Applied Computer Systems
ISSN 2255-8691 (online)
2026, vol. 31, no. 1, pp. 17–29
https://doi.org/10.2478/acss-2026-0002
https://content.sciendo.com

1862
RIGA TECHNICAL UNIVERSITY

Investigation of Electronic Document Management System Usability across User Groups

Muhammed Çağrı Aksu[1*], Alper Turan Alan[2]
[1]*Computer Engineering Department, Artvin Çoruh University, Artvin, Türkiye*
[2]*Computer Science and Cybersecurity Department, International University of Kuwait, Ardiya, Kuwait*

***Abstract* – The growing reliance on Electronic Document Management Systems (EDMSs) in public institutions necessitates an improved understanding of usability across diverse user groups. This study evaluates the perceived usability of a widely deployed commercial EDMS used in a public university context by examining differences across gender, age, personnel type (academic/administrative), education level, and prior EDMS experience. A mixed-methods design integrates objective task-based performance measures (completion, time, and perceived difficulty) and the System Usability Scale (SUS-TR) with qualitative feedback collected via open-ended questions. Overall, users valued the system's contribution to streamlining document workflows; however, they reported notable usability barriers, particularly related to complexity and navigation. No significant differences were observed by gender, age category, or prior EDMS experience, whereas administrative staff and participants with higher education levels reported higher SUS scores. The mean SUS score (53.25) indicates below-average perceived usability when interpreted against established benchmarks, suggesting the need for targeted usability improvements. Qualitative feedback further highlights the need to simplify interaction flows – particularly around document search, dispatch, and leave management – and to enhance training and support resources to address recurring usability issues and reduce user errors. The study offers actionable recommendations for improving EDMS usability in public institutions and underscores the importance of user-centred design in digital transformation initiatives.**

***Keywords* – Electronic document management, usability, user experience, user-centred design.**

I. Introduction

In public institutions, information and document management processes have become increasingly effective, rapid, and secure in an era of growing digitalisation [1]. The transition from traditional paper-based document management systems to digital solutions enables institutions to achieve greater efficiency, transparency, and speed, while simultaneously raising important questions about usability and user experience [2]. In this context, the Electronic Document Management System (EDMS) plays a crucial role in many public institutions. An EDMS is a software solution that integrates the processes of creating, organising, storing, and distributing documents within a single digital platform [3]. However, for such systems to be effectively utilised, it is essential to assess users' interactions with the system and the overall level of usability [4].

Usability refers to the degree to which a system can be used effectively, efficiently, and satisfactorily by users. A well-designed system empowers users to complete their tasks quickly and accurately, whereas a poorly designed system can introduce difficulties, increase error rates, and lead to dissatisfaction [5]. In environments such as public institutions, which encompass large and diverse user groups, evaluating usability across different user segments can contribute to the development of more inclusive and user-friendly solutions [6]. This study aims to examine the usability of a commercial off-the-shelf EDMS in a public-sector higher education setting by considering the experiences of various user groups.

The primary objective of this study is to understand how the EDMS is perceived and used by different user groups, identify the system's strengths and weaknesses, and provide actionable recommendations for more effective usage. User groups have been classified based on characteristics such as gender, age, type of staff (academic or administrative), education level, and prior experience with the EDMS. Participants were asked to complete five designated tasks, and both quantitative and qualitative data were collected regarding task completion status, time taken, difficulty ratings, and encountered challenges. Additionally, the System Usability Scale (SUS-TR) was employed to evaluate the system's overall usability [7].

Although EDMS usability has been examined in prior studies, the evidence is often based primarily on self-reported perceptions and provides limited integration of perceived usability with objective task-based performance indicators. In addition, public-sector evidence that systematically compares user groups (e.g., staff type and education level) using a unified evaluation framework remains fragmented. The EDMS evaluated in this study is a commercial off-the-shelf system used in public institutions in Türkiye. Rather than presenting a single-institution description, this study offers a replicable mixed-methods evaluation protocol that combines SUS-TR, task completion metrics, and qualitative user feedback to produce actionable implications for public institutions adopting comparable commercial EDMS solutions.

* Corresponding author's e-mail: cagriaksu@artvin.edu.tr
Article received 2025-11-21; accepted 2026-02-09

As public institutions undergo accelerated digital transformation processes, improving user experience in systems such as EDMS is critical for operational efficiency [2]. In this regard, the study not only diagnoses usability barriers in a real-world public-sector deployment but also translates the findings into transferable recommendations on training, navigation, and interface simplification for institutions using similar commercial EDMS platforms.

II. Related Work

EDMS solutions have become increasingly popular in modern business environments due to the efficiency and cost advantages they offer over traditional paper-based systems [8]. These systems help organisations optimise their operational processes by enabling the creation, storage, management, and sharing of documents in digital form. Especially for organisations that process large data volumes, EDMS offers an important solution in terms of streamlining workflows, providing rapid access to information and increasing data security [9]. The transition to electronic document management has been driven by the rise of e-commerce, digital transformation trends and the need for systematic approaches to document management tasks. In an increasingly digitalised business world, storing and managing documents with traditional physical archiving methods has become inefficient in terms of both time and cost. In addition, the need to comply with legislation, the increase in remote working trends and the need to protect against cybersecurity risks have made EDMS a more attractive alternative [10].

Especially in the health, finance, education and public sectors, the adoption of EDMS provides great benefits in terms of facilitating access to information and making operational processes more transparent [11]. However, in order for the system to be implemented successfully, appropriate infrastructure must be provided, employees must be trained and security policies must be implemented effectively [12]. Therefore, it is of critical importance that the transition process to EDMS is well planned and structured in accordance with the needs of the organisation.

As organisations move to digital solutions, EDMS implementation has become a focal point for researchers and practitioners alike. Numerous studies have explored the benefits and challenges associated with implementing EDMS across various industries. In particular, studies conducted on the implementation of EDMS in different sectors have revealed the advantages of the system such as increased efficiency, faster work processes, and reduced error rates [13].

A. Benefits and Challenges of EDMS Implementation

Vidogah and Ndekugri emphasise that demand management in construction organisations lags behind other management functions in using information technology [14]. There are significant problems with demand justification, quantification, and capturing supporting information. It is noted that while some systems such as spreadsheets and databases are in use, newer technologies such as EDMS are not yet widely adopted [15]. Integrating EDMS with other systems on a dedicated platform can greatly improve demand management processes and make organisational processes more efficient [9].

Raynes describes the key elements to consider before and during the implementation of an EDMS [16]. He emphasises that a complete document management system is not just about hardware and software but requires an effective management process and potentially a change in culture to ensure success [17]. Factors such as employees' resistance to system change, lack of knowledge, and difficulty in giving up habits are among the biggest obstacles encountered in EDMS implementation [18]. Therefore, training programs should be organised, and employees should be adapted to the system for the successful implementation of EDMS [19].

Owczarek et al. focus on developing a platform-independent web application designed to manage and distribute electronic documents via a web browser [20]. Web-based EDMS solutions accelerate document flow in organisations by facilitating access from different devices [10]. However, the implementation of such solutions requires strengthening cybersecurity measures. In particular, the protection of sensitive documents necessitates the implementation of advanced security policies and access control mechanisms to prevent data breaches [10].

Pho and Tambo discuss the essential role of a robust EDMS in the context of an integrated management system (IMS) in global organisations [21]. The researchers emphasise that there is no "one size fits all" design for EDMS and that it should be compatible with the specific needs, size, and resource allocation of each organisation [21]. Research shows that IMS improvements often overlook EDMS as an important technological support factor. However, proper implementation of EDMS can increase organisational learning, improve documentation accuracy and inter-institutional collaboration [11]. It is stated that EDMS makes processes more transparent by facilitating systematic documentation and workflows, especially in the public and healthcare sectors [19].

Cost, which is one of the biggest factors preventing the adoption of EDMS, also stands out in research. Due to high initial costs, infrastructure requirements and maintenance processes, many organisations avoid investing in EDMS [22]. However, the study conducted by Dourish et al. on the Placeless Documents system shows that adding user-centric features to the document management infrastructure can accelerate the return on investment by making the systems more flexible and suitable for user needs [23].

