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A Proposed Theoretical Model for Assessing the Quality of the Electronic Document Management Systems in the Construction Sector: A Case Study in Construction Companies

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This study aims to evaluate the quality attributes of the Electronic Documents Management systems (EDMS) and identify the direct impact of these quality attributes on achieving the satisfaction of employees in Jordanian construction companies. In addition, it aims to investigate the impact EDMS is attributing on the performance of these companies. The study uses a description analytical approach to collect data via a designed survey to be analysed using the SPSS package. The study sample includes (65) respondents working in construction companies. The results showed that there is a significant impact of quality attributes of EDMS on the satisfaction and performance of the companies that work in the construction sector. Moreover this study recommends for the Jordanian companies that work in this sector to adopt EDMS and developed strategy toward EDMS implemention, and pay more attention to the advantages of new systems that contribute in achieving a high quality service level raising the level of revenue for these companies.

Key words: *Electronic documents, management system, construction companies' quality.*

Introduction

Construction projects are considered one of the most important industries for the national economy as well as a vital indicator of the extent of development of and a measure of the degree of sophistication of a country. As the complexity of the construction projects

increased, many problems associated with manual document management and retrieval appeared (Hajjar & Abourizk, 2000). It is no secret to anyone that construction projects are related to more than one party, such as owner, supervision, contractor, etc, and is fragmented into more than one stage where this fragmentation increases the problems associated with document management (Elghamrawy & Boukamp, 2010). Any project will face challenges, and construction projects are no exception, as it faces many challenges related to accessing information, data, building documents, updated project plans, as well as how to save them. This has also led to problems in communication and information processing that have contributed to widespread rivalry between project parties (Nitithamyong & Skibniewski, 2004). Construction projects were forced to find the latest ways and means to confront these challenges in light of recent scientific and technological progress, which introduced a real revolution and radical turnaround on traditional methods in project management in general and construction projects in particular. The most recent of these methods is electronic management, which is no longer considered luxury but rather an imperative that has a fundamental role in the process of making decision and forecasting future steps. Electronic management includes electronic document management, as building document management is an essential component of the overall project management function (Hajjar & Abourizk, 2000).

Construction projects suffer from the increasing volume of production of documents of various kinds and how these are shared and distributed at company level, for example through e-mail systems that may exacerbate security problems with documents and controlling, tracking and retrieving them (Sutton, 1996). Building document management has contributed efficiently in setting the basic step for the building industry and increasing its productivity (Bjork, 2003).

Construction project management always seeks to raise the quality of its outputs and reduce their cost by following the best techniques that help these projects to reduce paper storage and the risks of paper damage, in addition to facilitating the process of monitoring and storing electronic documents or photocopies of paper documents and keeping multiple versions of them.

The Problem of the Study

The researchers, through their identification with construction projects and interviewing executive parties of these projects, noticed that the right kind of electronic documents management plays a major role in the success of these projects. On the contrary, poor management of electronic documents will lead to the misuse of the control components in construction in terms of execution time and has an impact on both the quality of execution and the cost of execution of the projects.

They also indicated that when an electronic documentation mechanism is missing it's accompanied with the existence of many problems related to the current documentation process, namely:

The loss of some important documents; the loss of time and effort in searching files and information; the dispersion of documents, drawings and plans; the difficulty of restricting and classifying documents and plans; the need for places to store files and documents due to the huge increase in paperwork.

Moreover, construction projects suffer from poor communication between the project's parties, because execution sites of some construction projects are in locations physically far away from the administration offices. Therefore, there must be a system for managing electronic documents so that the project's parties can view all the files and updated project plans in a direct way unrelated to location to avoid execution problems.

Importance of the Study

The importance of the study emerges from the following:

1. The construction sector, which is considered one of the most important economic sectors in terms of activity rates, absorption of employment, creation of employment opportunities, and interaction with other economic sectors, and contributes significantly to the local productivity.
2. Promoting utilisation of modern document management techniques in the management process of the construction project attributes greatly to the success of the project.
3. It's essential to provide those who are interested in the construction sector, either contractors, consultants and engineering offices, etc., with information about the use and importance of electronic document management.
4. The necessity of clarification of the standards affecting the quality of electronic document management in construction projects.

Study Questions

Main Questions

1- Does the quality of electronic document management systems impact on the satisfaction of users working in Jordanian construction companies?
2- Does the quality of electronic document management systems impact on the performance of the systems used by Jordanian Construction Companies?

Sub Questions

1- Does the quality of the content of the Electronic Documents Management system impact on the satisfaction of users working in Jordanian construction companies?
2- Does the quality of the design of the Electronic Documents Management system impact on the satisfaction of users working in Jordanian construction companies?
3- Does the quality of the organisation of the Electronic Documents Management system impact on the satisfaction of users working in Jordanian construction companies?
4- Does the degree of ease of use of the Electronic Documents Management system impact on the satisfaction of users working in Jordanian construction companies?
5- Does the quality of the content of the Electronic Documents Management system impact on the performance of the systems applied at Jordanian Construction Companies?
6- Does the quality of the design of the Electronic Documents Management system impact on the performance of the systems applied at Jordanian Construction Companies?
7- Does the quality of the organisation of the Electronic Documents Management system impact on the performance of the systems applied at Jordanian Construction Companies?
8- Does the degree of ease of use of the Electronic Documents Management system impact on the performance of the systems applied at Jordanian Construction Companies?

