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The Key Factors in Adopting an Electronic Records Management System (ERMS) in the Educational Sector: A UTAUT-Based Framework

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ABSTRACT Higher education institutions, like nearly all organizations, need to implement information management systems that enable them to handle routine operations easily and, at the same time, generate many types of standardized and *ad hoc* reports. Higher professional education (HPE) institutions face unique challenges when implementing their computer-based information management systems. Electronic records management systems (ERMSs) help manage the extensive information needed to plan and make well-informed decisions. ERMS is a fairly new addition to organizations, and those organizations are still learning how to use them effectively. Unfortunately, some organizations are still slow to adopt these systems. With this in mind, this paper proposes a framework that identifies the key factors that influence HPEs in adopting their own ERMS. The framework developed in this paper is based on two other models: the unified theory of acceptance and use of technology (UTAUT) and technology–organization–environment (TOE). The questionnaires we distributed to 364 respondents in the HPE sector to collect the views of as many stakeholders as possible. These survey responses led the study to propose a framework that identifies the critical factors that influence the adoption of ERMSs in HPEs. This framework is expected to guide HPE institutions in understanding the most essential factors (individual, technological, and environmental) that must be addressed to adopt an ERMS.

INDEX TERMS Information management systems, electronic records management, computer-based information systems, records, higher education institutions, information and educational field.

I. INTRODUCTION

Nearly all HPEs have been trying, to one extent or another, to implement information management systems that will deliver significant value. Developed nations like the U.K. and the U.S. realize how vital information is and organizations in those countries have often invested appropriately in implementing systems to manage their information. These systems are essential to ensure the survival of the organizations and ensure that those organizations comply with their countries' laws [1], [2].

The adoption of computer-based information systems has been particularly pronounced in developing countries that are shifting from an agriculture-based economy to a knowledge-based economy. This shift suggests that information is increasingly recognized as a resource that has a direct effect on the development of the nation and its prudent use of production and its natural resources. Computer-based information systems are a significant contributor to national growth [3]–[5].

Information must be recorded to be of value. This recorded information captures evidence of an organization's activities. Organizations must use this recorded information to support their business functions; it is vital in evaluating their performance. Without reliable records, agencies and governments cannot do their jobs or manage their resources and revenues. The civil service cannot deliver essential services like healthcare and education.

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This realization highlights the importance of records in effective governance [6], [7].

HPE institutions use e-records primarily as a strategic resource. E-records contribute to the institutions' competency, enhance the evaluation of performance and, ultimately, are essential to achieving effective performance. Several HPE institutions around the globe have documented the importance of their Electronic Records Management Systems [8]–[10].

Moreover, electronic media is generating new data at an exponential growth rate. This growth coupled with ongoing technological innovations is driving a qualitative change in the way individuals, organizations, institutions, and governments are run. This can be illustrated by the way technology has transformed data storage. Besides, information and communication technologies (ICT) are producing information in new ways thanks to office automation and other digitalized mechanisms [10]–[14].

The literature shows that some researchers have ignored the use of ERMS in the educational field [4], [15], [16]. This means that some schools have not been included in studies that assess the relationship between computers, communication skills, teaching experiences, and the use of technologies to address the challenges associated with the integration of the above. Also, research in this area should equip schools to identify the ways technology can improve students' personal development and their educational outcomes by adopting policies informed by research. Research in the field would also lead to developing technologies tailored to educational institutions' needs. Relevant technologies and user support would help ensure the effective use of technology [17], [18].

In the case of HPE institutions, records are created periodically. The quality of their record keeping is pivotal in determining the success or failure of those institutions. They must use their data effectively and efficiently, and use it to their best advantage [5], [19], [20].

The considerable volume of records produced in HPEs demands management guidance to facilitate high-quality educational performance. This means that effective e-records management requires a framework to guide the implementation process. Institutions that fail to follow the framework will jeopardize a possible successful implementation [12], [21]. Institutions must address the factors that influence the successful adoption of an ERMS adoption. This is particularly important because there is so little research on this topic. Once the issue is addressed, a framework can be created to assist HPEs to adopt an ERMS successfully.

This paper identifies the influence of individual, technological, and environmental factors on ERMS adoption. The structure of the document is as follows: The need for HPE institutions to adopt ERMS is presented in section 2. The benefits of ERMS are itemized in section 3. Section 4 follows up with related work on ERMS adoption factors. The framework development is presented in Section 5. Section 6 describes the methodology of this research. Lastly, section 7 shows the results discussion and interpretations. Section 7 discusses the conclusions of this study.