In light of this research, organisations need to develop a strong strategy, train employees and increase security measures to effectively adopt EDMS. Especially in large-scale projects, efficiency should be maximised by integrating the systems with other corporate information management systems [24].

B. Enhancing Usability and Organisational Effectiveness

Erden et al. provide insights into the development of an EDMS within Turkey's Ministry of Food Agriculture and Livestock [25]. Their work focuses on improving knowledge, document, and institutional memory through various activities, including the design of an EDMS that enhances institutional awareness and maturity. They detail methodologies for impact

assessment and highlight the significance of integrating EDMS with existing systems to ensure sustainability and effective archival practices.

Katuu broadens the discussion on standards and good practice guidelines in records management, emphasising the importance of international developments [26]. His extensive literature review outlines existing standards used by records management professionals for digital records, revealing a long tradition of standards development dating back to the 1980s. The study categorises these standards into those with assessment mechanisms and those without, noting that the inclusion of an assessment mechanism depends on the intended purpose of the guidelines.

Olefhile et al. examine the implementation of electronic document and records management systems (EDRMS) in Botswana's public sector, particularly within the Ministry of Trade and Industry (MTI) [27]. The study identifies critical success factors for EDRMS adoption, such as top management support, effective record-keeping practices, and robust training. Findings reveal challenges, including poorly managed change processes and inadequate training for users, underscoring that successful EDRMS implementation requires not just technological factors but also an understanding of non-technological elements.

Pappel et al. explore advancements in e-governance in Estonia, where the government has successfully digitalised public services and documentation processes [28]. They examine the development of e-services in local governments, focusing on the use of EDRMS and their interoperability. The paper presents a case study of an Estonian local government that validated an interoperable framework, providing insights into effective solutions for managing data within an e-state context.

Krasnyanskiy et al. address the growing volume of information necessitating the creation of automated systems for data recognition, classification, and routing [29]. They discuss the integration of modern machine learning and artificial intelligence technologies to develop algorithms that enhance document routing in EDMS within scientific and educational institutions. Their research outlines methods for efficiently extracting, processing, and recognising senders and recipients of documents, culminating in the formation of a subsystem for automatic document routing.

Balabanov and Davletshin examine the impact of globalisation and informatisation on documentation processes within organisations [30]. They discuss the importance of adhering to IMS principles to optimise document flow and highlight the benefits of implementing an EDMS. Their findings suggest that organisations can achieve greater efficiency and effectiveness in documentation processes, particularly as the scale of operations and the number of staff involved increase. They argue that maximum benefits from electronic document flow are realised when the functionalities of the chosen EDMS align with the operational needs of the organisation.

Demirkol et al. focused on the usability of student information systems using the System Usability Scale, emphasising the importance of user-centric design in maintaining the effectiveness of information systems [31]. Their research underscores the need for assessing user experiences to enhance system usability and functionality in various contexts.

Fernando et al. investigate the applicability of EDMS in the Sri Lankan construction industry [9]. They stress that while such systems offer significant benefits, including improved security, user-friendliness, and cost reduction, the industry lags in adoption. Their in-depth case study of the "Altair" project, using the Aconex EDMS, identified that having a dedicated staff member for document handling can reduce complexity. The study further revealed that the lack of knowledge about EDMS is the greatest barrier to its adoption in the industry.

Mukhoid and Kurylo focus on the automation of vacation tracking processes within companies [32]. They discuss the typical lifecycle of documentation and the main drawbacks of traditional paperwork systems. Their article evaluates existing vacation tracking algorithms, highlighting inefficiencies such as suboptimal use of working time and potential human errors. The authors describe the stages of automation and propose methods for addressing these issues, presenting mechanisms for data acquisition and analysing the results. They conclude with a long-term plan for further automation of vacation tracking processes.

Ayaz and Yanartaş investigate the factors influencing the adoption and use of EDMS in public institutions, specifically at Bartın University [13]. Utilising the unified theory of acceptance and use of technology (UTAUT), their study reveals that performance expectancy and social influence significantly impact the intention to use EDMS, accounting for 61 % of the variance in intentions. Their findings emphasise the necessity of understanding these factors to facilitate successful adoption while noting that effort expectancy did not show a positive effect.

Parker and Mobey conducted action research in a UK company to explore perceptions of risk in project management following the introduction of an EDMS [33]. The study identified factors that contribute to a better understanding of risk assessment and project management, highlighting the importance of a framework to support these processes. Similarly, Johnston and Bowen reviewed case studies to identify the benefits achieved through the implementation of EDMS [34]. While few studies provided quantitative evidence of these benefits, the overall consensus was that EDMS could improve records management and document control within organisations.

In addition to exploring the benefits of EDMS, researchers have also focused on factors influencing the successful implementation of these systems. Alshibly et al. conducted a comprehensive literature review and engaged expert panel input to identify critical success factors for implementing EDMS in government organisations [35]. Through a questionnaire survey and factor analysis, the study confirmed the importance of specific categories for successful EDMS implementation.

Cho hypothesised that organisations with a strong learning orientation would facilitate the implementation and usage of EDMS, emphasising the role of organisational culture in system

effectiveness [36]. Furthermore, researchers have proposed innovative approaches to enhance the functionality of EDMS. For example, Alberto et al. introduced the concept of the Compiling Remote Electronic Document (CReED) management system, which redefines the infrastructure of traditional EDMS by incorporating features such as access control, auto-segregation, and advanced security measures [37]. This research aimed to improve document capture, storage, indexing, retrieval, and archiving processes within EDMS, highlighting the importance of security and user privileges in document management.

Overall, the literature on EDMS emphasises the critical role of electronic solutions in modern document management practices. From exploring the benefits of EDMS to identifying crucial success factors for implementation, researchers have highlighted the significance of digital transformation in selecting and implementing EDMS [38]. As organisations continue to adopt electronic solutions for document management, further research is needed to address the evolving challenges and opportunities in this field.

III. Methodology

In this study, the perceived usability of a commercial off-the-shelf EDMS deployed in a state university (public-sector) setting was examined across users with various characteristics. The research was designed as a mixed-methods study combining qualitative and quantitative data collection methods. To measure users' experiences with the EDMS, task completion tests, task completion times, task difficulty ratings, and SUS-TR data were collected. Additionally, feedback was gathered from participants regarding the system's strengths and weaknesses.

A. Participants

The study involved 53 participants who were administrative and academic staff members from a university. They possessed various characteristics such as age, gender, education level, and experience with the EDMS. Purposeful sampling and snowball sampling methods were used in the selection of participants.

As shown in Table I, 29 (54.72 %) of the participants were male and 24 (45.28 %) were female. With regard to the education level, 18 (33.96 %) held a Bachelor's degree, 15 (28.30 %) had a Master's degree, 12 (22.64 %) held a Doctorate, and eight (15.09 %) were associate degree graduates. In terms of EDMS experience, 27 participants (50.94 %) had experience working with the EDMS, while 26 (49.06 %) were inexperienced. EDMS experience was operationalized using self-reported EDMS usage duration (in months). Based on this measure, participants with more than 36 months of EDMS use were classified as 'experienced', whereas those with 36 months or less were classified as 'inexperienced'. This threshold was determined a priori by the researchers to distinguish long-term routine users from relatively newer users. Regarding internet usage frequency, 44 participants (83.02 %) used the internet daily, eight (15.09 %) used it frequently, and one participant (1.89 %) used it rarely. Forty-two participants (79.25 %) were classified as young (under 45 years old), while 11 (20.75 %) were classified as middle-aged and older (45 years and above). The participants' ages ranged from 20 to 60 years, with an average age of 37.85 ± 8.91. In terms of personnel type, 26 participants (49.06 %) were academic staff and 27 (50.94 %) were administrative staff.

