Challenges in the technological adoption of document management systems

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Article Info	ABSTRACT
	Incorporating information and communication technologies (ICT) in public organisations in keeping with digital government policies and access to ICT by citizens motivates public institutions to implement systems to provide better services to citizens. One of the most essential public services is the documentary process, which includes document management systems (DMSs) storing, organising, and managing the documentary flow. The acceptance and use of a DMS enabling digital signature in public institutions depends to a certain extent on a set of factors influencing user behaviour towards it. This paper reports the findings of a quantitative, cross-sectional, and correlational study examining the behavioural intention (BI) to use a DMS, employing three constructs of the unified theory of acceptance and use of technology (UTAUT). The research involved 998 workers from public institutions who participated in a survey, with quantitative data analysed using Spearman correlation. The results show that performance expectancy (PE), effort expectancy (EE), and social influence (SI) positively correlate with the BI to use a DMS and thus must be considered as relevant factors in DMS implementation in public institutions. The results provide relevant information to policymakers and DMS managers to promote the adoption of DMS in the digital transformation process that organisations are experiencing.

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1. INTRODUCTION

The incorporation of information and communication technologies (ICT) has created the need to become agile and accurate in sharing information with their stakeholders [1]. In public administration, the adoption and use of ICT has increased [2], and creating or editing electronic documents is also commonplace. Public institutions use various information systems and technological tools to improve citizen-oriented services [3] and increase efficiency. However, citizens still carry out procedures before public institutions in person and face difficulties in locating documents or carry hardcopy documents that are at risk of being damaged or misplaced [4]. Citizens demand using ICTs, motivating public administration institutions to provide online services [2] that require technological support. In addition to technological support, leadership at the highest level, human factors, and senior management support are required [5]. The intensive use of the internet in public institutions shows significant progress in saving resources, increasing user satisfaction, and overcoming bureaucratic barriers [6].

The digital transformation phenomenon in public and private organisations highlights the importance of data management to facilitate sustainable decision making in the digital age, where employee behavior is a key factor [4]. In the digital age, usually the documents are generated on computers [1] that must be managed in an agile and timely manner, making information systems necessary [7]. In accordance with Peru's digital government policy, Peruvian institutions must implement a document management system (DMS) that incorporates digital signature technology. A DMSs function is "to capture, receive, use, administer, maintain, and dispose of electronic records" that can be shared with other areas or other institutions, eliminating the need to manage paper documents and analogue records [8]. A DMS provides an organisational advantage through accurate, fast, and accessible information, thus reducing operational costs [9].

However, the adoption of a technology implies its maximum use. In this regard, despite their momentum in the public sector, many DMSs are not massified or fully used [3]. In other cases, they are new to organisations, which are still learning how to use them. According to Jordan *et al.* [9], there are numerous examples across various business information solution domains where DMS implementations have either failed or achieved only partial success. Document management represents high costs for the organisation, and DMSs can help to reduce costs, whereby the significant impact of organisational maturity on DMSs in all phases of their life cycle is an important aspect [10].

DMSs are urgently needed as part of an initiative to reduce paper use in public institutions through a digital documentary system. For this purpose, institutions must develop actions for its implementation. Although deadlines are enforced for implementing DMSs in institutions, no previous research has examined the constructs that influence the behavioural intention (BI) to use a DMS in the Peruvian context. It is important to design a more efficient approach to implementing and using DMS and avoiding change resistance. DMS has become an essential means of digital transformation in organisations through reducing paper usage, increasing the speed of specific processes, reducing business costs, and supporting sustainability activities in organisations [11]. Additionally, DMSs are considered to be tools for managing the knowledge of organisations [12]. However, as an emerging concept, relatively little research has been conducted on the usage of DMSs, highlighting the need to determine the factors that contribute to reducing failed DMS implementations [9]. This highlights the importance of analysing BI towards DMS use, whereby the individual dimension is relevant to technology adoption.

Several models, theories, or frameworks related to technological adoption have been proposed, including the technology acceptance model (TAM), theory of planned behaviour (TPB), the unified theory of adoption and use of technology (UTAUT) and the technology-organisation-environment (TOE) framework. TAM [13] integrates basic constructs such as perceived usefulness and perceived ease of use. It has also been applied to assess the adoption of electronic document management system (EDMS) technology, specifically as a tool to improve productivity and efficiency by university stakeholders [14], whose results show a correlation between TAM constructs and EDMS adoption. TPB incorporates the constructs of attitude, perceived behavioural control, social norms and BI. Meanwhile, UTAUT features performance expectancy (PE), facilitating conditions, effort expectancy (EE), and social influence (SI), among other factors.