II. THE NEED FOR HIGHER PROFESSIONAL EDUCATIONAL INSTITUTIONS TO ADOPT ELECTRONIC RECORDS MANAGEMENT SYSTEMS

In the educational sector, technology can play a very positive role by building on traditional learning and teaching methods, enabling students to have easy access to the information they need, and leveraging academic achievement [2], [10], [13], [22], [23].

HPE institutions are ever more dependent on computers to collect, store, and process their data. E-records are essential for providing the smooth administration of all types of information processing, supporting routine service, informing management decisions, and assuring policy implementation [24]. Once processed, information contained in records will produce the knowledge that can assist timely and well-informed decision making in organizations. More specifically, the detail in students' records is invaluable in developing strategies, enhancing performance, and, ultimately, delivering a nuanced assessment of student and teacher performance evaluation [25], [26].

As a rule, educational institutions all over the globe increasingly recognize the importance of information as a valuable management resource. This has led to the development of a variety of computer systems – many using the internet for either communication or cloud-based computing. IT specialists define an information system as an organized combination of people, hardware, software, communication channels, and data resources that work in an integrated way to collect, transform, and disseminate information within an organization [22]. HPE institutions have developed information systems to implement the Outcome-Based Education (OBE) model. These systems are tailored to accommodate the unique OBE evaluation methodology [9], [27]. These OBE systems support effective decision-making as one component of an integrated system to evaluate educational activities. They are entirely encapsulated in ERMS.

In those HPE institutions that have adopted OBE, students can use several portfolios to provide additional evidence to document day-to-day activities. Information that is accurate and reliable is essential to evaluate options and reach decisions.

In spite of the evident importance of records management, most HPEs are not taking the initiative to implement OBE systems even when management recognizes its importance. Only a few of them have implemented OBE systems [2], [10], [12], [13], [28]. This disappointing situation could be attributed to the lack of awareness and the absence of a framework. Some institutions that have implemented an OBE system believe that they are doing the right thing and this is true for both HPEs in developing and underdeveloped nations [29].

In the educational sector, a shift in attitude towards ERMS adoption could reduce the gap between the demand

and supply of education [30]. This has led HPEs to increase their investment in ERMS systems in many countries around the world to enhance the whole educational system [4], [10], [31]. Moreover, the adoption of ERMS is recognized as essential to delivering education in the modern world. ERMS is seen as a set of processes that are instrumental in improving HPE effectiveness. Prior studies in this area have revealed several barriers that developing nations face when adopting ERMS (e.g., [16], [32], [33]).

Studies have shown that technology and systems adoption, particularly ERMS adoption, is still in the infancy stage [10], [13], [25], [34]. Most of these studies have been conducted in other fields outside education to determine barriers in ERMS adoption. They have highlighted three significant categories of barriers: human-related barriers, organizational barriers, and technological barriers [35]–[37]. According to Heeks [38], information systems combining technical, social, organizational, and environmental aspects are generally successful. Unfortunately, there have been very few studies about the individual and environmental issues impacting ERMS adoption.

Some researchers proposed models for adopting system such as ERMS. For example, Mosweu *et al.* [12] study identified factors for adoption and usage of electronic document and records management systems in the Botswana context. Using the UTAUT framework, the author concluded that there is a need for a further study to be done with many participants and factors that should be considered when implementing similar information systems especially in developing world contexts. There is a need to include new factors with new dimensions to propose an integrated framework that could guarantee a successful adoption of EMRS.

The above emphasizes the apparent need to examine innovation and technology adoption, enabling higher education institutions to be competitive and become global leaders in the educational realm. A deeper insight into such adoption is required for the dissemination and promotion of the adoption and use of different learning innovations [33].

III. THE BENEFITS OF ELECTRONIC RECORDS MANAGEMENT SYSTEMS

ERMS refers to a computer program or a suite of applications designed to track and store records and related meta-data. It can ''slice and dice'' the data according to any arbitrary classification method. E-records do not possess the same implicit metadata as their physical counterparts; e-record meta-data must be explicit, not implicit. An e-record can be composed of many parts; the ERMS can process this data in any way an analyst sees fit [39].

For example, the Minnesota State Archives (2012) stated that an effective ERMS system would provide sufficient security to protect confidential records, provide ready access to public records, and manage e-records in compliance with legal requirements, i.e., trustworthiness, completeness, accessibility, legal admissibility, and durability. An ERMS must be able to convert records in a native format to an official government mandated record format [40].