Study Objectives

This study aims mainly to:

1. Present a suggested model that evaluates the quality of the electronic document management system of the construction sector in Jordan.
2. Measuring the effectiveness of the electronic document management systems applied in the construction sector in Jordan.

Sub-objectives

1. Explaining the most important factors that affect the quality of the electronic document management system.
2. Identifying the importance of electronic authentication management.
3. Identifying the opportunities to improve the current electronic document management systems.
4. Exploring the experiences of construction companies in Jordan in applying the electronic document management systems.

Research Hypotheses

First Main Hypothesis

H_{01}: The quality of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.

Second Main Hypothesis

H_{02}: The quality of the Electronic Documents Management system has no statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

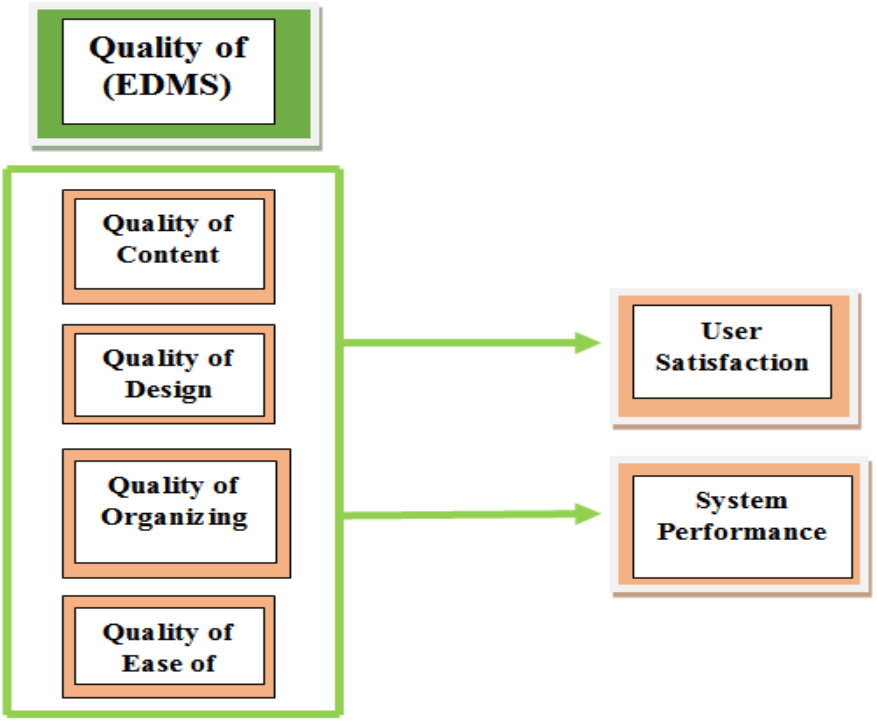
Sub Hypotheses

$H_{01\text{-}1}$: The quality of the content of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.
$H_{01\text{-}2}$: The quality of the design of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.
$H_{01\text{-}3}$: The quality of the organisation of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.
$H_{01\text{-}4}$: The degree of ease of use of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.
$H_{02\text{-}1}$: The quality of content of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.
$H_{02\text{-}2}$: The quality of the design of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.
$H_{02\text{-}3}$: The quality of the organisation of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.
$H_{02\text{-}4}$: The degree of ease of use of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

Study Model

Figure 1 represents the study model where the independent variable is the quality of Electronic Document Management System (EDMS) and the two dependent variables are user's satisfaction and system performance.

Figure 1. Study Model



Theoretical Background

The task of managing documents and records goes far back, even before the beginning of civilisation. Our early ancestors, the cave dwellers, used to draw pictures on the walls of their caves, depicting events of their times. This can be thought of as the earliest known form of record keeping, i.e., recording events for future reference. Egyptian hieroglypltics are another example of primitive record keeping. In both these cases, historians have been able to obtain information indirectly of people from bygone eras about the environment and activities at the time.

In the 1980's, most of the available systems were Document Image Processing (DIP) systems that could be equal to a filing cabinet where documents could be scanned, indexed, and stored in the system for the purpose of retrieval either on the screen or by printing.

Some of the more advanced DIP systems also included elements of workflow, which allowed the organisation to route scanned documents (images) around the organisation. For example, an organisation could scan their incoming mail, and then those scanned images could be routed to designated staff for processing. Electronic Document Management Systems (EDMS) emerged in the 1990's. EDMS generally integrated with applications such as Microsoft Office and allowed users to manage documents actively, which could then be stored and indexed in a document repository. They could be checked in and checked out and versions and revision cycles tracked changes using versioning control. Some of these systems also included DIP functionality, which allowed both conventional paper and electronic files to be scanned, indexed, and archived.

Sprague (1995) defined a document as a set of information pertaining a topic structured for human comprehension, represented by a variety of symbols, and is stored and handled as a unit. This definition includes contracts and agreements, reports, manuals, handbooks, business forms, E-mails and voice mails, drawings, blueprints and photographs, etc.

Başıbüyük & Ergüzen (2015) defined Electronic Document Management Systems (EDMS) as systems that prepare and upload documents to computers with the ability to save document header information (document name, document editors, document type, document date, subject, abstract, page number etc..) as well as the ability to make changes on the document. Moreover, (EDMS) has the ability to share the document with different users; ending with archiving the document and based on the principle of managing all of the stages.