Several studies have examined the implementation and adoption of DMSs in international contexts, although works related to the adoption of DMSs using the constructs of UTAUT are limited. According to Mosweu and Bwalya [3], there is a general lack of models to guide research and implementation for the developed world. The aim of this study is to investigate DMS adoption among public institution users, studying the PE, EE, and SI on BI to use a DMS. This work contributes to scientific literature, while also holding practical relevance because adopting a DMS is crucial to institutions' digital transformation process. The following section presents a literature review, followed the methodology used to validate the hypothesis, the results, and discussion. Finally, the conclusions are presented.

2. LITERATURE REVIEW
2.1. Document management systems

The documentary process is among the most critical and high-impact public services. Different governments have encouraged the implementation and use of DMSs, as they improve the management of records and make processes more efficient, leading to increased user satisfaction [15] and transparency, and reduced operating costs. DMS simplifies the search for data, information, files and processes, eliminating the need to be physically present in the office [11]. Document management is defined as the process of handling, organising, and administering documents efficiently and securely [16], with electronic technology and systems including new data formats to fulfil this purpose [17], [18]. Moreover, the document access must be secure [19], with Park *et al.* [20] proposing encryption to protect the privacy of the content of such documents. Studies seeking to explain how people adopt an electronic DMS having examined the working style of public entity staff using the theory of diffusions [21].

DMS aims to provide an organisation's users with a simple and efficient mechanism for accessing, managing and sharing information. It provides basic document manipulation, synchronisation and sharing functionality [22]. Other terms for similar systems are also found in literature, such as EDMS, electronic records management system (ERMS), and electronic document and record management system (EDRMS). An EDMS enables the creation, use, and destruction of electronic documents to facilitate workflow [7]. ERMS emerged in the 1990s, largely managing the indexing of content and tracking and storing electronic records. They have also been considered by multiple municipal governments to improve service delivery [23]. EDRMS merge document management and record management functionality [3], [15], thus increasing business efficacy, delivering improved accountability [15], and producing efficient and systematic workflows. Several authors argue that many systems promoted by the public administration are not fully adopted by system users [23]-[25] which has motivated this research.

2.2. Document management system adoption

Several authors have proposed models for evaluating the intent to use DMSs based on models and theories of technological adoption. TAM has been designed to understand how users accept or use technologies, with Table 1 presenting the models/theories or frameworks related to technology adoption. It is noted that studies on adoption have used the TAM and UTAUT models in addition to the TOE model. TAM has been used to explain and predict technology use by users and has been tested and validated in different contexts, confirming its ability to predict technological adoption by an organisation's users. Its main constructs are perceived use and ease of use [13]. The TOE framework integrates a set of constructs categorised into technological, organisational, and environmental dimensions [26].

The UTAUT model tries to explain users' intention to use an information system and comprises four main factors: PE, EE, SI, and facilitating conditions [7], [27]. The UTAUT model was proposed by Venkatesh et al. [27] after studying previous models/theories. Its constructs are determinants of the intention to use technology at the individual level [27]: i) PE which represents the extent to which an individual perceives that using the system will enhance their job performance [3]; ii) EE, referring to the extent to which the technology is considered easy to use [3]; and iii) SI, marking the 'degree to which an individual perceives that important others believe that he or she should use the new system' [27]. SI is related to the influence of family, superiors, colleagues, and friends on attitudes and behaviours. This theoretical approach has been supported by several authors, highlighting that employees are more likely to adopt new technology if they have positive expectations about how it will help them in their. In this context, Beaubien et al. [28] emphasise that the UTAUT constructs such as PE and EE are positively correlated with users' BI to adopt new technology.

Table 1. Models and theories

DMS	Model/theory	Author
Factors affecting the adoption and utilization of a document workflow management system	UTAUT	[3]
Adoption of an ERMS using UTAUT	UTAUT	[8]
ERMS implementation and the competency of educational institutions	TAM3	[23]
Factors and adoption of EDRMS	UTAUT	[24]
Factors that influence the adoption of EDRMS using UTAUT	UTAUT	[25]
ERMS adoption framework in the oil and gas sector	UTAUT and TOE	[26]
Adoption of ERMS and ensuring productivity	UTAUT	[29]

2.3. Factors influencing document management systems use

While public administrations have promoted various systems such as DMSs, several factors determine the success of their implementation. One factor mentioned in the literature is the support of senior management, whose understanding of the importance of information systems, dedication, and provision of the necessary budget are crucial [30]. The system's complexity aspects-such as user-friendliness, stability, and a good response time are also taken into account [7], [15], [26]. Training and change management are essential factors in the DMS implementation [8]. Another factor is user knowledge [24] including training users within the organisation to increase their level of knowledge and skills in the management of the DMS [24]. Hawash et al. [8] use TOE to categorise EE and PE as technological and SI and enabling conditions as organisational. Table 2 presents the list of factors identified in the literature review that influence BI. In addition, a study into factors influencing the adoption of a DMS [8] in developing countries found twenty factors that were prioritised by fifteen experts. EE, PE, and SI ranked third, fourth, and tenth, respectively.

