJ	Query & Key words	**46**	**0**	**0**	0
Wiley Online Library	Query & Key words	43	5	0	0
ACM Digital Library	Query & Key words	27	0	0	0

Table 3List of different terms whose abbreviations are similar

terms	abbreviations
Energy Data Management Systems	(EDMS)
Electric Dipole Moments	(EDMS)
Environmental Data Management software	(EDMS)
Electrical Discharge Machining	(EDM)
Educational Data Mining	(EDM)
Error Detection Mechanisms	(EDM)
Electronic Distance Measurement	(EDM)
Equivalent Dipole Moment	(EDM)
Emergency Decision Making	(EDM)

The research resulted in viewing nearly a thousand titles and reading more than a three hundred abstracts During this stage, (48) papers were collected that met the first four conditions of the inclusion and exclusion criteria, and they may answer the research questions from the researcher's view point.

The process of reading the full text was conducted for the papers for the purpose of extracting and defining evaluation and selection criteria, as well as finding answers to the other questions of this research.

Through these papers, the researcher extracted a set of information and definitions that covered various aspects of EDMS and learned about the solutions, capabilities, and benefits offered by these systems. During this stage, (٤) papers were diagnosed that directly dealt with the process of evaluating and selecting EDMS using MCDM techniques.

3.6   Research Hypothesis:

We found that there are differences between the literature in the number and type of selection and evaluation criteria for EDMS used by researchers or evaluators, and that there is no study that covers all possible criteria and used them without exception.

This difference between the set of criteria used in each study may be due either to meet the desire of a specific institution or to the reliance of the evaluators on a specific source to derive the criteria without conducting an extensive search from various sources on the criteria that can be used for evaluation and selection for EDMS.

Therefore, assuming that the diversity of sources, the elicitation of criteria may lead to understanding the vision from various aspects, the researcher developed a set of hypotheses for this study:

1- Selection and evaluation criteria can be compiled from the studies that conducted the EDMS selection process for specific institutions
2- Certain specifications or characteristics of EDMS can be used as selection and evaluation criteria
3- Selection and evaluation criteria can be formulated from some of the critical success factors associated with EDMS functionality
4 - Criteria for granting quality certification for software defined by the International Organization for Standardization (ISO), some of which can be used as selection and evaluation criteria for EDMS
5- Selection and evaluation criteria for EDMS can be derived from some of the opinions, suggestions or requirements of people working in the institution or experts in the field of information and communication technologies.
From this standpoint, the main and sub-criteria were collected and defined as shown in Table 1.

3.7   Preparing and Conducting Interviews with Experts:

After completing the process of collecting standards from the literature, a process of preparing an interview was conducted with a group of experts in the field of information and communication technology, managers with long experience and employees in active joints in

the institution, for the purpose of confirming the eligibility, appropriateness and adequacy of the set of standards and investigating the possibility of proposing other standards

The interview takes about 20 to 30 minutes. At first, a questionnaire is asked about personal information, years of experience, field of work, academic achievement, field of study, and specialization.

Then, definitions of the main and sub-criteria described in Table 1 are read, and the organizational structure of the criteria shown in Figure is reviewed.

The interview follows the qualitative method in analyzing the results, where the respondent discusses two axes, the first about the suitability of the criteria presented for the purpose of confirming them, and the second axis about the adequacy of the criteria for the purpose of investigating the possibility of the existence of other criteria not mentioned.

4. Results

The literature widely discussed the specifications of these systems, their capabilities, and how to build and improve them this answers RQ1. In addition, the researchers measured the factors that influence the success of EDMS adoption and identified critical success factors. While the problem of decision-making in the field of selecting an EDMS for government units has not been discussed well and widely and it is still open from a cognitive point of view.

After completing the literature review, we found a few papers that directly contributed to the selection and evaluation of EDMS for government institutions such as universities such as [2] and municipal departments such as [17, 37] using MCDM And using its techniques such as AHP , TOPSIS , SWARA ,

Based on hypotheses, we were able to extract evaluation and selection criteria for EDMS from 39 research papers, as shown in Table 1. And we have organized the criteria into main and sub-criteria as shown in Figure 2 .This answers RQ2.

To ensure that the criteria are appropriate and sufficient to conduct the evaluation, the interview was conducted with 20 experts, and the results indicate that 95% of the experts agree that the criteria are appropriate, as one of the experts believes that the criteria of ICT infrastructure readiness could be an excuse for not choosing a highly efficient system.

On the other hand, 80% of the experts agree that the set of criteria is sufficient to conduct the EDMS evaluation process. Where 10% of the experts suggested adding the criteria of reliability, and through clarification and requesting the definition of the criteria, it was found that it bears the same definition that the criteria of security and access control achieves, as well as one of the experts discusses adding the criteria of trust and during the discussion it became clear that what

is meant by the reputation of the seller and the guarantee of competence and these criteria were covered, one Respondents suggest adding a criterion for the duration of the system's operation, but despite the possibility of measuring and estimating the time, the duration of the system's operation may depend on many future variables and cannot be counted or predicted accurately. Also, the existence of a criterion for the duration of system implementation, after-sales services, updating and developing the system are effective factors in increasing the period during which the system remains in operation as effectively as possible.