TABLE I
Demographics of the Participants

Category	Subcategory	Count	Percentage (%)
Gender	Male	29	54.72
	Female	24	45.28
Education Level	Bachelor's Degree	18	33.96
	Master's Degree	15	28.3
	Doctorate	12	22.64
	Associate Degree	8	15.09
EDMS Experience (usage duration)	Experienced	27	50.94
	Inexperienced	26	49.06
Internet Usage Frequency	Daily	44	83.02
	Frequently	8	15.09
	Rarely	1	1.89
Age Category	Young (<45 years)	42	79.25
	Middle-aged and Older (45+ years)	11	20.75
Personnel Type	Academic	26	49.06
	Administrative	27	50.94

B. Data Collection

Data in this study were collected through tasks assigned to participants, the SUS-TR survey, and open-ended questions, following a structured process carried out in three consecutive phases. In the first phase, participants were asked to complete five tasks on the EDMS, each designed to represent the core functions they frequently perform in daily institutional workflows. The tasks included: (1) requesting a one-day annual leave for the following day, (2) listing all documents categorised as leave request forms, (3) preparing a document with a specified file code and subject and adding oneself as the signer, (4) forwarding a document received from another user to a different person, and (5) concluding a document that had been sent to them. For each task, task completion status was recorded using a binary scale (1 = Completed, 0 = Not Completed), and the time required to complete each task was measured in seconds. Participants who completed the tasks were also asked to rate the difficulty of each task on a scale from 1 (very difficult) to 7 (very easy), providing subjective assessments of task complexity. To minimise potential confusion due to the reverse direction of the task difficulty scale (1 = 'very difficult', 7 = 'very easy'), the scale anchors were provided in the rating form and explained to participants before scoring.

After completing the tasks, participants proceeded to the SUS-TR survey, the Turkish adaptation of the SUS, originally developed by John Brooke in 1986 as a standardised tool for assessing system usability. The SUS consists of 10 items rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with odd-numbered items structured positively and even-numbered items structured negatively. The total score obtained from the items is normalized to a value out of 100. The scale has been shown to possess high internal consistency, with Cronbach's Alpha values typically ranging

between 0.85 and 0.96. The Turkish version used in this study, SUS-TR, was adapted through translation and back-translation procedures and validated through psychometric testing on Turkish samples. Previous studies have reported internal consistency coefficients between 0.84 and 0.91 for SUS-TR, indicating that the adapted version maintains strong reliability consistent with the original scale.

In the final phase of data collection, participants were asked four open-ended questions to gather qualitative insights regarding their experiences with the system. These questions were: "Would you recommend this system to other institutions? Why?", "What are the features you like most about the system?", "What are the features you like least about the system?", and "What recommendations do you have for improving the system?". Additionally, during the task execution process, the researcher observed and documented the specific challenges faced by each participant. These observations, together with the participants' written feedback, were incorporated into the qualitative data analysis to provide a more comprehensive understanding of user experiences and system usability.

C. Data Analysis

The collected data were analysed using both quantitative and qualitative analysis methods, and the quantitative analyses were conducted in two stages: data preparation and data analysis, while qualitative data were examined using the topic modelling method based on participants' open-ended feedback. Before the quantitative analysis stage, the participants' SUS scores, task completion scores, average task completion times, and average task difficulty perceptions were calculated. The task completion score reflected how many of the five assigned tasks each participant successfully completed, and the task completion times and difficulty perceptions were derived from the time measurements and difficulty ratings provided by participants for each task. SUS scores were calculated using the formula given in (1); accordingly, for odd-numbered items representing positive statements, 1 was subtracted from the participant's score on the 1–5 scale, whereas for even-numbered items representing negative statements, the participant's score was subtracted from 5 to perform reverse coding. After summing all corrected item scores, the total was multiplied by 2.5, resulting in a SUS score ranging from 0 to 100 [39], [40].

$$SUS = 2.5\sum_{i=1}^{10} s_i, \tag{1}$$

where $s_i = x_i - 1$ for odd i and $s_i = 5 - x_i$ for even i.

Descriptive statistics were then applied to the quantitative data, and the central tendencies (mean), dispersion (standard deviation), and distribution values (minimum and maximum) for task completion scores, task completion times, task difficulty perceptions, age, and SUS scores were presented in the findings section. These descriptive results provided an overview of participants' task performances, including how many tasks they completed and how quickly they completed them, as well as how difficult they perceived the tasks to be. The mean task completion score indicated the number of tasks typically completed by participants, while the standard deviation reflected variability in performance among them. Average time values showed the mean duration required to complete the tasks, allowing an assessment of participants' overall speed, and the associated standard deviation indicated differences in task completion times. Average difficulty perception scores revealed how challenging participants found the assigned tasks and enabled comparisons among users. Additionally, variables such as age and SUS score were used to examine demographic characteristics and participants' overall perceptions of system usability. The SUS score, representing perceived usability, provided an overall measure of how usable participants found the system.

After the descriptive statistics stage, statistical analyses were carried out to determine whether there were relationships between user groups and difficulty perceptions, task performance (scores and times), and perceived usability. Perceived usability was measured through the SUS score, and before selecting the appropriate statistical test, normality tests were conducted. Because the Shapiro-Wilk test is recommended for small and medium-sized samples, it was used as the normality test [41], [42]. The results indicated no strong evidence of non-normality for SUS ($W = 0.973$, $p = 0.273$). Given the relatively small subgroup sizes, we additionally assessed homogeneity of variances using Levene's test. For two-group comparisons (gender, EDMS experience, age category, and personnel type), Levene's tests were non-significant (all $p > 0.05$), supporting the equal-variance assumption. For multi-category comparisons, Levene's tests also indicated homogeneity of variances for education level ($p = 0.773$) and internet usage frequency ($p = 0.511$). Accordingly, independent-samples t-tests were used to compare SUS scores across two-category variables, and one-way ANOVA was applied for multi-category variables (internet usage frequency and education level). Relationships among continuous variables (age, average task completion time, average difficulty perception, and task scores) were examined using Spearman's rank correlation, because average task completion time ($p < 0.001$) and task score ($p < 0.001$) deviated from normality. All statistical analyses were performed in Python using the SciPy, Pandas, and Statsmodels libraries.

Qualitative data analysis was carried out using the topic modelling method, a natural language processing technique used to uncover latent patterns and underlying themes in textual data [43]. The Latent Dirichlet Allocation (LDA) algorithm was specifically used to interpret participants' feedback and identify themes emerging from their responses to particular questions [44]. The topic modelling analysis proceeded in three stages. First, the qualitative feedback obtained from participants was categorised according to the four open-ended questions, and the responses were compiled and prepared for analysis. During pre-processing, linguistic cleaning was performed, which included removing stop words (such as "and," "a," "but"), eliminating punctuation, and discarding unnecessary expressions. All text was converted to lowercase, and only meaningful words were retained to prepare the dataset for topic modelling. In the second stage, the LDA algorithm was applied separately for each of the

four questions. The LDA model generated three latent themes for each question by analysing word distributions in the text, with each theme represented by a distinct set of weighted terms. In the final stage, the resulting themes and the key terms associated with each were examined in detail. These themes revealed the underlying patterns in participants' responses and provided insights into general tendencies regarding the system, highlighting which features were most prominent and how users evaluated different aspects of the system. Additionally, the researcher's observations regarding the challenges participants encountered during the task tests were also included in the topic modelling analysis. All data pre-processing and modelling procedures were conducted using Python, with the NLTK library used for text pre-processing and the Gensim library utilised for the topic modelling operations.

D. Validity and Reliability

To enhance the validity of the research, the validated measurement tools were used. Within the scope of the reliability analysis of the SUS-TR scale, the reverse coding of the even-numbered questions was first performed. Since the even-numbered questions in the SUS scale are negatively coded, these questions need to be reverse-coded. The reverse coding process was carried out by transforming the values in the response scale of the questions according to a formula. This process was applied to the even-numbered questions in the scale. After the reverse coding process, Cronbach's Alpha coefficient was calculated to measure the internal consistency of the scale. The obtained Cronbach's Alpha value was found to be 0.89. This result indicates that the SUS scale has a high level of reliability. Generally, Cronbach's Alpha values above 0.70 indicate that the scale is reliable, and a high value such as 0.89 demonstrates that the internal consistency of the concepts measured by the scale is quite strong [45].

IV. Findings

This section presents the results of the study under three thematic categories: (A) user performance on EDMS tasks, (B) perceived usability across user groups, and (C) user experience, satisfaction, and improvement suggestions. All quantitative and qualitative findings are presented along with the relevant tables and figures.