Table 2. Factors identified in the literature review

Factors
PE, EE, SI, facilitating conditions, gender, age, and BI to adopt [3].
PE, EE, SI, and BI [8].
ERMS characteristics: policy, roadmap, user involvement, and technical support; cloud characteristics: security, reliability, and integrity; intention to implement and competency [23].
PE, EE, SI, facilitating conditions and BI [24].
PE, facilitating conditions, EE, SI, gender, age, position grade, BI to adopt, usage behaviour, and perceived risk [25].
Availability, compatibility, EE, PE, security, system quality, accountability, change management, facilitating conditions, SI, training, legislation and laws, policy and trust [26].
PE, SI, EE, training, facilitating conditions, policy, productivity, and intention to adopt [29].

2.4. Document management systems acceptance model

In this study, the UTAUT theory is used to propose a model of DMS acceptance using three constructs. The aim is to find out the relationship between the constructs PE, SI, and EE in BI. The proposed model is shown in Figure 1.
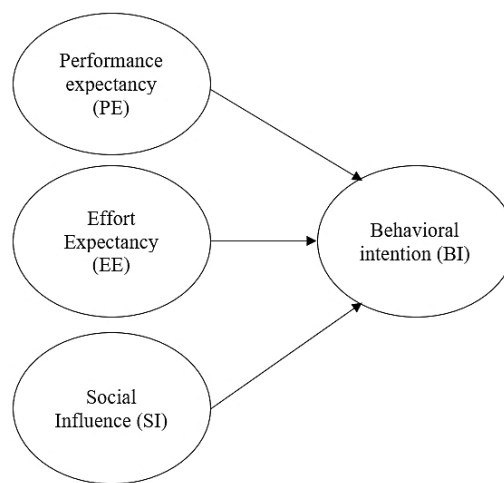

Figure 1. Factors influencing BI to use a DMS

3.   METHOD

The research follows a quantitative, cross-sectional, and correlational approach. The unit of analysis is the worker of a public institution who is a user of the DMS or whoever acts as a user. The sample is non-probabilistic.

3.1. Population and sample

The study involved public administration workers who are DMS users. The sample comprises 998 DMS users who participated in a survey, among whom 44.8% were men and 55.2% were women. Regarding age distribution, 9% were between 24 and 30 years old, 23% between 31 and 37 years old, 26% between 38 and 44 years old, 20% between 45 and 50 years old, and 22% were 51 years old or older.

3.2. Data collection

A questionnaire was used to collect data, adapted from Mukred *et al.* [29] and comprising twenty items distributed in two modules. The first module of the questionnaire contains questions focusing on the sociodemographic characteristics of the participants (five items), such as sex, age range, frequency of DMS use, hours of DMS use per week, and institution. The second module contains questions related to the constructs of PE (four items), EE (four items), SI (four items), and BI (three items). Data was collected between July and September 2022. Cronbach's alpha reliability coefficient was calculated as 0.94.

3.3. Data analysis

SPSS 24 statistical software was used to analyse the data. Participation in the survey was voluntary. The data were subjected to preliminary testing, including normality testing, reliability, and validity testing. Preliminary evidence is important in determining the suitability of the dataset, from which valid conclusions

can be drawn. Normality was verified using the Shapiro-Wilk test. A value of 0.97 was obtained, with a p-value<0.001. The null hypothesis is thus rejected, and the residuals do not present normal distribution. Table 3 presents the results of the normality test are presented. The Breusch-Pagan homogeneity test yielded a value of Bp of 2.5498 with a p-value>0.05, meaning that the null hypothesis is not rejected and thus the assumption of homoscedasticity is met.

Table 3. Normality test

Factor	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistical	gl	Sign.	Statistical	gl	Sign.
PE	.137	998	.000	.905	998	.000
EE	.136	998	.000	.931	998	.000
SI	.128	998	.000	.930	998	.000
BI	.223	998	.000	.819	998	.000

The multicollinearity analysis (variance inflation factor [VIF]) of each construct produced values below 10. In the case of performance expectation, the value obtained was equal to 3.586. The value obtained for EE was 2.757, and the value for SI was 2.044. It can be concluded that there is no multicollinearity (VIF<10).