The development of cost effective electronic document management systems has been made possible through the evolution of several key computer science technologies. These technologies include the following:

1. Economical Compact Digital Storage Technology.
2. Electronic Scanning Technology
3. High Speed Communications Technology
4. Image Display Technology
5. Image Compression

Previous Studies

(Ahmad et al., 2017) Study: aimed to identify the electronic and paper document management systems applied in a sample of small-size Jordanian Construction companies. The study applied interviews and questionnaires to investigate and evaluate the components, processes and challenges of the current Electronic Document Management Systems as well as to verify the electronic formatting of the used documents and files in small-size construction

companies. The study concluded that most of the investigated documents in these companies were in electronic format, but there was still a need for an effective Electronic Document Management System to achieve successful results within the organisation. The study also concludes on a set of barriers for adopting electronic systems such as: implementing and applying these, systems may need a major investment of time, effort and money, while benefits may need time to be noticed. In addition, employees may be unwilling to learn the new methods and procedures of applying a new system.

(Yatin et al., 2015) Study: titled "Electronic Document Management System: Malaysian Experience." This study is designed to investigate the usage and effectiveness of the implementation Generic Office Environment-Electronic Government Document Management System (GOE-EGDMS). Questionnaires were collected through web-survey and were analysed using Exploratory Factor Analysis, Confirmatory Factor Analysis and Structural Equation Modeling (SEM). The study aimed to determine the factors that affect the utilization and the effectiveness of Document Management Systems in public organisations. The study results included that there is a positive relationship between service quality and information quality. In addition, service quality has a positive impact on the user's satisfaction while information quality has both a positive individual impact and the increased user's satisfaction. Moreover, user's satisfaction has a positive impact on the individual impact, which in turn has a positive organisational impact. So, service quality and information quality are greatly related, henceforth, implementing Electronic Document Management Systems will lead to an increasing efficiency of the workers, downsizing personnel numbers, improving of services, minimizing storing space and eliminating duplication of work by different government offices.

(Burtylev, et al., 2013) Study: This article featured the advantages of Electronic Document Management Systems. The effectiveness of implementing these systems was evaluated where the selection of appropriate software tools for developing Document Management Systems is undertaken. The problems of these systems and their solutions were studied with the aid of software implementation in enterprises. In addition, examples of successful electronic document management systems were presented in some organisations such as inventory control, trade, inventory, concrete and home services. This study found that arranging electronic documents brings great economic benefits to the organisation. It must choose an electronic document management system appropriately suited to its work and ensure its implementation where the implementation period may reach from one week to a year or more, depending on the degree of its complexity. This study also, emphasized the need to train and upgrade the employees.

(Wang & Plume, 2012) Study: This study aims to provide a comprehensive review of the stages of using Document Management Systems in construction industry. While it is widely

accepted that Document Management Systems can provide easy access and safe storage of project documents and information, there are some problems with using these systems effectively. In this study, it was found that there was a lack of document management skills and absence of well-defined Document Management processes, and there were no established standards for monitoring and management of the construction industry. This research paper summarized the main issues related to the current status of using Document Management Systems in construction industry, and proposed a research agenda for the use of BIM to facilitate more efficient document and information management of the project.

(Wong & Sar, 2012) Study: This study investigated and explored the benefits, obstacles, and acceptance of the Electronic Document Management System via the Internet by the parties involved in the construction and building industry. The data collected from interviews and questionnaires by those interested in the construction sector showed that construction workers in Hong Kong started to adopt a new Electronic Document Management System. However, they have a limited experience in this field and the use of the Electronic Document Management System led to enhancing the communication between the parties on the construction project, improving communication, saving time and costs as well as improving work quality.

(Al Shibly& Al-Nsour, 2007) Study: This paper aimed to identify the most important factors that influence EDMS success. A survey questionnaire was distributed with 136 participants from two selected Jordanian municipalities that participated in this study. The results showed six key factors for EDMS success, namely: organisational readiness, support for senior management and commitment to develop EDMS, perceived cost savings, as well as citizen service that enhances perceived benefits, time savings and productivity.

(**Brumec et al., 2006) Study:** This study analysed some features of current document systems in the public sector in Croatia. The study discussed the needs of restructuring commercial operations that are concerned with generating relevant official decisions for the end users (individuals and companies), it also suggested a practical model for designing Document Management Systems (DMS) based on modern information and communication technologies that could manage and support the use of documents in the system.

This study found the following:

1. Dealing with unstructured documents that contain large amounts of data collected over many years differs greatly in profit-making organisations from government and public services organisations.
2. The implementation of a Document Management System entails additional costs for migrating old documents to the new document system. However, a profit and return on

investment will be achieved after four years, by reducing the need for physical archiving space, and increase in high-quality customer service.

(Matheu, 2005) Study: In this thesis, the applied electronic document management systems and their shortcomings were studied in small and medium-sized companies in the construction industry in Spain. This study proposed a model for information flow and designed a guide for managing documents through the Internet, applicable to various construction projects, regardless of their complexity, size and duration of execution. This thesis targeted 30 companies concluding that from small and medium companies' perspective the main challenges lie in the lack of a unified documents system and the inefficiency of the flow of information from various sources (documents stored in the electronic document management system). In addition, this study noted that SMEs in Spain use EDMS slightly compared to other countries in Europe. This study confirmed that electronic document management systems allow storing documents and facilitate their exchange between all workers in construction projects and enabling them to view the final copies in the event of any amendment.