An ERMS minimizes human errors, ensures data security, facilitates access to information, duplicates documents, provides data documentation, reduces information and communication technology costs, supports decision-making activities, enhances quality, serves as a data repository, and minimizes the use of paper [41]. Further, an ERMS will clarify information, enable timely delivery, reduce storage space, and ensure easy data access and data sharing of information [9], [42], [43].

Management of records carries several advantages:

1) E-records reduce the volume of data and de-clutter the data storage area. Data can be archived offsite for safe storage. This will allow some organizations to reduce their storage space requirements by up to 40%.
2) Rapid retrieval of information: successful systems can expediently retrieve information; this helps allow the provision of superior customer service.
3) Legal compliance and mitigation of litigation risks: an effective ERM safeguards the organization from litigation and legal investigations; an ERM should serve as a safety net for organizations against dangers and pitfalls.

An organization cannot function effectively without a proper ERMS. An efficient and effective system is necessary to avoid issues that could threaten operations [24], [44]–[46].

An ERMS will monitor records throughout their life cycle. The sound management of records and archives is invaluable for effective organizational functioning. A systematically organized record system allows both public and private firms to access information quickly; this ensures transparency, reliability, and accountability. It also enables the organization to guarantee records maintenance [34], [47], [48].

Organizations create records to preserve information for future reference and processing. These records help ensure the accountability of the organization, safeguard evidence of its activities, allow timely administrative information access, and preserve the records from creation until planned destruction. These records form permanent evidence of the business transactions conducted [24], [49].

Previous research indicated that a large proportion of government records are not created through electronic means. Moreover, government institutions collaborate with central and local governments to make sure that e-records are stored securely and are easy to access [4], [12], [50]. Records and information management systems can ensure information clarity, ensure fast delivery, minimize storage space, facilitate data access, and provide practical information sharing. In other words, ERMS is a phenomenal technology that supports business transformation and superior management that satisfies information policy and compliance needs in the current business and institutional environment [51].

IV. RELATED WORKS ON ERMS

Employees working in all types of organizations have often avoided using technology whenever possible [52]. This has motivated researchers in the IT field to want to identify the factors that discourage the quick adoption of IT even when its benefits are so promising [53]. Specifically, researchers want to identify the key factors that ensure a successful ERMS implementation. This study uses a research framework which enables a thorough investigation of the factors that are most influential in the adoption of ERMS. The study framework focuses on the three dimensions mentioned earlier: individual, technology, and environment.

There are remarkably few studies of HPEs adopting ERMS when compared to the number of studies in other industries such as healthcare. Nevertheless, the experience gained in implementing electronic health records (EHR) is instructive even though the reviews are specific to the sector. The insights gained in the healthcare sector are transferable regarding concepts, methods, and management.

The likelihood that management and staff will adopt IT is directly related to their expectation that this will lighten their loads in completing their work [54]. Added to this, they must recognize that adopting IT will provide more benefits than any alternative course of action [55]. This recognition is the first step in adopting IT – mainly when it is at the innovative stage [56].

Today, there is a universal recognition that adopting an ERMS in HPE is essential to bring the supply and demand for education into closer alignment. Most nations have become increasingly aware of the importance of investing in innovation to produce improvements in the educational system [57]. It is also well recognized that the adoption of an ERMS can contribute to providing education through processes that enhance HPE effectiveness, performance, and goal achievement. In prior studies, several barriers have been mentioned that hinder ERMS adoption, particularly in developing nations [4], [10], [12].

According to several studies in education, ERMS adoption is still at the very early stages [8], [12], [25], [34], [58], [59]; most of these studies are in the healthcare sector. These studies found the barriers to be technological and organizational [22], [60].

According to Lewellen [61], an excellent way to understand the current situation regarding ERMS adoption in public institutions is to determine the content and context of record dimensions. This sets the stage for demonstrating the value of moving from legacy shared-drive systems to a full-fledged ERMS. ERMS has been the subject of many empirical studies, with different purposes and results. These studies have examined various factors that influence ERMS adoption. The next few sections discuss the importance of the individual, technological, and environmental factors that affect the adoption of ERMS.

To date, the adoption and implementation of ERMS have been negligible in developing nations, but this does not mean that these systems won't improve the efficiency and effectiveness of governments, drive transparency and accountability, and provide public service more efficiently. Countries all over the globe face challenges in implementing ERMS; the problems are universal and do not depend on the country's nature.

A. INDIVIDUAL FACTORS

The individual dimension (attitude, knowledge and skills and self-efficacy) is vital in determining the success of adopting an ERMS [62].