4. RESULTS AND DISCUSSION

This section presents the results and discussion of the data collection. A survey was conducted to study the acceptance of the use of DMSs in public institutions. The support of senior management is crucial to the success of any initiative in organisations. Likewise, senior management is considered to influence the implementation of the DMS, providing the necessary budget and time for the initiative. With 80.6% positive responses, participants agree that the management of their institution supports the use of the DMS. In addition, 83.8% of employees feel that their institution supports using the DMS. Research has shown that when people use technology in their daily work processes, their work performance improves [27].

The results of the survey related to frequency of use indicate that 73.5% of participants use the DMS several times a day and 12.6% at least once a day, while 7% of participants use it two or three times a week, and 5.9% at least once a week. Moreover, 38.3% of participants used the DMS for less than 10 hours per week, 19.6% between 8 and 10 hours, 18.5% between 4 and 7 hours, and 15.1% between 1 and 3 hours per week.

4.1. Factors in document management systems adoption

Table 4 presents the descriptive statistics (means and standard deviations) of the UTAUT constructs in the survey responses. PE is related to users' perception that using the system benefits their work performance. In our survey, 81.2% of participants agreed that the DMS benefits their work. More specifically, 69% of participants felt that the DMS allows them to do things faster, 68.9% believed that the DMS increases their productivity, and 68.9% agreed that the DMS improves their work performance.

EE referes to users' perception of how easy a technology is to use and serves as a key predictor of its adoption. This factor takes into account the perceived effort required by an individual user to learn and operate the system [25]. It is referred to as 'perceived ease of use' in TAM. In our survey, 62.7% of participants agreed that the DMS is clear and understandable, 66.5% felt that they could easily teach someone how to use the DMS, 66.5% reported that the DMS is easy to use, and 67.9% found it easy to learn how to use the DMS.

SI refers to users' perception that people close to them believe they should use the system. In our survey, 52.1% of participants agreed that people who influence their behaviour think they should use the DMS, whereby in particular 66.9% felt that people in their work environment believe they should use the DMS. Regarding BI, 80.6% of participants stated that they would continue to use the DMS frequently, 82.5% that they would continue to use it in the future, and 82.3% that they would continue to use the DMS.

4.2. Spearman's correlation

Table 5 presents the results of the correlation analysis between the variables of BI to use the DMS. Spearman's correlation was used to establish the relationship between the variables. The results show that BI, PE, EE, and SI are correlated with each other see Table 5. P-value values are below 0.05 in all cases, indicating statistical significance. Thus, we use the following categories to establish the strength of the Spearman's coefficient: weak from 0.1 to 0.29, moderate from 0.3 to 0.49, and strong from 0.5 to 1.0 [31].

The value of Spearman's correlation for PE towards BI is 0.702, and thus we can affirm that PE has a strong positive effect on BI. The value of Spearman's correlation for EE towards BI is 0.622, suggesting a

strong positive effect. The value of Spearman's correlation for SI towards BI is 0.657, again indicating a strong positive effect.

Table 4. Means and standard deviations

Construct	Mean	Standard deviation	Response
PE			
PE1	4.21	0.918	Agree
PE2	3.91	1.045	Neutral
PE3	3.89	1.028	Neutral
PE4	3.82	1.034	Neutral
EE			
EE1	3.71	1.042	Neutral
EE2	3.80	1.057	Neutral
EE3	3.81	1.015	Neutral
EE4	3.86	0.996	Neutral
SI			
SI1	3.52	1.112	Neutral
SI2	3.84	1.019	Neutral
SI3	4.24	0.906	Agree
SI4	4.29	0.875	Agree
BI			
BI1	4.19	0.935	Agree
BI2	4.27	0.893	Agree
BI3	4.27	0.895	Agree
Total	3.97	0.984	Agree

Table 5. Between-factor correlations

	BI	PE	EE	SI
BI				
Correlation coefficient	1.000	.702**	.622**	.657**
Sig. (bilateral)	.	.000	.000	.000
PE				
Correlation coefficient	.702**	1.000	.697**	.598**
Sig. (bilateral)	.000	.	.000	.000
EE				
Correlation coefficient	.622**	.697**	1.000	.542**
Sig. (bilateral)	.000	.000	.	.000
SI				
Correlation coefficient	.657**	.598**	.542**	1.000
Sig. (bilateral)	.000	.000	.000	.

The Spearman's correlation values found for each construct of the UTAUT model are higher than 0.622. Values greater than 0.5 indicate that the coefficient is strong. Table 6 presents the measure of variance for each of the key factors, showing that PE, EE, and SI explained 75.67% of the variation in BI. PE and SI are significant ($p<0.001$) in explaining BI, whereas EE is not significant ($p=0.298$).