(Bjork, 2003) Study: This study showed that there is a rapid growth in the use of the electronic document management systems in the construction industry in Sweden and Finland, especially in major projects. The study concluded that the obstacles hindering the implementation of the electronic document management systems in construction projects related to the technical problems of the systems and to their cost.

(Giandon et al., 2002)Study: This research paper showed how the implementation of electronic document management (EDM) could contribute to the management of the architecture and construction engineering sector (ACE), especially in the design process. This paper clarified the basic concepts of EDM and their application in the design process as it was based on ideas previously submitted by (Koskela, 1992 and Tzortzopoulos and Formoso, 1999). The following concepts were discussed: "Reducing the share of non-value-added activities, reducing variance, reducing cycle time, simplifying by reducing the number of steps and parts, increasing output flexibility, increasing process transparency, improving flow while optimizing conversion." This paper showed some of the problems that hinder document management in the design process, namely: conflicts in design processes, lack of communication between project parties and duplication in design.

An Electronic Document Management System comprises of the following components: Image scanners, High-speed communications interface, Mass storage, Displays, Hard copy output devices (see Figure 2).

Whereas Figure 3 illustrates the several levels of software included in Electronic Management System.

Figure 2. Typical Components of Electronic Document Management System

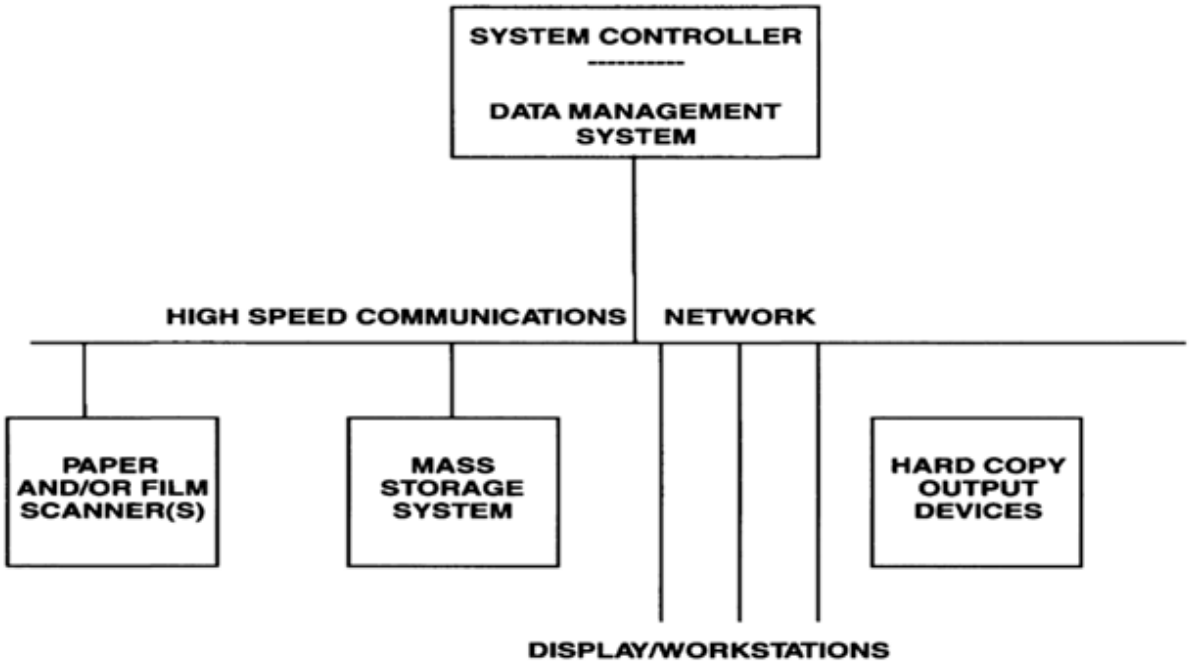
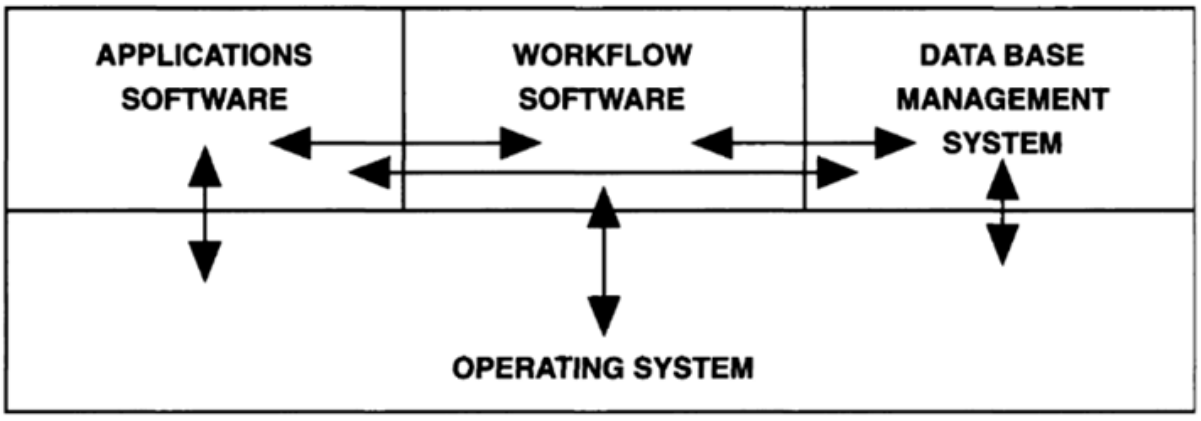


Figure 3. Software Structure within a Typical Electronic Document Management System



The Population of the Study

The study population consist of the workers in the field of electronic documents management systems in construction companies in Jordan.