A. User Performance on EDMS Tasks

Descriptive statistical analyses of task completion scores, task completion times, perceived task difficulty, participant age, and SUS scores provide a general overview of users' performance during interaction with the EDMS. The results are summarised in Table II.

TABLE II
Results of Descriptive Analysis of Variables

Variable	Mean	Standard Deviation	Min	Max
Task Completion Score	3.19	1.44	1.0	5.0
Task Completion Time	95.18	43.73	31.0	192.20
Task Difficulty Perception	5.10	1.30	1.80	7.0
Age	37.85	8.91	20	60
SUS Score	53.25	18.0	7.5	100

Participants achieved an average task completion score of 3.19, indicating that they completed roughly three out of the five assigned tasks. The high standard deviation (1.44) highlights substantial variability in performance. Task completion time averaged 95.18 s, with a broad range between 31.0 and 192.20 s (SD = 43.73). Perceived task difficulty averaged 5.10, representing a medium level of difficulty, with some variability among participants (SD = 1.30). The age distribution ranged from 20 to 60 years (M = 37.85, SD = 8.91).

System usability, measured by the SUS, yielded a mean score of 53.25. Normative evidence commonly places the average SUS score around 68; therefore, a score in the low-50s indicates below-average perceived usability. In Bangor et al.'s interpretation, such scores typically fall toward the lower end of the marginal/low acceptability region and correspond to less favourable adjective ratings (i.e., closer to "poor" than "good") [46]. Similarly, the Sauro-Lewis grading approach classifies scores in this range as a low grade (often mapped to a "D" band), suggesting that the evaluated EDMS exhibits notable usability shortcomings and would benefit from targeted improvements [47].

The relationships between continuous variables were examined using Spearman correlation due to violations of normality assumptions. Figure 1 presents the correlation matrix. A strong positive relationship was found between SUS score and perceived task ease (r = 0.680), suggesting that users who found tasks easier evaluated the system more positively. A moderate positive relationship between SUS score and task performance (r = 0.382) indicates that users who completed more tasks perceived higher usability. A weak negative relationship was observed between task completion time and SUS score (r = –0.334), meaning that longer task durations were associated with lower usability. The correlation between age and SUS score was weakly positive (r = 0.120), reflecting minimal influence of age on usability perception.

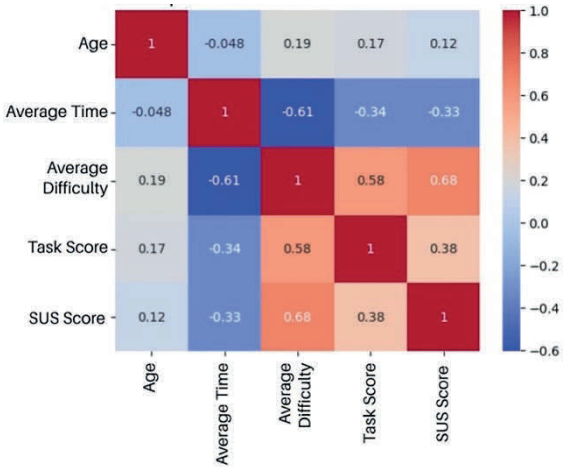

Fig. 1. Relationship between perceived usability and continuous variables.

B. Perceived Usability across User Groups

To examine whether perceived usability differed across various user groups, several statistical tests were performed using the SUS scores obtained from participants. Table III

presents the independent samples t-test results for variables with two categories, including gender, EDMS experience, age category, and personnel type. When examining Table III, it is observed that there is no significant relationship between perceived usability and gender ($t = 0.68$, $p > 0.05$). Male participants reported an average SUS score of 51.64 ($SD = 15.98$), while female participants reported an average score of 55.21 ($SD = 22.31$). This finding indicates that gender does not create a significant difference in system usability perceptions and suggests that the system yields similar usability experiences for both men and women.

TABLE III
RESULTS OF THE T-TEST FOR THE DIFFERENCE BETWEEN PERCEIVED USABILITY AND TWO-CATEGORICAL VARIABLES

Variable	Group	*N*	Mean	Std Dev	*t*	*p*-value
Gender	Male	29	51.64	15.98	0.68	0.50
	Female	24	55.21	22.31		
EDMS Experience	Experienced	27	55.93	20.90	1.04	0.30
	Inexperienced	26	50.48	16.76		
Age Category	Young	42	52.44	18.66	0.61	0.55
	Middle and above	11	56.36	20.90		
Personnel Type	Academic	26	45.00	17.55	3.41	0.001
	Administrative	27	61.20	17.09		

Similarly, no significant difference was found between participants with EDMS experience and those without EDMS experience ($t = 1.04$, $p > 0.05$). Participants with prior EDMS experience had a mean usability score of 55.93 ($SD = 20.90$), while inexperienced participants reported a mean score of 50.48 ($SD = 16.76$). These results demonstrate that familiarity with the EDMS does not significantly influence perceived usability, suggesting that the system does not substantially advantage or disadvantage users based on their prior experience.

In terms of age category, the findings also showed no significant difference in usability perceptions between younger participants and those categorised as middle-aged or older ($t = 0.61$, $p > 0.05$). Younger participants reported a mean SUS score of 52.44 ($SD = 18.66$), while the older group reported a slightly higher average of 56.36 ($SD = 20.90$). However, this difference was not statistically significant, indicating that perceived usability is relatively stable across age groups and that age does not appear to be a determining factor in evaluating the system.

In contrast, a significant difference was observed when the personnel type variable was examined. The *t*-test revealed a statistically significant relationship between personnel type and perceived usability ($t = 3.41$, $p < 0.05$). Administrative staff reported a considerably higher average SUS score ($M = 61.20$, $SD = 17.09$) compared to academic staff ($M = 45.00$, $SD = 17.55$). This notable difference suggests that administrative personnel perceive the EDMS to be more usable than academic personnel. The higher evaluation by administrative staff indicates that personnel type is an influential factor affecting usability perception and that the system may align more closely with the workflow expectations and daily practices of administrative users.

To further examine differences across groups with more than two categories, one-way ANOVA was applied for the variables of education level and internet usage frequency. The analysis results are presented in Table IV. When examining Table IV, no significant relationship was found between internet usage frequency and SUS score ($F(2, 47) = 2.57$, $p = 0.088$). Participants who used the internet daily, frequently, or rarely did not differ significantly in their evaluations of system usability. This result shows that general internet usage habits do not play a determining role in shaping usability perceptions.

TABLE IV
RESULTS OF THE ONE-WAY ANOVA FOR THE DIFFERENCE BETWEEN PERCEIVED USABILITY AND MULTI-CATEGORICAL VARIABLES

Source of Variance	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	*F* Value	*p* Value
Education Level	4801.81	3	1600.60	5.71	0.002
Internet Usage Frequency	1439.31	2	719.66	2.57	0.088
Error	13 180.22	47	280.43		

However, a statistically significant relationship was observed between education level and perceived usability ($F(3, 47) = 5.71$, $p = 0.002$). This finding indicates that individuals with different education levels display significantly different usability evaluations. To determine the specific source of these differences, Levene's homogeneity test was performed first, and the results indicated that variances were homogeneous across groups ($F(3, 47) = 0.773$, $p > 0.05$). Following confirmation of homogeneity, Tukey's multiple comparison test was applied. The results revealed a significant difference between participants at the Doctoral education level and those at the Bachelor's education level ($p = 0.0401$, difference = 17.71), indicating that Doctoral-level participants evaluated the system significantly more positively. Additionally, a significant difference was found between the Bachelor's and Master's education levels ($p = 0.0062$, difference = –20.83), demonstrating that participants with Bachelor's degrees evaluated the system significantly lower than those with Master's degrees. These findings show that the education level is an important factor influencing system usability evaluations, with higher-educated individuals perceiving the system as more usable.

C. User Experience, Satisfaction, and Improvement Suggestions

In this section, the qualitative data obtained from participants were analysed in detail using topic modelling. The analyses consisted of participants' responses to four open-ended questions and observation notes taken during the task tests. The resulting themes provide a comprehensive framework for users' experiences with the system, their satisfaction levels, challenges, and development needs. Three core themes emerged for each question, represented by high-weighted words. The figures graphically present the weights of the top 10 words for each theme.