In the Theory of Planned Behavior (TPB), according to Fishbein and Ajzen [63], the individuals' attitudes are vital in determining how well they will adopt new technology. In this case, the attitude towards behavior refers to the positive/negative perception of the individual toward behavioral performance. On this basis, Venkatesh *et al.* [64] referred to attitude as the general response of the individual to using a system. Therefore, this study treats attitude as an important factor in determining the likelihood of a successful ERMS adoption [23], [65]–[67].

The second factor is knowledge and skills. Yusof and Chell [68] stressed the need for organizations to employ professionals to establish and manage records management systems; however, most organizations still disregard this advice. This is particularly true in developing countries. In developed countries, clerical staff take responsibility for records management; the Information System officer supervises these staff. This stresses the importance of knowledge and skill in a successful ERMS adoption.

Finally, the literature makes special mention of computer self-efficacy. This refers to a better understanding of user intention and behavior [69]–[71]. Self-efficacy in ERMS is defined very much like computer self-efficacy. It refers to a person's sense of whether he has the skill to use a computer to drive a task to completion [72]. This means that a person's sense of whether he can use the computer system determines whether he can do the job with a computer. If he believes he can, he can; if he believes he can't, he can't. Thus, in effect, ERMS self-efficacy is the perception of the individual of his self-efficacy in using ERMS in learning activities.

Regarding IT adoption in developing nations, empirical studies show that individual factors of attitude, knowledge, skills, and self-efficacy of new technologies significantly affect ERMS adoption in educational institutions [1], [66], [68]–[70].

B. TECHNOLOGICAL FACTORS

The technology dimension includes four primary elements: perceived usefulness, perceived ease of use, adaptability, and ICT Infrastructure.

Using technology in any field creates the possibility to improve the quality of service as well as the staff's efficiency and effectiveness. This should more than offset the costs to the organization [62]. In support of this point, Hung *et al.* [73] emphasized the importance of adopting technologies in institutions in spite of the countless studies have identified many

barriers and challenges to implementing IT in the educational organizations [22], [74]. This means there is a clear need to examine the factors influencing the successful technology adoption.

Technology is the software and hardware people in organizations use in their day-to-day tasks (i.e., ICT) [75]. These technologies augment their ability (e.g., ERMS) to do their jobs while protecting their information and infrastructure. It is evident that technology is a fundamental issue where an ERMS is concerned [6], [52]. It is the base of the four technological aspects: perceived ease of use, perceived usefulness, ICT infrastructure, and adaptability.

In recent years, IT and ERMS related studies have highlighted the importance of technological factors. These studies highlight their significant influence on perceived ease of use on intention towards system use [76], and the impact of perceived ease of use on intention towards system adoption [12]. Other studies along these lines highlighted the importance of an ICT structure in supporting the use of technology [77], in that ICT infrastructure has a central role in successful system adoption [78]. Systems must be adaptable for them to be adopted successfully [79], [80].

C. ENVIRONMENTAL FACTORS

The literature makes it clear that there is a genuine need to investigate environmental factors that influence technology implementation [58]. Until now, the literature has identified three environmental factors that play significant roles in system adoption: laws and legislation, policies, and competitive pressures [14], [50], [81].

Asogwa [34] pointed out weaknesses in earlier archival laws that have significant implications for underdeveloped Africa. African countries rarely have legislation dealing with e-records and e-archives management; they are unable to manage such records effectively. In other words, the lack of procedures and laws renders such documents unrecognizable in court.

Policies are required to ensure the systematic, effective, and efficient management of records. Policies refer to statements that guide organizations concerning records management [14], [50]. In other words, document management demands policies to ensure a robust framework. It is crucial to provide an overview that addresses all aspects of record keeping requirements (content type, medium, storage, business process) in the form of policy. The system should adhere to laws and regulations. It must be extensible and flexible to address long-term needs. The absence of legislation or policy would render organizations unable to retain or delete information. To compound the matter further, the literature reports that legislation governing records have not been updated to reflect the current technological developments and the legislation that is in place is only loosely enforced [1], [68], [82].

On the other hand and according to previous studies [83]–[85], competitiveness pressure is one of the vital factors that influence the technology adoption. Therefore, to gain successful implementation, the current study includes the competitiveness pressure in the proposed framework.

V. FRAMEWORK DEVELOPMENT

This paper primarily identifies the factors affecting the adoption of ERMS in the education sector, particularly in HPEs. The study conducted a literature review and used the results to begin its investigation of both the opportunities and challenges for HPEs implementing an ERMS.