A sample of 65 respondents was selected, where all the respondents are administrative and operational practitioners, and they all work with electronic document issues.

Analysis

Stability and Reliability of the Study Instrument

The Face validity of the instrument of the study has been verified by presenting it to a group of arbitrators who have ample experience and knowledge in the field of applied statistics and Electronic Business. The questionnaire has been modified according to the suggestions of the arbitrators. In order to check the reliability of the study instrument, the researchers have used Cronbach's Alpha as shown in table 1, which demonstrated that the instrument is acceptable for measuring the variables of the study.

Table 1: The Reliability Results of the Instrument of the Study (Internal Consistency of the Items of the Questionnaire)

Main Variables	**Sub-variables**	**No. of Items**	**Cronbach's Alpha**
Quality of EDMS	Quality of Content	6	0.79
	Quality of Design	5	0.66
	Quality of Organisation	4	0.74
	Ease of Use	4	0.80
User Satisfaction		6	0.73
System Performance		7	0.78

Descriptive Statistical Analysis

Likert five point scale was selected since is considered one of most important scales of performance and is used as an instrument to measure opinions and perceptions because it is easy to understand and its degrees are balanced. Each point in the scale has been given a score according to the Likert scale score, see table 2.

Table 2: Likert scale scores

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

The convenience of the items of the questionnaire has been divided into three levels, see table 3.

Table 3: Convenience Levels

No.	Convenience degree	Range
1	Low	1-2.33
2	Moderate	2.34-3.67
3	High	3.68-5

The items of the variables of the study have got the following scores as shown in table 4.

Table 4: Descriptive Analysis of the Item of the Questionnaire

	Variable	Mean	S.D.	Conv.
A	**Quality of Content**	2.57	1.05	Moderate
1	Information is updated by the system	3.38	1.07	Moderate
2	The system presents information in more than one language	2.57	1.10	Moderate
3	Information is presented in many various forms	2.77	1.09	Moderate
4	The information presented by the system is precise	1.48	0.50	Low
5	The presented information is convenient to the company in content comprehensiveness and details	1.97	1.20	Low
6	The presented information is reliable	3.26	1.05	Moderate
B	**Quality of Design**	2.90	0.83	Moderate
1	The system is attractive in terms of innovation in design and beauty in pictures and animation	3.37	1.05	Moderate
2	The design is suitable, convenient and the figures are appropriate according to the service provided	2.17	1.10	Moderate
3	The background characteristics and colours used are well matched.	2.88	1.05	Moderate
4	The visual and audio characteristics that are used are well designed	3.06	1.06	Moderate
5	Text characteristics are suitable	3.00	1.06	Moderate
C	**Quality of Organisation**	3.05	1.12	Moderate
1	All presentation pages are consistent and compatible	3.05	1.27	Moderate
2	There is a suitable system map and links to the page to help browse	3.06	1.17	Moderate
3	The system contains links to the web	3.02	1.28	Moderate
4	The information is represented in a well-organised way on the pages	3.08	1.28	Moderate
D	**Ease of Use**	2.90	.071	Moderate
1	The system is easy to use and can be browsed as well as used to find information	2.88	1.05	Moderate

2	The titles, the characteristics and the nature of the system are authentic	3.09	1.03	Moderate
3	The security of the user's information is preserved	3.03	1.09	Moderate
4	The interactivity of the system is acceptable and there are feedback tools	2.62	1.07	Moderate
V 1	**User Satisfaction**	3.29	0.81	Moderate
1	I benefit of EDMS in My work	3.43	1.12	Moderate
2	I trust the used EDMS	3.32	0.95	Moderate
3	I am able to use EDMS	3.23	1.10	Moderate
4	The response to the requirements of the users of EDMS is high	3.12	1.24	Moderate
5	The equipment used in EDMS is suitable to the nature of the work	3.28	1.15	Moderate
6	The users of the system are able to adapt with requirements of the job.	3.39	1.36	Moderate
V 2	**System Performance**	3.03	0.63	Moderate
1	The current DBMS is used to store, retrieve, add, modify, delete, and present	3.00	0.98	Moderate
2	The system takes care not to duplicate the data stored	3.08	0.99	Moderate
3	The system used a computerized network that connects all branches of the companies for data storage and transfer	2.95	0.99	Moderate
4	The software used enables more than one user at the same time	2.98	0.93	Moderate
5	The system reduces paperwork	2.92	0.96	Moderate
6	The used system helps with analysis, classification and summarization and retrieval of Data and information	3.14	1.06	Moderate
7	The system enables users to flexibly exchange data	3.17	1.63	Moderate