I – Findings from Topic Modelling Analysis for the First Question

The first open-ended question asked to participants in the study was, "Would you recommend this system to other institutions? Why?" Participants' responses to this question were examined using topic modelling analysis, and three main themes were identified. Each theme is represented by the weights of specific words, and the graphical representation of the top 10 words by weight is provided. The analysis of the themes evaluates how these words reflect participants' general tendencies regarding the use of the system. Figure 2 presents the words associated with the three different themes identified from the topic modelling analysis of the first question, along with their weights.

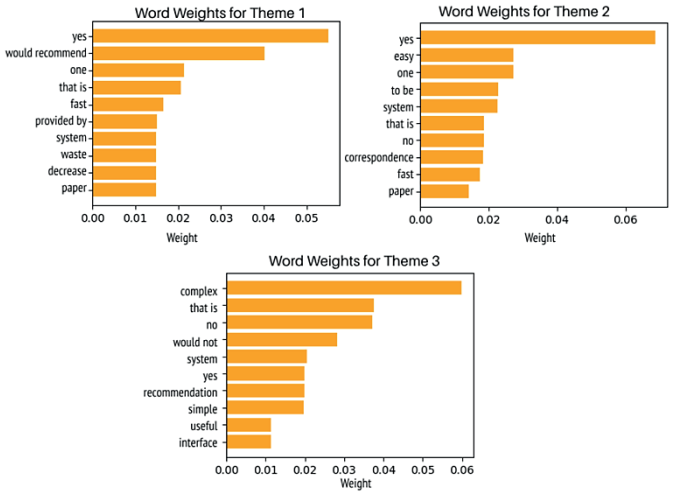

Fig. 2. The topic modelling analysis result of the first question.

Upon examining Fig. 2, it is evident that the first theme encompasses positive feedback and the benefits provided by the system. The most prominent words in this theme include "yes" (5.5 %), "would recommend" (4.0 %), and "fast" (1.7 %). Participants indicated that they found the system fast, noted it reduces paper waste, and described it as generally efficient. The second theme reflects the evaluations of users who found the system easy and quick to use. In this theme, expressions such as "yes" (6.9 %), "easy" (2.7 %), and "correspondence" (1.9 %) stand out. Participants emphasised that the system speeded up correspondence and reduced paper usage. The third theme includes negative feedback, with the most important words being "complex" (6.0 %), "no" (3.7 %), and "would not" (2.8 %). In this theme, some participants found the system complex and stated that they would not recommend it. The presence of words like "simple" and "user-friendly" with low weights indicates complaints regarding the system's lack of user-friendliness.

II – Findings from Topic Modelling Analysis for the Second Question

The second open-ended question posed to participants in the study was, "What are the features you like most about the system?" Figure 3 presents the words associated with the three different themes identified from the topic modelling analysis of the second question, along with their weights.

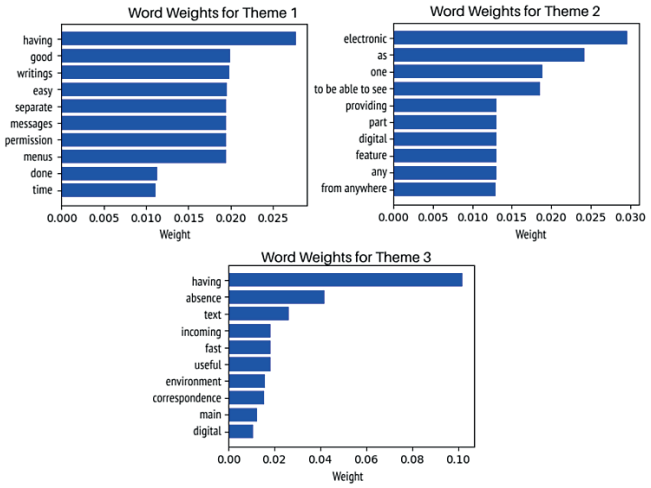

Fig. 3. The topic modelling analysis result of the second question.

Upon examining Fig. 3, it is evident that the first theme focuses on users' appreciation of the system's ease of use and functionality. Among the most prominent words are "having" (2.8 %), "easy" (2.0 %), and "menus" (1.9 %). Participants noted that not only are permission and documentation processes simple and quick to perform, but the menus are also comprehensible. The second theme emphasises the system's capability to operate in an electronic environment. Words such as "electronic" (3.0 %), "as" (2.4 %), and "to be able to see" (1.9 %) stand out in this theme, with participants stating that the system supports digital processes and allows access from anywhere. The third theme consists of evaluations regarding the current shortcomings of the system. Here, expressions like "having" (10.2 %) and "absence" (4.2 %) are noteworthy, as some participants pointed out the areas they found lacking or insufficient in the system. Additionally, positive expressions indicating that the system is fast and user-friendly were also included in this theme.

III – Findings from Topic Modelling Analysis for the Third Question

The third open-ended question posed to participants in the study was, "What are the features you like least about the system?" Figure 4 presents the words associated with the three different themes identified from the topic modelling analysis of the third question, along with their weights.

Upon examining Fig. 4, it is evident that the first theme focuses on participants' concerns regarding the system's shortcomings and complexity. In this theme, expressions such as "absence" (6.1 %), "difficult" (2.4 %), and "complex" (1.7 %) stand out, with users indicating that some features of the system are lacking and that the menus are overly complex. Additionally, a lack of training was emphasised. The second theme addresses the complexity of the system's interface. Words like "having" (9.2 %), "difficult" (4.0 %), and "complex" (3.4 %) are prominent in this theme. Participants expressed that the system had a complex interface, especially during documentation processes, which complicated workflow.

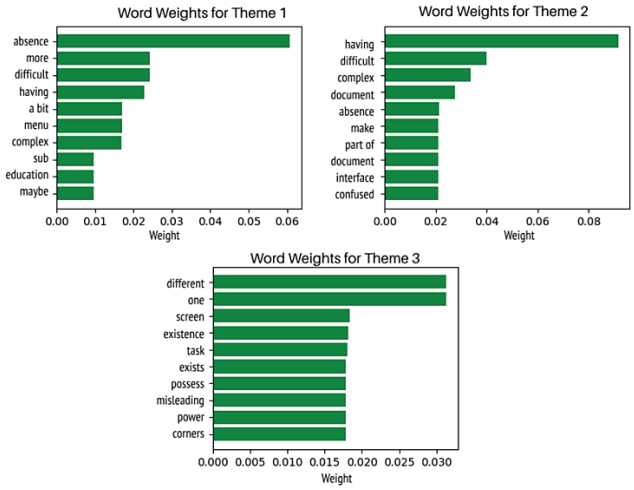

Fig. 4. The topic modelling analysis result of the third question.

The third theme discusses the visual complexity of the system and navigation difficulties. Expressions such as "different" (3.1 %), "screen" (1.8 %), and "task" (1.8 %) indicate that users find it challenging to navigate between screens and feel that some parts of the system can be misleading.

IV – Findings from Topic Modelling Analysis for the Fourth Question

The fourth open-ended question posed to participants in the study was, "What are your recommendations for improving the system?" Figure 5 presents the words associated with the three different themes identified from the topic modelling analysis of the fourth question, along with their weights.

Fig. 5. The topic modelling analysis result of the fourth question.

Upon examining Fig. 5, it is evident that the first theme emphasises participants' concerns regarding the lack of training and interface improvements in the system. Words such as "necessary" (6.5 %), "absence" (5.1 %), and "training" (2.3 %) are prominent, with participants highlighting the need for better training to support the system and for addressing deficiencies in the interface. The second theme contains suggestions for making the system more user-friendly. In this theme, expressions like "having" (5.1 %), "necessary" (4.1 %), and "user-friendly" (2.2 %) stand out, with participants indicating that the system should be organised to be easier and more user-friendly, particularly suggesting that including helpful videos and guide content would be beneficial. The third theme underscores the need for simplifying and making the system easier to use. Words such as "can be simplified" (2.0 %), "easy" (2.0 %), and "interfaces" (2.0 %) are significant in this theme. Participants stated that the system's interfaces and menus should be made simpler.