Content analysis identified the factors that influence the adoption of an ERMS. The relevant papers were chosen through a search of databases, an open search, and searches of websites using the keywords: ERMS adoption, e-records system factors, factors influencing technology adoption, and factors for ERMS adoption. The literature research was limited to English articles. The study analyzed and categorized the article content to select the articles to be read. The study reviewed more than 100 related articles. The factors were extracted and confined. The top cited factors were chosen to refine the study framework. Table 1 shows the list of top-cited elements.

TABLE 1. List of top cited factors.

No	Factor	Dimension	No. of references
1	Perceived Ease of Use	Technology	55
2	Perceived Usefulness	Technology	51
3	ICT Infrastructure	Technology	50
4	Knowledge and Skills	Individual	45
5	Policies	Environment	42
6	Law and Legislation	Environment	37
7	Self-efficacy	Individual	36
8	Competitive Pressure	Environment	29
9	Adaptability	Technology	28
10	Attitude	Individual	25

The methodological steps followed by the paper are depicted in Figure 1.

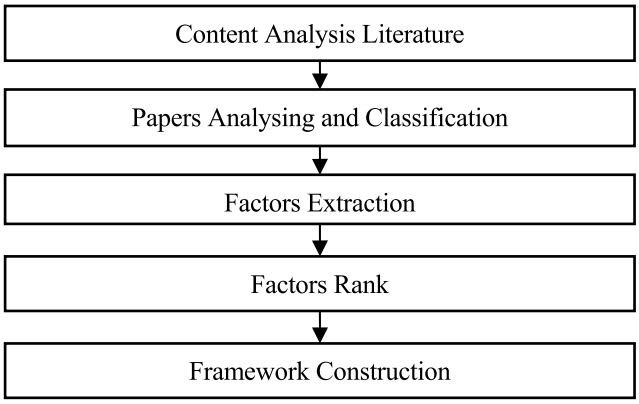

FIGURE 1. Methodology framework development.

According to Ngulube and Ngulube [86], researchers develop conceptual frameworks primarily by building models while theories lead to theoretical frameworks. Researchers in the Social Sciences start with models and then progress to concepts that represent an identified research problem within

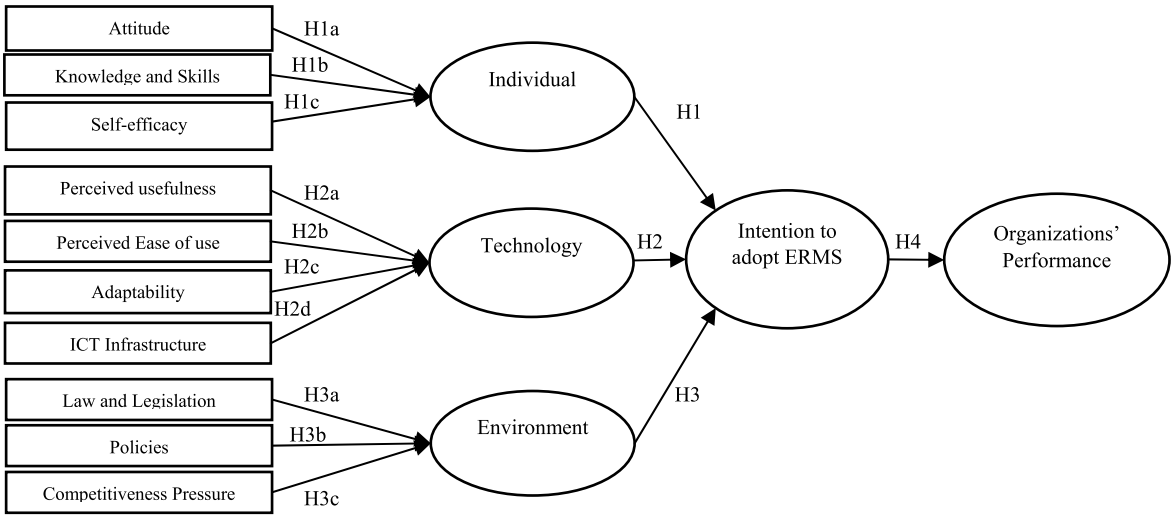

FIGURE 2. Proposed conceptual framework for electronic records management.