From table 4, it is noticed that the variable quality of content (A) has got a moderate convenience score with 2.57 Mean and 0.57 Standard Deviation (S/D). Item A1 has ranked first with a moderate convenience scoring 3.38 Mean and 1.07 S/D. While item A4 ranked last with a low convenience scoring 1.48 Mean and 0.50 S/D. It is also noticed that for the variable quality of Design (B) scored a moderate convenience with 2.90 Mean and 0.83 S/D. Item B1 has ranked first with a moderate convenience scoring 3.37 Mean and 1.05 S/D. While item B2 ranked last with a moderate convenience scoring 2.17 Mean and 1.10 S/D. Furthermore, it is noticed that for the variable quality of Organising (C) scored a moderate convenience with 3.05 Mean and 1.12 S/D. Item C4 has ranked first with a moderate convenience scoring 3.08 Mean and 1.28 S/D. While item C3 ranked last with a moderate

convenience scoring 3.02 Mean and 1.28 S/D. The variable Ease of Use (D) has got a moderate convenience with 2.9 Mean and 0.71 S/D. Item D2 has ranked first with a moderate convenience scoring 3.09 Mean and 1.03 S/D. While item D4 ranked last with a moderate convenience scoring 2.62 Mean and 1.07 S/D. The dependent variable user satisfaction (V1) has got a moderate convenience with 3.29 Mean and 0.81 S/D. Item V1_1 has ranked first with a moderate convenience scoring 3.43 Mean and 1.12 S/D. While item V1_4 ranked last with a moderate convenience scoring 3.12 Mean and 1.24 S/D. The dependent variable system performance (V2) has a moderate convenience with 3.03 Mean and 0.63 S/D. Item V2_7 has ranked first with a moderate convenience scoring 3.17 Mean and 1.63 S/D. While item V2_5 ranked last with a moderate convenience scoring 2.92 Mean and 0.96 S/D.

Table 5: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statis-tic	Stat.	Stat.	Stat.	Stat.	Stat.	Std. Error	Stat.	Std. Error
A	65	1.33	3.83	2.5702	.56595	-.128	.297	-.528	.586
B	65	1.00	5.00	2.8954	.82622	.075	.297	-.391	.586
C	65	1.00	5.00	3.0500	1.12083	-.095	.297	-.968	.586
D	65	1.50	4.50	2.9038	.70944	.206	.297	-.606	.586
V1	65	1.74	5.00	3.2878	.80539	-.107	.297	-.767	.586
V2	65	1.64	4.49	3.0312	.63125	-.167	.297	-.326	.586
Valid N (listwise)	65								

From table 5, it is observed that all independent and dependent variables have Skewness and Kurtosis in the period ± 2.00. Henceforth, the distribution of these variable could be considered to be normal with sufficient confidence. This is approved by the result of Shapiro-Wilk Test shown in Table 6, where Sig. value is greater than 0.5 (Field, 2005).

Table 6: Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig.
A	.978	65	.285
B	.987	65	.720
C	.965	65	.056
D	.969	65	.102
V1	.977	65	.265
V2	.986	65	.654

Hypothesis Testing

In order to test the hypotheses Multiple Stepwise Linear Regression is used. To ensure the validity of the regression model, a multicollinarity test was performed as shown in the following tables (9) and (12). Since the values of VIF of all variable were less than 10 and the values of Tolerance is greater than 0.1 this confirms that the model has no problem of multicollinarity.

First Main Hypothesis: in order to test this hypothesis we are stating, "*The quality of the Electronic Documents Management systems has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.*"

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.933[a]	.870	.868	.29457
2	.975[b]	.951	.950	.18174
3	.984[c]	.969	.967	.14641
4	.994[d]	.988	.987	.09366

a. Predictors: (Constant), C
b. Predictors: (Constant), C, B
c. Predictors: (Constant), C, B, A
d. Predictors: (Constant), C, B, A, D
e. Dependent Variable: V1

From table 7, the largest coefficient of determination R^2 equals 0.988 for the model no. 4 which implies that model 4 is the most suitable model for explaining the variance in the

dependent variable user satisfaction (V1) and interpreting 98.8% of the variance in it due to the change in the four independent variables as suggested by the model. So the four independent variable (A, B, C, and D) entered the regression equation.

Table 8: ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.659	1	36.659	422.473	.000[a]
	Residual	5.467	63	.087		
	Total	42.125	64			
2	Regression	40.077	2	20.039	606.704	.000[b]
	Residual	2.048	62	.033		
	Total	42.125	64			
3	Regression	40.818	3	13.606	634.736	.000[c]
	Residual	1.308	61	.021		
	Total	42.125	64			
4	Regression	41.599	4	10.400	1.186E3	.000[d]
	Residual	.526	60	.009		
	Total	42.125	64			

a. Predictors: (Constant), C
b. Predictors: (Constant), C, B
c. Predictors: (Constant), C, B, A
d. Predictors: (Constant), C, B, A, D
e. Dependent Variable: V1

From table 9, the sig. value for model 4 indicates that the overall regression model is a good fit for the data.