In addition, 15% of the experts indicate that cost cannot be an obstacle, as the institution must provide sufficient financial aspect, despite their acceptance of the cost criterion as an evaluation measure. 35% of experts stress the importance of providing appropriate training .15% of the respondents affirm that the development and modernization of the system is a necessity .And 5% of them request that the update should be done after the approval of the beneficiary .Also, 10% affirmed the importance of security, confidentiality, and the electronic signature as a tool to prevent repudiation.

On the other hand, 15% of the respondents do not wish to compress the data, and 5% do not

Figure 2: organizational structure of Main criteria and sub-criteria

wish to have the feature to delete the document and An expert explains that parallel processing of documents may cause confusion. Finally, 5% of respondents underestimate the importance of
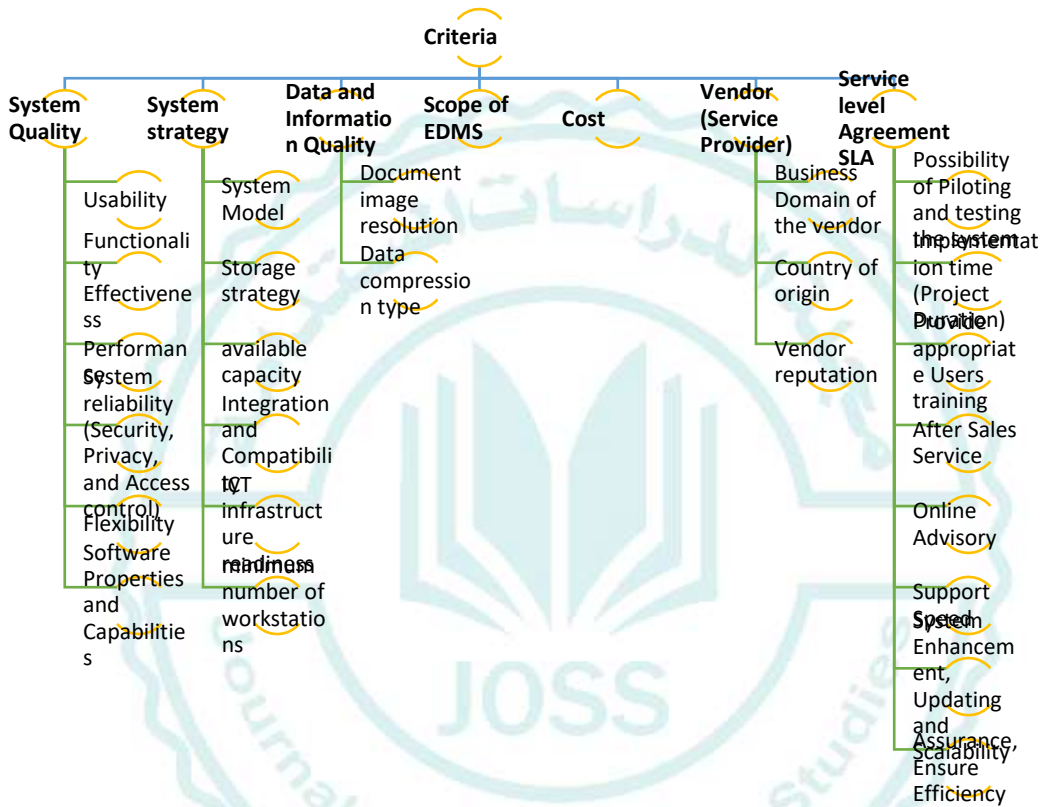
the country of origin criterion.

5. Discussion and Future Work

The advantages that EDMS offers, which help to facilitate work management, reduce costs, effort, time, and errors, increase the accuracy of work and production, provide transparency, protection, and automate office work, have made the need to use EDMS urgent in government institutions and public sector organizations. Additionally, using paper less is a step towards the digital transition and waste elimination. As a result, there is now a greater need and demand for selecting the best solutions. Although there are many EDMS, their features and specifications vary, and not all of them can be successfully deployed in governmental institutions and other organizations in the public sector. Additionally, selecting the system is a difficult task that is risky to carry out using conventional, routine methods.

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However, it is still necessary to achieve the best outcomes in the selection process related to the kind and quantity of criteria and sub-criteria required for the evaluation process, which determines whether EDMS is the most user-friendly, secure, quick, adaptable, and efficient among the alternatives. Although some studies used MCDM methodologies, they did not adhere to a uniform set of criteria, making it clear that choosing an acceptable EDMS for use in institutions and public sector organizations is not well addressed when looking at the pertinent literature.

Therefore, we followed the systematic literature review methodology for the purpose of all relevant literature as well, and for the purpose of expanding the area of extracting and formulating criteria, we formulated a set of hypotheses that contributed to extracting more criteria that can be used to evaluate EDMs, after which the set of criteria was presented to experts through an interview whose results were analyzed using the qualitative approach.

Through the results of the interviews analysis, it is clear that the extracted criteria are appropriate and sufficient in general from the point of view of the experts. On the other hand, the emphasis of some experts on the importance of some criteria opens the door to another question, which is how important each criterion is. Therefore, the importance of each criterion must be determined, and this is possible by conducting a weight for the criteria using one of the multi-criteria decision-making methods such as the AHP technique, and this is what we propose as future works.

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