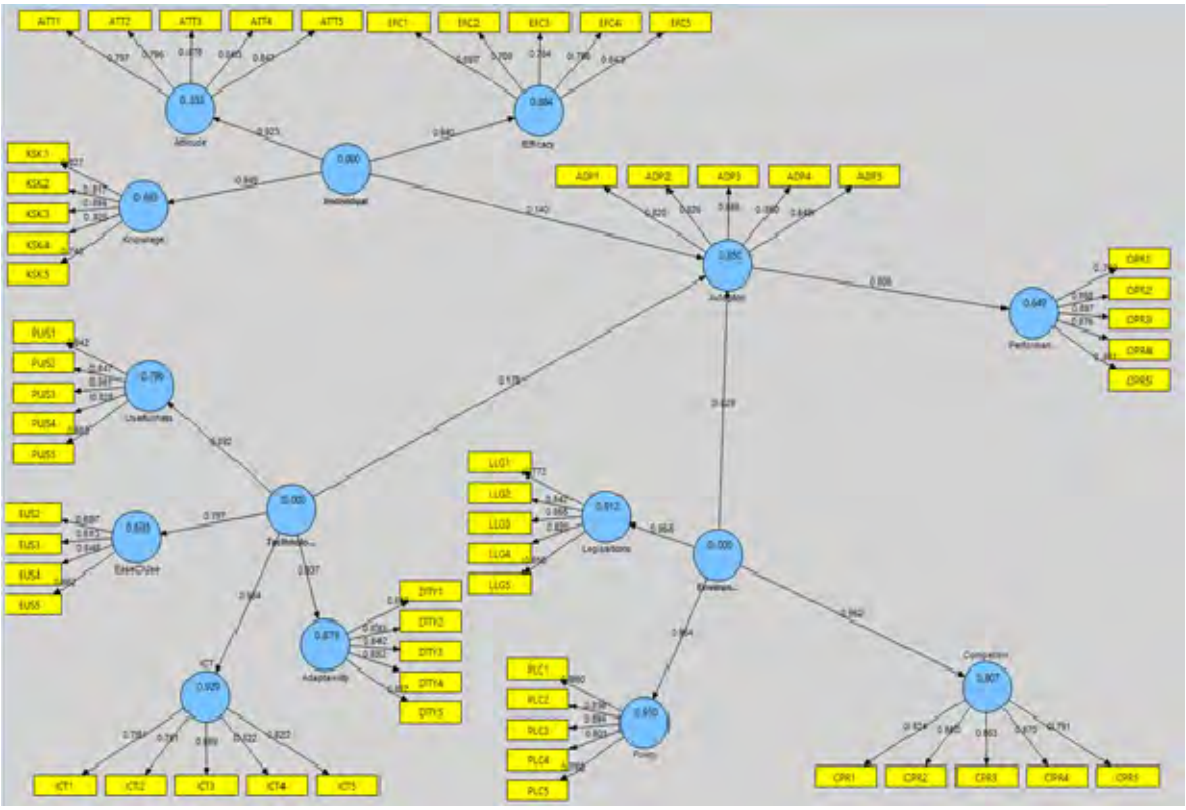

FIGURE 3. Path coefficients' results.

a given subject matter. They then collect data to understand the dynamics and establish linkages among these concepts. Concepts become theoretical structures because they are the building blocks of theory. Concepts are measurable, and measurement is essential for operationalization. Unlike theories, concepts are valuable because they can be used to explain and predict; models describe a phenomenon. Theories are tested through propositions or hypotheses using a methodology appropriate for the model or theory.

Earlier studies proposed theories that explain the influence of technology use and adoption. These theories include the Technology Acceptance Model (TAM), the Diffusion of Innovation (DOI) model, the Theory of Reasoned Action (TRA) model, the Unified Theory of Acceptance