Table 9: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.090	.107		10.219	.000		
	C	.675	.033	.933	20.554	.000	1.000	1.000
2	(Constant)	.577	.083		6.958	.000		
	C	.454	.030	.627	15.245	.000	.464	2.155
	B	.411	.040	.418	10.174	.000	.464	2.155
3	(Constant)	.202	.092		2.193	.032		
	C	.479	.024	.661	19.658	.000	.450	2.222
	B	.325	.036	.331	9.133	.000	.387	2.585
	A	.212	.036	.148	5.876	.000	.801	1.248
4	(Constant)	-.149	.070		-2.138	.037		
	C	.373	.019	.515	19.457	.000	.297	3.368
	B	.142	.030	.144	4.732	.000	.224	4.469
	A	.254	.024	.177	10.797	.000	.773	1.294
	D	.378	.040	.331	9.437	.000	.170	5.891

a. Dependent Variable: V1

From table 9, The general form of the equation to predict the dependent variable User Satisfaction (V1) is represented by Equation 1 represented below.

$$V_1 = 0.373 * C + 0.142 * B + 0.254 * A + 0.378 * D - 0.149 \qquad \text{Eq. 1}$$

So, an increase in the variable quality of Organisation (C) by one unit will participate by 0.373 increase in the variable User Satisfaction (V1). The increase in the variable quality of design (B) by one unit will participate by 0.142 increase in the variable User Satisfaction (V1) while the increase of variable quality of content by one unit will participate by 0.254 increase in the variable User Satisfaction (V1). This is in contrast to the increase in the variable ease of use (D) where a unit increase will contribute to 0.378. From this equation it is evident that the ease of use comes in at first rank in contributing to the dependent variable User satisfaction followed quality of organisation, quality of content and, finally, quality of Design.

H_{01-1}: The quality of Content of the Electronic Documents Management system has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 9) equals 0.000 for the variable (A), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The quality of Content of the Electronic Documents Management systems has a statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies."

H_{01-2}: The quality of Design of the Electronic Documents Management systems has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 9) equals 0.000 for the variable (B), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The quality of Design of the Electronic Documents Management systems has a statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies."

H_{01-3}: The quality of organisation of the Electronic Documents Management systems has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 9) equals 0.000 for the variable (C), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The quality of organisation of the Electronic Documents Management systems has a statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies."

H_{01-4}: The ease of Use of the Electronic Documents Management systems has no statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 9) equals 0.000 for the variable (D), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The ease of Use of the Electronic Documents Management systems has a statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies."

Second Main Hypothesis

H_{02}: The quality of the Electronic Documents Management systems has no statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.911[a]	.830	.828	.26692
2	.946[b]	.895	.891	.21172
3	.982[c]	.964	.962	.12509
4	.986[d]	.972	.970	.11047

a. Predictors: (Constant), B
b. Predictors: (Constant), B, C
c. Predictors: (Constant), B, C, A
d. Predictors: (Constant), B, C, A, D
e. Dependent Variable: V2

From table 10, the largest coefficient of determination R2 equals 0.972 for the model no. 4 which implies that model 4 is the most suitable model for explaining the variance in the dependent variable user satisfaction (V2) and interpreting 97.2% of the variance in it due to the change in the four independent variables as suggested by the model. So the four independent variable (A, B, C, and D) entered the regression equation.

Table 11: ANOVA[e]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.947	1	21.947	308.047	.000[a]
	Residual	4.488	63	.071		
	Total	26.435	64			
2	Regression	23.656	2	11.828	263.867	.000[b]
	Residual	2.779	62	.045		
	Total	26.435	64			
3	Regression	25.481	3	8.494	542.827	.000[c]
	Residual	.954	61	.016		
	Total	26.435	64			
4	Regression	25.703	4	6.426	526.568	.000[d]
	Residual	.732	60	.012		
	Total	26.435	64			

a. Predictors: (Constant), B
b. Predictors: (Constant), B, C
c. Predictors: (Constant), B, C, A
d. Predictors: (Constant), B, C, A, D
e. Dependent Variable: V2

From table 11, the sig. value for model 4 indicates that the overall regression model is a good fit for the data.

Table 12: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.761	.122		6.259	.000		
	B	.709	.040	.911	17.551	.000	1.000	1.000
2	(Constant)	.723	.097		7.489	.000		
	B	.496	.047	.638	10.552	.000	.464	2.155
	C	.214	.035	.373	6.175	.000	.464	2.155
3	(Constant)	.135	.079		1.718	.091		
	B	.362	.030	.466	11.900	.000	.387	2.585
	C	.253	.021	.441	12.171	.000	.450	2.222
	A	.333	.031	.294	10.799	.000	.801	1.248
4	(Constant)	-.052	.082		-.633	.529		
	B	.264	.035	.340	7.478	.000	.224	4.469
	C	.197	.023	.343	8.706	.000	.297	3.368
	A	.356	.028	.313	12.813	.000	.773	1.294
	D	.202	.047	.223	4.268	.000	.170	5.891

a. Dependent Variable: V2

From Table 12, The general form of the equation to predict the dependent variable System Performance (V2) is represented by Equation 2 represented below.

V_1=0.197*C+0.264*B+0.356*A+0.202*D-0.052 Eq. 2

So, an increase in the variable quality of Organising (C) by one unit will participate by 0.197 increase in the variable System Performance (V2). The increase in the variable quality of design (B) by one unit will participate by 0.264 increase in the variable System Performance (V2) while the increase of variable quality of content by one unit will participate by 0.356 increase in the variable System Performance (V2) in contrast of the increase in the variable ease of use (D) where a unit increase in it will contribute to 0.202. From this equation it evident that the quality of content comes in the first rank in contribution to the dependent variable User satisfaction followed quality of Design, quality of content and finally quality of organising.

H_{01-1}: The quality of Content of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 12) equals 0.000 for the variable (A), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The ease of Use of the Electronic Documents Management system has a statistically significant impact on the satisfaction of the users working at Jordanian Construction Companies."

H_{01-2}: The quality of Design of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 12) equals 0.000 for the variable (B), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The ease of Use of the Electronic Documents Management system has a statistically significant impact on the performance of the systems at Jordanian Construction Companies."