Table 6. Measure of variance ($R2$) of the key factors

Dependent variable	R2	Independent variable	B	Value t	p
BI	.7567	Constant	.822	4.228	.000
		PE	.271	12.383	.000
		EE	.020	1.042	.298
		SI	.459	24.603	.000

4.3. Discussion

One of the most important systems in public institutions is the document processing system. Institutions that have not implemented a DMS depend on the use of paper and require the physical presence of the citizen. The literature shows that executing a procedure in person is costly, exposes the process to dishonesty, and requires additional time to complete a procedure. To provide better services to citizens, institutions are implementing DMSs, but the literature shows that these systems are not fully used. To explain how people adopt technology, several authors have proposed models and theories, including UTAUT.

In this study, we have examined whether there is a relation between the PE, EE, and SI constructs of UTAUT and BI according to the participants of public institutions that use DMSs. The participants agreed on the importance of senior management support, and more than 80% felt that their institution supports DMS use. The participants felt that the use of the DMS benefits their work. The findings confirm that the three selected

UTAUT factors have a high correlation with BI to use DMS, which is in line with several previous studies studying the influence of these factors on the intention to adopt new technologies.

The results highlight the relationship between PE and BI, with a value of 0.702. This is consistent with the findings of Hawash *et al.* [26] that according to which PE influences the adoption of a DMS. Ayaz and Yanartaş [7] reported a positive correlation greater than 0.5 (0.637) between PE and BI. In addition, 81.2% of the participants felt that the DMS benefited them in their work performance. This result confirms the idea that an employee will adopt the system if he/she perceives that the effort is minimal. The averages are close to 4 (see Table 4) in the items related to the benefits of the DMS for work, making it faster and increasing productivity, show the advantages of using the DMS to reduce the attention time of a procedure.

The correlation between EE and behavioural is 0.622. This result is consistent with that of Hawash *et al.* [26], who observed that EE influences DMS adoption. Ayaz and Yanartaş [7] found a positive correlation greater than 0.5 (0.520) between EE and BI. Overall, the participants found it easy to learn how to use the DMS. However, when measuring the variance (R^2) of the constructs under study, it was found that the EE was not significant in explaining behavioural, a result consistent with [7].

The correlation between SI and BI is 0.657. This result is consistent with the study of Hawash *et al.* [26] who found that SI affects DMS adoption. Ayaz and Yanartaş [7] found a positive correlation greater than 0.5 (0.569) between SI and BI. The mean scores greater than 4 (see Table 4) on the SI construct items of top management and general organisational support for DMS use indicate that top management support is an important factor. This result is in line with the study of [8], who argue that top management commitment has been recognised by several authors as one of the critical factors for adoption and has been categorised in the dimension organisational of the TOE framework. Also, the 75.67% variation in behavioral intention is explained by PE, EE, and SI. The percentage variation in another similar study [7] was less than 61%, where the factor EE did not have a statistically significant effect on use intention.

The results of the study highlight the importance of using models such as UTAUT to understand and predict the adoption of DMS in public institutions, considering the digital transformation process in which they are immersed. The institutionalisation of DMS in institutions reduces time and improves the flow of documents. Likewise, the study has made it possible to know the situation of the adoption of DMS in institutions and its importance in the process of digital transformation in which they find themselves.

4.4. Limitations and suggestions for future research

In terms of limitations, i) the results of this study cannot be generalised to all public institutions because the sample is non-probabilistic and not all institutions have been included, and ii) its quantitative approach does not enable an in-depth analysis of the factors that contribute to DMS adoption. Therefore, future work should include more institutions using a probabilistic sample and consider using a qualitative approach to gain a better understanding of the factors that contribute to DMS adoption, such as organisational culture, normativity and emotional aspects.

5. CONCLUSION

The implementation of DMSs has been encouraged by different governments and their adoption of DMS is relevant in the digital transformation process of public institutions. However, despite efforts, institutions do not achieve the expected results in terms of implementation, with several factors conditioning the adoption of such systems. This article has presented a study of DMS adoption in public institutions, with a survey sample comprising 998 employees from public institutions. The results show that 81.8% of employees perceive the system as beneficial for their work, 80.6% feel that they have the support of management and 83.8% feel that management supports the use of the DMS. A correlation is found between PE, EE, SI, and BI. However, it is necessary to improve the indicators for the perceived ease of use of DMS. Thus, EE, PE, and SI are factors that must be considered in DMS implementation in public institutions. Likewise, a model of the factors that influence BI to use a DMS is proposed.

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