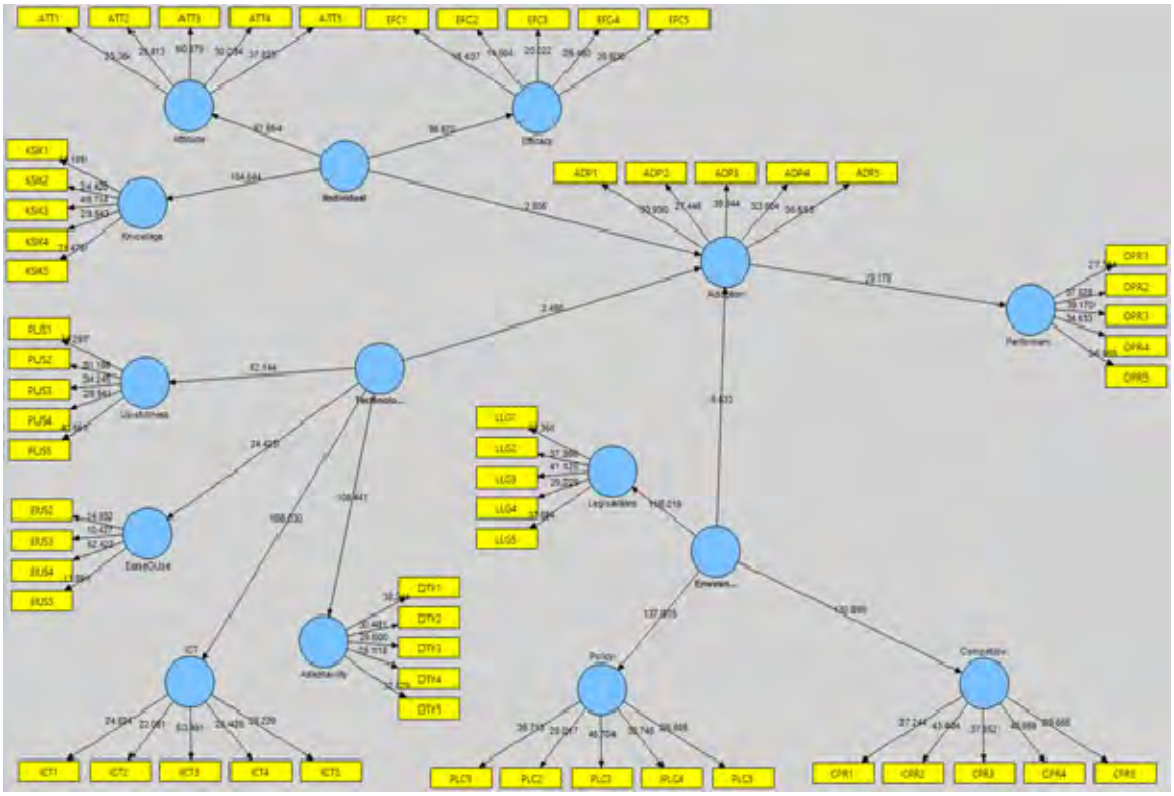

FIGURE 4. Path coefficients' T values.

and Use of Technology (UTAUT) model, and the Theory of Planned Behavior (TPB). In this study, the UTAUT, as an integrated model, and the Technology-Organization-Environment (TOE) model were employed to assess the behavioral intention towards the adoption of ERMS.

Early studies in the education sector primarily used UTAUT or TAM as the foundation of their theoretical models regarding technology adoption [87]–[91]. Nevertheless, these models have not proven reliable for making forecasts. This has led to the development of other models [92], [93]. TAM explains only 40% of the variance in technology acceptance/adoption in the workplace; UTAUT has a better track record at 70% [94]. This study uses the UTAUT model to inform its conceptual framework.

Educational institutions recognize they need to adopt new technologies to enhance their reach. Institutions that are successful in adopting technologies understand the factors that affect that adoption. This paper identifies the elements necessary for ERMS adoption in the educational sector. It explores the interplay among the relevant adoption factors (the individual, technological, and environmental factors).

This study begins by identifying the content and context of records to be managed. This provided the background for understanding the forces at play on the adoption of an ERMS in public sector educational institutions. It also provides insights into the impediments that arise when shifting from legacy shared-drive systems to an ERMS.

The literature identified the factors that influence the adoption of an ERMS. These factors may be categorized as technological factors, organizational factors, environmental factors, and individual factors. This study deals with only three elements: individual, technological and environmental. These three factors are critical because they are vital in determining the success or failure of an ERMS implementation in the educational sector. These three factors are sufficient to develop a comprehensive, robust framework.

The empirical studies in the literature identified several other factors that could be important in affecting staff attitudes regarding an EMRS adoption. Given the terms of reference for this study, the individual dimension includes only three elements: attitude, knowledge and skills, and self-efficacy. The technological aspect refers to another four factors: perceived usefulness, perceived ease of use, adaptability, and ICT Infrastructure. The three environmental factors are legislation, policies, and competitive pressure.

As mentioned, the proposed framework was developed using UTAUT and TOE (see Figure 2).

The proposed hypotheses are shown in Table 2 below. There are four main hypothesis and 10 sub-hypothesis as seen in Table 2.

VI. METHODOLOGY

This section discusses the methods and instruments to realize the research objectives. It presents the data collection strategy,

TABLE 2. The study hypotheses.