H_{01-3}: The quality of organisation of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

H_{01-4}: The ease of Use of the Electronic Documents Management system has a statistically significant impact on the performance of the systems applied at Jordanian Construction Companies.

Since the sig. value in the coefficient table of the model 4 (Table 12) equals 0.000 for the variable (D), then the null hypothesis is failed and we accept the alternative hypothesis stating that "The ease of Use of the Electronic Documents Management system has a statistically significant impact on the performance of the systems at Jordanian Construction Companies."

Conclusions and Recommendations

The findings of description analysis confirm the high importance of EDMS in increasing the performance of companies in construction sector as perceived by their employees and that the design of the system is considered as an highly important attribute of the EDMS.

The results showed that there is a high awareness by employees toward the effect system on the performance of EDMS companies the work construction sector.

The overall evaluation of the availability of the attributes of EDMS is moderate as perceived by the research sample. This explains the reason that companies in this sector maintain a

good competitive image. Furthermore the results show a significant impact of the quality EDMS on the satisfaction of the users working at Jordanian companies in the construction sector.

Finally, the results prove the direct impact quality has on the performance of the applicable EDMS at Jordanian companies that work in construction sector.

This study recommends that the contracting companies implement electronic document management systems and train the employees of their companies.

It also recommends for others to assess the characteristics that evaluate the electronic document management system in a more comprehensive study.

The researchers hope that in the future they will study the challenges facing companies in implementing the electronic documents management systems.

REFERENCES

Ahmad, H. S., Bazlamit, I. M., & Ayoush, M. D. (2017). "Investigation of Document Management Systems in Small Size Construction Companies in Jordan". Procedia Engineering, 182, pp. 3–9. Do10.1016/j.proeng.2017.03.101

Al Shibly,H., Al-Nsour,M., (2007) "Prerequisites of Electronic Documentation Management System (EDMS) success" . Conference Paper, Information Management in the Networked Economy: Issues & Solutions, pp.125-130. 10.13140/RG.2.1.3503.7603.

Başıbüyük, M., Ergüzen, A. (2015). "Electronic Document Management System for Kırıkkale University." Unified Journal of Computer Science Research, Vol. 1, No. 2, pp. 008-015.

Bjork, B-C. (2003) "Electronic Document Management in Construction-Research Issues and Results" . Journal of Information Technology in Construction, Vol. 8, pp. 105-117.

Burtylev, I.N., Mokhun,K.V., Bodnya,Y.V., Yukhnevich,D.N., (2013). "Development of Electronic Document Management Systems: Advantage and Efficiency", Science and Technology, Vol. 3, No. 2A, pp. 1-9. doi: 10.5923/s.scit.201301.01.

Brumec, J., Dobrović, Ž., Tomičić, M., (2006). "The model of the document management system in the public sector", Journal of Information and Organisational Sciences, Vol. 30, No.1, pp. 29-46.

Elghamrawy, T. and Boukamp, F., (2010). "Managing construction information using RFID-based semantic contexts", Automation in Construction, Vol.19,No.8, pp.1056-1066.

Field, A. (2005). Discovering Statistics Using SPSS, Second Edition, SAGE Publications Ltd, London, UK.

Giandon, A., Junior ,M., Scheer, S., (2002). "Implementing electronic document management system for the Lean design", Proceedings IGLC-10, Gramado, Brazil.

Green, W. (1993). "Electronic Document Management Systems" First Edition, Academic Press, INC., San Diego, CA, USA.

Hajjar, D., AbouRizk, S. M. (2000). "Integrating Document Management with Project and Company Data". Journal of Computing in Civil Engineering, ASCE, Vol.14,No.1, pp. 70-77.

Matheu,N.F., (2005). “Life cycle Document Management System for Construction”, ,PhD thesis, UNIVERSITAT POLLITECNICA DE CATALUNIA.

Nitithamyong, P. and Skibniewski, M. J., (2004). “Web-based construction project management systems: how to make them successful?” Automation in Construction,Vol.13,No.4, pp.491-506.

Sprague Jr., Ralph H., (1995), “ Electronic Document Management: Challenges and opportunities for information systems managers MIS Quarterly”, Vol. 19, Issue 1, No. 1, pp. 29–49. JSTOR, www.jstor.org/stable/249710. Accessed 14 Jan. 2020.

Sutton, M.J.D. (1996) “Document Management for the Enterprise: principles, techniques and applications”. John Wiley & Sons: New York, NY, 369p.

Wang, C. & Plume, J. (2012), “A Review on Document and Information Management in the Construction Industry: From Paper-based Documents to BIM-based Approach”, Proceedings of 2012 Int. Conf. on Construction and Real Estate Management, Kansas City, USA, 1-2/Oct. 2012, Vol. 1, pp. 369-373. (ISBN 978-7-112-14631-4)

Wong,T.Y.C.,Sar,H.K. (2012). “Web-based Document Management Systems in the Construction Industry”, TS01C - Construction Economics and Management I, 5393.

Mat Yatin, Saiful Farik & Ramli, Ahmad & Shuhaimi, Hasnah & Hashim, Husain & Kadir, Wan & Zaini, Muhamad Khairulnizam & Abdul Kadir, Mohd Razilan. (2015) “Electronic Document Management System: Malaysian Experience”. Australian Journal of Basic and Applied Sciences, Vol. 9, No. 3, pp. 82-89.