V – Findings from Topic Modelling Analysis of Task Test Observations

As a result of the topic modelling analysis conducted on the task test observations, three main themes emerged. The first theme encompasses participants' experiences with document searching and leave request processes. The most prominent words include "document" (4.3 %), "search" (3.5 %), and "leave" (3.4 %), indicating that participants faced difficulties particularly in searching for documents and in the leave request procedures. Expressions such as "input" and "section" provide details on how these processes occur.

Fig. 6. The topic modelling analysis result of the task test observations.

The second theme highlights notes related to dispatch processes and sending documents to personnel. In this theme, expressions like "dispatch" (5.8 %), "search" (3.8 %), and "do" (3.7 %) stand out. Participants attempted to complete the procedures by clicking the dispatch button, but they encountered some difficulties during this process.

In the third theme, issues related to leave processes and manual data entry have come to the forefront. Words such as "worked" (5.1 %), "manual" (3.5 %), and "leave" (3.2 %) indicate that participants found the data entry for leave application processes to be difficult and time-consuming.

V. Discussion

In this study, we explored the usability of the EDMS as perceived by various user groups within a public institution. The findings indicate that while the system has several strengths, such as its ability to streamline document management processes, significant areas for improvement have

also been identified. Participants noted that the system facilitates faster access to documents and reduces dependency on paper-based records, which aligns with the trends towards digitalisation in organisational practices.

The mean SUS score of 53.25 suggests below-average perceived usability when interpreted against established SUS benchmarks. Normative evidence commonly places the average SUS score around 68; therefore, a score in the low-50s indicates that users experience noticeable usability limitations. In Bangor et al.'s interpretation, such scores typically fall toward the lower end of the marginal/low acceptability region and correspond to less favourable adjective ratings (i.e., closer to "poor" than "good") [46]. Similarly, the Sauro-Lewis grading approach classifies scores in this range as a low grade (often mapped to a "D" band), suggesting that the evaluated EDMS would benefit from targeted usability improvements [47]. The reported difficulties with specific tasks – such as document searching and leave requests – further support the need for usability enhancements to improve user satisfaction and overall experience. Similar challenges in document management systems have been noted in other contexts, such as in construction claims management, where inadequate technology integration hampers efficiency [14]. The clarity or complexity of tasks has a direct effect on users' performance and satisfaction, highlighting the importance of robust design tailored to user needs.

Additionally, the significant relationship between the type of staff and perceived usability indicates the importance of user demographic factors in assessing the usability of information systems. Administrative staff reported a higher SUS score compared to their academic counterparts, suggesting that differences in workflow patterns and frequency of interaction with the system may affect user satisfaction [4]. This finding is consistent with Cho, who posited that organisations with a strong learning orientation and effective training practices tend to implement document management systems more successfully [36]. The disparity in usability perception between different staff types emphasises the need for tailored training programmes that address the specific contexts in which different users operate.

This study also found that participants with higher education levels reported significantly higher SUS scores. One plausible explanation is that the EDMS may impose relatively high cognitive and procedural demands, such that users with stronger analytical skills, greater familiarity with formal workflows, or higher exposure to complex software environments can navigate it more effectively. Alternatively, this pattern may reflect differences in role-related digital practices and self-efficacy rather than system complexity alone; users with higher education may more frequently engage with administrative platforms, have greater confidence in handling digital procedures, or access informal support networks more easily. Importantly, our data do not allow a causal conclusion regarding whether education level directly drives usability perceptions; however, the observed gap suggests that the current interface and workflow design may not be equally accessible for all user groups. From a practical standpoint, this finding underscores the need to reduce complexity and provide layered support (e.g., role-specific guidance, task-focused tutorials, and clearer navigation cues) so that users with varying educational backgrounds can achieve comparable performance and satisfaction.

Moreover, the qualitative feedback gathered from participants underscored concerns regarding system complexity and the need for improved training solutions. As noted by Nielsen, poorly designed interfaces can lead to increased error rates and subsequent user dissatisfaction [5]. This feedback reinforces the necessity for targeted user training and the implementation of user-friendly design principles, as observed in the successful integration of electronic record systems [26], [35]. Effective training, combined with an intuitive interface, can significantly enhance user engagement and proficiency.

The results of the Spearman correlation analysis revealed a strong positive relationship between perceived task ease and SUS scores, indicating that users who found the tasks easier evaluated the system as more usable [48]. This demonstrates that users' subjective perceptions of task difficulty play a critical role in shaping overall usability judgments. Conversely, participants' qualitative feedback highlighted the need for simpler and more intuitive interfaces, as many reported challenges related to navigation and expressed the necessity for additional support tools such as instructional videos and user guides.

In light of these discussions, this research contributes to a broader understanding of how specific usability challenges within EDMS can affect operational efficiency in public institutions. It emphasises the critical need for ongoing assessments and iterative improvements based on user feedback to promote system usability and effectiveness. Such responsiveness is essential, particularly as organisations continue to navigate digital transformation [2], [6]. Overall, these findings highlight the importance of user-centred and iterative improvement cycles for EDMS deployments in public institutions.

VI. Conclusion

This study has provided a comprehensive analysis of the perceived usability of an EDMS used in a public institution, highlighting both the system's strengths and areas for improvement. The mixed-methods approach allowed for a thorough investigation of user experiences across different demographics, revealing that while the system facilitates essential document management tasks, there are notable concerns related to usability, complexity, and the need for better training facilities. The research demonstrated that, despite the increasing adoption of EDMS in public institutions, several challenges remain, particularly in ensuring that the system is user-friendly and meets the diverse needs of all users.

Key findings indicate that administrative staff perceive the system more positively than academic staff, underscoring the influence of organisational role and patterns of system use on overall usability assessments. In addition, participants with higher education levels reported more favourable SUS scores, which may indicate that the current workflows and interface

place relatively high cognitive and procedural demands on users. Although this pattern does not imply causality, it highlights the importance of reducing complexity and providing layered, role-specific support so that users with diverse educational backgrounds can achieve comparable usability outcomes. The SUS score (53.25) indicates below-average perceived usability when interpreted against established benchmarks, reflecting a shared sentiment among users regarding the need for enhancements to make the system more intuitive and efficient. The qualitative feedback gathered from participants emphasised specific usability issues, including complexities in navigation and operational processes, which align with studies in similar contexts regarding electronic systems [4], [35]. Furthermore, consistent with established IS adoption literature, usability perceptions and ease-of-use judgments can be shaped by users' competencies and prior exposure to similar technologies. For example, the Technology Acceptance Model emphasises perceived ease of use as a central determinant of technology evaluations and use-related outcomes [49], while UTAUT highlights the role of experience and facilitating conditions (i.e., organisational and technical support) in shaping users' technology perceptions and use [50]. Empirical studies also suggest that higher levels of digital literacy are associated with more favourable evaluations and use intentions toward digital technologies, especially in organisational and public-sector contexts [51]. Accordingly, the usability challenges observed in this study may be partly attributable to differences in users' digital competencies, familiarity with similar systems, and the availability of institutional support during the transition to digital document management [50], [52].

The insights gained from this research suggest several actionable recommendations: first, simplifying the user interface to facilitate easier navigation and task completion; second, implementing comprehensive training programmes to ensure all users, regardless of their prior experience, can effectively utilise the system; and third, continuously gathering user feedback to inform ongoing improvements. Additionally, enhancing system performance through the integration of artificial intelligence and automation technologies can further streamline document management processes, reduce human errors, and improve user satisfaction [53]. By adopting these strategies, public institutions can enhance the user experience, boost operational efficiency, and support the overall goal of optimising document management processes. This will not only improve day-to-day operations but also contribute to broader digital transformation initiatives within the public sector. In particular, the integration of EDMS with other existing information systems and the use of cloud-based solutions can enhance accessibility, ensure data security, and facilitate remote work environments, which are becoming increasingly relevant in today's digital age [54].

VII. Future Research Areas

Future studies should examine longitudinal changes in usability after implementing the recommended interface and training improvements to determine whether SUS scores and task performance metrics improve over time. In addition, research comparing multiple public institutions using the same EDMS could help distinguish organisation-specific factors (e.g., local workflows, training practices, and support structures) from system-level usability characteristics. Finally, future work may explore the feasibility and impact of advanced functionalities – such as intelligent document classification and workflow automation – to assess whether such capabilities can enhance efficiency without increasing cognitive load for end users.

Ethical Considerations

The study was conducted with the approval of the Artvin Çoruh University Ethics Committee (E-18457941-050.99-135186). Participants voluntarily took part in the study, and all data collection processes were carried out in accordance with principles of confidentiality and anonymity.

References

[1] C. Atal, M. Angala, F. R. Fernandez, and C. K. Lacsina, "Electronic document flow monitoring and control system using document structure analysis," *ECS Transactions,* vol. 107, no. 1, 2022, Art. no. 20169. https://doi.org/10.1149/10701.20169ecst

[2] K. V. Andersen and H. Z. Henriksen, "E-government maturity models: Extension of the Layne and Lee model," *Government Information Quarterly,* vol. 23, no. 2, pp. 236–248, 2006. https://doi.org/10.1016/j.giq.2005.11.008

[3] A. Ismael and I. Okumus, "Design and implementation of an electronic document management system," *Journal of Applied Sciences of Mehmet Akif Ersoy University*, vol. 1, no. 1, pp. 9–17, Sep. 2017. https://doi.org/10.31200/makuubd.321093

[4] S. Petter, W. DeLone, and E. McLean, "Measuring information systems success: models, dimensions, measures, and interrelationships," *European Journal of Information Systems,* vol. 17, no. 3, pp. 236–263, May 2008. https://doi.org/10.1057/ejis.2008.15

[5] J. Nielsen, *Usability Engineering*. Morgan Kaufmann, 1994.

[6] A. Poositaporn, A. Onuean, and H. Jung, "Design of weighted usability model for elderly/young and general/military user groups," in *2022 IEEE International Conference on Big Data and Smart Computing*, Daegu, Korea, Jan. 2022, pp. 310–313. https://doi.org/10.1109/BigComp54360.2022.00067

[7] D. Demirkol and Ç. Şeneler, "A Turkish translation of the system usability scale: The SUS-TR," *Uşak University Journal of Social Sciences,* vol. 11, no. 3, pp. 237–253, 2018. https://doi.org/10.29217/uujss.495

[8] M.-T. Sun and J.-L. Hou, "The architecture and models for document security reasoning in an electronic document management system," *Journal of the Chinese Institute of Industrial Engineers,* vol. 20, no. 4, pp. 305-316, July 2002. https://doi.org/10.1080/10170660309509239

[9] H. Fernando, T. Hewavitharana, and A. Perera, "Evaluation of Electronic Document Management (EDM) systems for construction organizations," in *2019 Moratuwa Engineering Research Conference (MERCon)*, Moratuwa, Sri Lanka, July 2019, pp. 273–278. https://doi.org/10.1109/MERCon.2019.8818768

[10] A. Haider, B. Aryati, and B. Mahadi, "Opportunities and challenges in implementing electronic document management systems," *Asian Journal of Applied Sciences,* vol. 3, no. 1, Feb. 2015. [Online]. Available: https://www.ajouronline.com/index.php/AJAS/article/view/2239

[11] N. Kain and O. Koshy, "Electronic document management systems: benefits and pitfalls," *British Journal of Healthcare Management,* vol. 19, no. 4, pp. 173–177, Aug. 2013. https://doi.org/10.12968/bjhc.2013.19.4.173

[12] N. Balogun, L. Raheem, M. D. Abdulrahaman, and U. Balogun, "Adoptability of electronic document management system in Ilorin businesses," *Nigerian Journal of Technology,* vol. 38, no. 3, pp. 707–715, July 2019. https://doi.org/10.4314/njt.v38i3.24

[13] A. Ayaz and M. Yanartaş, "An analysis on the unified theory of acceptance and use of technology theory (UTAUT): Acceptance of electronic document management system (EDMS)," *Computers in*

Human Behavior Reports, vol. 2, Aug.–Dec. 2020, Art. no. 100032. https://doi.org/10.1016/j.chbr.2020.100032
[14] W. Vidogah and I. Ndekugri, "A review of the role of information technology in construction claims management," *Computers in Industry,* vol. 35, no. 1, pp. 77–85, Feb. 1998. https://doi.org/10.1016/S0166-3615(97)00085-7
[15] D. Anggraini, K. Adi, and J. E. Suseno, "Electronic document management systems implementation across industries: systematic analysis," *Indonesian Journal of Electrical Engineering and Computer Science,* vol. 36, no. 1, 2024, Art. no. 264. https://doi.org/10.11591/ijeecs.v36.i1.pp264-273
[16] M. Raynes, "Document management: is the time now right?," *Work Study,* vol. 51, no. 6, pp. 303–308, Nov. 2002. https://doi.org/10.1108/00438020210441858
[17] S. D. Seiler, "A case for implementing an electronic document managament system (EDMS)," Master of Arts, University of Massachusetts Boston, 2002. [Online]. Available: https://scholarworks.umb.edu/cct_capstone/280/
[18] M. Grange and M. Scott, "An investigation into the affect of poor end user involvement on electronic document management system (EDMS) implementation," in *UK Academy for Information Systems Conference Proceedings*, Mar. 2010. [Online]. Available: https://core.ac.uk/reader/301363050
[19] M. Katani, "Challenges of implementing an electronic document management system in a large health care facility in Southern California," Master of Science, University of Victoria, 2014. [Online]. Available: https://dspace.library.uvic.ca/bitstream/1828/5482/1/Katani_Maryam_MSc_2014.pdf
[20] D. Owczarek, J. Wojciechowski, J. Murlewski, B. Sakowicz, and A. Napieralski, "Electronic document management system," in *Proceedings of the International Conference Mixed Design of Integrated Circuits and System,* Gdynia, Poland, June 2006, pp. 791–792. https://doi.org/10.1109/MIXDES.2006.1706695
[21] H. T. Pho and T. Tambo, "Integrated management systems and workflow-based electronic document management: An empirical study," *Journal of Industrial Engineering and Management,* vol. 7, no. 1, pp. 194–217, 2014. https://doi.org/10.3926/jiem.846
[22] R. Knowles, "Electronic document management systems: how to select and implement the right documentation management system for your organisation," *The Electronic Library,* vol. 13, no. 6, pp. 527–532, June 1995. https://doi.org/10.1108/eb045423
[23] P. Dourish *et al.*, "Extending document management systems with user-specific active properties," *ACM Transactions on Information Systems (TOIS),* vol. 18, no. 2, pp. 140–170, Apr. 2000. https://doi.org/10.1145/348751.348758
[24] F. Guo, C. T. Jahren, and Y. Turkan, "Electronic document management systems for the transportation construction industry," *International Journal of Construction Education and Research,* vol. 17, no. 1, pp. 52–67, 2021. https://doi.org/10.1080/15578771.2019.1685612
[25] İ. H. Erden, T. Özbay, and K. Camci, "Knowledge, document and institutional memory improvement," in *2015 Fourth International Conference on Agro-Geoinformatics (Agro-geoinformatics)*, Istanbul, Turkey, July 2015, pp. 65–68. https://doi.org/10.1109/Agro-Geoinformatics.2015.7248079
[26] S. Katuu, "Managing digital records in a global environment: A review of the landscape of international standards and good practice guidelines," *The Electronic Library,* vol. 34, no. 5, pp. 869–894, Sep. 2016. https://doi.org/10.1108/EL-04-2015-0064
[27] M. Olefhile, M. Athulang, and K. J. Bwalya, "Electronic document and records management system (EDRMS) implementation in a developing world context: Case of Botswana," in *Digital Access and E-Government: Perspectives from Developing and Emerging Countries*, P. M. Mothataesi Sebina, II, K. H. Moahi, and K. J. Bwalya, Eds. Hershey, PA, USA: IGI Global, 2014, pp. 235–252. https://doi.org/10.4018/978-1-4666-5868-4.ch015
[28] I. Pappel, V. Tsap, and D. Draheim, "The e-LocGov model for introducing e-governance into local governments: An Estonian case study," *IEEE Transactions on Emerging Topics in Computing,* vol. 9, no. 2, pp. 597–611, Apr.–June 2021. https://doi.org/10.1109/TETC.2019.2910199
[29] M. Krasnyanskiy, A. Obukhov, A. Voyakina, V. Skvortsov, and V. Khvorov, "The algorithm of document routing in the electronic document management system using machine learning methods," *International Multidisciplinary Scientific GeoConference: SGEM,* vol. 18, no. 2.1, pp. 765–772, 2018. https://doi.org/10.5593/sgem2018/2.1/S07.097
[30] I. P. Balabanov and F. F. Davletshin, "Implementation of ISO 9001, ISO 14001, ISO 45001 requirements with the systems of electronic document turnover," *International Journal of Engineering and Technology (UAE),* vol. 7, no. 4, pp. 78–81, Sep. 2018. https://doi.org/10.14419/ijet.v7i4.7.20388
[31] D. Demirkol, A. Seneler, T. Daim, and A. Shaygan, "Measuring perceived usability of university students towards a student information system (SIS): A Turkish university case," *Technology in Society,* vol. 62, Aug. 2020, Art. no. 101281. https://doi.org/10.1016/j.techsoc.2020.101281
[32] O. Mukhoid and O. Kurylo, "Extensible integration of the electronic document management system with productivity software," *System Research and Information Technologies,* vol. 2020, no. 3, pp. 40–50, Mar. 2020. https://doi.org/10.20535/SRIT.2308-8893.2020.3.03
[33] D. Parker and A. Mobey, "Action research to explore perceptions of risk in project management," *International Journal of Productivity and Performance Management,* vol. 53, no. 1, pp. 18–32, Jan. 2004. https://doi.org/10.1108/17410400410509932
[34] G. P. Johnston and D. V. Bowen, "The benefits of electronic records management systems: a general review of published and some unpublished cases," *Records Management Journal,* vol. 15, no. 3, pp. 131–140, Dec. 2005. https://doi.org/10.1108/09565690510632319
[35] H. Alshibly, R. Chiong, and Y. Bao, "Investigating the critical success factors for implementing electronic document management systems in governments: evidence from Jordan," *Information Systems Management,* vol. 33, no. 4, pp. 287–301, Aug. 2016. https://doi.org/10.1080/10580530.2016.1220213
[36] V. Cho, "A study of the effectiveness of electronic document management systems," *International Journal of Information Technology and Management,* vol. 7, no. 3, pp. 327–352, Mar. 2008. https://doi.org/10.1504/IJITM.2008.017608
[37] K. G. Alberto, C. M. Abella, M. G. C. E. Sicat, J. D. Niguidula, and J. M. Caballero, "Compiling remote files: Redefining electronic document management system infrastructure (CReED)," in *2009 International Conference on Information and Multimedia Technology*, Jeju, Korea (South), Dec. 2009, pp. 347–350. https://doi.org/10.1109/ICIMT.2009.113
[38] L. Özgür Polat, "Digital transformation process in selection and implementation of an electronic document management system," in *Digital Transformation and Internationalization Strategies in Organizations*, O. Yildiz, Ed. Hershey, PA, USA: IGI Global, 2022, pp. 62–84. https://doi.org/10.4018/978-1-7998-8169-8.ch004
[39] J. Brooke, "SUS – A quick and dirty usability scale," in *Usability Evaluation in Industry*, P. W. Jordan, B. Thomas, I. L. McClelland, and M. B. Weerdmeester, Eds. London: CRC Press, Jan. 1996, pp. 189–194.
[40] J. R. Lewis, "The system usability scale: past, present, and future," *International Journal of Human-Computer Interaction,* vol. 34, no. 7, pp. 577–590, Mar. 2018. https://doi.org/10.1080/10447318.2018.1455307
[41] C. Avram and M. Mărușteri, "Normality assessment, few paradigms and use cases," *Revista Romana de Medicina de Laborator,* vol. 30, no. 3, pp. 251–260, July 2022. https://doi.org/10.2478/rrlm-2022-0030
[42] S. S. Shapiro and M. B. Wilk, "An analysis of variance test for normality," *Biometrika,* vol. 52, no. 3–4, pp. 591–611, Dec. 1965. https://doi.org/10.1093/biomet/52.3-4.591
[43] A. Goyal and I. Kashyap, "Latent Dirichlet allocation – An approach for topic discovery," in *2022 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COM-IT-CON)*, Faridabad, India, May 2022, pp. 97–102. https://doi.org/10.1109/COM-IT-CON54601.2022.9850912
[44] D. M. Blei, A. Y. Ng, and M. I. Jordan, "Latent Dirichlet allocation," *Journal of Machine Learning Research,* vol. 3, pp. 993–1022, Jan. 2003. [Online]. Available: https://www.jmlr.org/papers/volume3/blei03a/blei03a.pdf
[45] R. A. Peterson, "A meta-analysis of Cronbach's coefficient alpha," *Journal of Consumer Research,* vol. 21, no. 2, pp. 381–391, Sep. 1994. https://doi.org/10.1086/209405
[46] A. Bangor, P. Kortum, and J. Miller, "Determining what individual SUS scores mean: adding an adjective rating scale," *Journal Usability Studies,* vol. 4, no. 3, pp. 114–123, Apr. 2009.
[47] J. R. Lewis and J. Sauro, "Item benchmarks for the system usability scale," *Journal of Usability studies,* vol. 13, no. 3, May 2018. [Online]. Available: https://uxpajournal.org/wp-content/uploads/sites/7/pdf/JUS_Lewis_May2018.pdf
[48] J. Sauro, *A Practical Guide to the System Usability Scale: Background, Benchmarks & Best Practices*. Measuring Usability LLC, Apr. 2011.

[49] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *Management Information Systems Quarterly,* vol. 13, no. 3, pp. 319–340, Sep. 1989. https://doi.org/10.2307/249008
[50] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a unified view," *Management Information Systems Quarterly,* vol. 27, no. 3, pp. 425–478, Sep. 2003. https://doi.org/10.2307/30036540
[51] A. K. Kabakus, E. Bahcekapili, and A. Ayaz, "The effect of digital literacy on technology acceptance: An evaluation on administrative staff in higher education," *Journal of Information Science,* vol. 51, no. 4, pp. 930–941, 2025. https://doi.org/10.1177/01655515231160028
[52] A. Zuiderwijk, M. Janssen, and Y. K. Dwivedi, "Acceptance and use predictors of open data technologies: Drawing upon the unified theory of acceptance and use of technology," *Government Information Quarterly,* vol. 32, no. 4, pp. 429–440, Oct. 2015. https://doi.org/10.1016/j.giq.2015.09.005
[53] S. S. Muminova and M. A. o'g Asatov, "Prospects for using artificial intelligence technologies in document automation systems," *Academicia Globe,* vol. 2, no. 6, pp. 293–302, June 2021. [Online]. Available: https://media.neliti.com/media/publications/357998-prospects-for-using-artificial-intellige-6e337f58.pdf
[54] I. I. Belov, "Automation of electronic document management systems functions by means of artificial intelligence technologies," *Herald of an Archivist,* vol. 3, pp. 772–783, 2022. https://doi.org/10.28995/2073-0101-2022-3-772-783

Muhammed Çağrı Aksu received the BSc and MSc degrees in Computer Engineering and the PhD degree in Management Information Systems. He is an academic specialising in data-driven governance, usability evaluation, and applied artificial intelligence for public-sector information systems. His research interests include electronic document/records management systems, decision support, and machine learning-based text analytics.
E-mail: cagriaksu@artvin.edu.tr
ORCID iD: https://orcid.org/0000-0002-8577-4413

Alper Turan Alan is an Assistant Professor of Computer Science and Cybersecurity at the International University of Kuwait. He holds a PhD in Computer Science and an MSc (with distinction) in Software Engineering from the University of Southampton, UK, as well as a BSc in Computer Engineering from Çankaya University, Türkiye. His research interests include human–computer interaction, intelligent agents, artificial intelligence, e-government, smart grids, and data privacy.
E-mail: alper.alan@iuk.edu.kw
ORCID iD: https://orcid.org/0000-0002-9798-2332