Hypothesis	
H1	Individual factors positively affected the intention to adopt ERMS
H1a	Attitude positively affects the intention to adopt ERMS
H1b	Efficacy positively affects the intention to adopt ERMS
H1c	Knowledge and Skills positively affect the intention to adopt ERMS
H2	Technological Factors positively affect the intention to adopt ERMS
H2a	Perceived Usefulness positively affects the intention to adopt ERMS
H2b	Perceived Ease of Use positively affects the intention to adopt ERMS
H2c	Adaptability positively affects the intention to adopt ERMS
H2d	ICT infrastructure positively affects the intention to adopt ERMS
H3	Environmental Factors positively affect the intention to adopt ERMS
H3a	Laws and Legislation positively affect the intention to adopt ERMS
H3b	Policies positively affect the intention to adopt ERMS
H3c	Competitiveness pressure positively affect the plan to adopt ERMS
H4	ERMS Adoption has a decisive role in an organization's performance

the questionnaire development processes, and the reliability and validity measurements.

A. QUESTIONNAIRE DEVELOPMENT

This study used a survey questionnaire as its primary data collection tool. The survey instrument was developed based on a review of the existing literature on ERMS acceptance and adoption as indicated in Table 3.

TABLE 3. Sources of survey instrument items.

Construct	No. of Items	References
Attitude	5	[95],[96]
Knowledge and skills	5	[97],[98]
Self-efficacy	5	[99]
Perceived usefulness	5	[100]
Perceived ease of use	4	[100]
Adaptability	5	[101],[102]
ICT infrastructure	5	[103]-[105]
Laws and Legislation	5	[98]
Policies	5	[37],[50], [106],[107]
Competitiveness Pressure	5	[83]-[85]
Intention to adopt ERMS	5	[108]
Organization's Performance	5	[109], [110]

The survey has 59 items adjusted by the researcher as the purpose of the current study demands. The survey was also translated into the Arabic language for Arabic speaking respondents. The questionnaire called for respondents to answer each of the items using a five-point Likert-scale ranging from (1) strongly disagree to (5) strongly agree.

To eliminate any ambiguous questions from the survey and collect valuable feedback, five academic experts from the information system and electronic records management fields authenticated the structure of the survey before carrying out the study. As mentioned above, the questions used in the survey were obtained from other information system studies with items that had already been established as valid and reliable.

The construct validity of the questionnaire was examined to assess the extent to which the questions measure the variables they are designed to measure. The construct validity of the survey questions was assured through a literature review and by studying items that have been assessed by other researchers.

B. DATA COLLECTION

This study focused on HPE institutions in developing countries with Yemen as a case study. For its sample, the study chose HPE institutions that adhered to high standards and sound policies. There is a pressing need for HPE institutions to adopt ERMSs because they would dramatically assist decision makers and managers. The management teams of HPE institutions are primarily engaged in the development of new, institution-wide policies to minimize the transition gap from paper to e-based records and to establish mandated standards and practices. The governance structure in such institutions is suitable for e-records implementation, and their institution-wide data standards and common e-records management tools would add to the reinforcement of the adoption.

The questionnaire's e-version and an introductory page were uploaded to the survey website. An invitation letter with a link to the survey was sent to the educational practitioners in HPE organizations. The questionnaire design precluded the skipping of questions. The Survey Gizmo system automatically excluded a total of 97 responses because the surveys were incomplete (the respondents closed the browser before completion). Consequently, 364 valid responses were obtained with a response rate of 78.20% - an acceptable rate of response for Internet surveys, where the average response rate is 22%-59.4% in IT studies as reported in [111].

VII. RESULTS AND DISCUSSION

This section is allocated to present the results of the survey. These survey results were analyzed with the Structure Equation Modeling (SEM) with Smart PLS 3. The section also includes interpretations of the findings.

A. RELIABILITY AND VALIDITY

The concept of reliability speaks to the degree the values of measurements are reliable and free from errors [112]. The measure of construct reliability or internal consistency of

TABLE 4. The reliability test of the items.

Latent Variable	Items	Mean	Std. Deviation	Variance	Cronbach's Alpha if Item Deleted
Attitude	ATT1	4.19	1.015	1.031	.984
	ATT2	4.27	.983	.966	.984
	ATT3	4.20	.972	.946	.984
	ATT4	4.30	.941	.885	.984
	ATT5	4.21	.977	.954	.984
Knowledge and Skills	KSK1	4.19	.957	.915	.984
	KSK2	4.23	.957	.916	.984
	KSK3	4.17	.956	.914	.984
	KSK4	4.06	1.140	1.300	.984
	KSK5	4.25	.956	.915	.984
Self-Efficacy	EFC1	4.11	1.067	1.139	.984
	EFC2	4.12	1.100	1.210	.984
	EFC3	4.10	1.122	1.260	.984
	EFC4	4.30	.990	.980	.984
	EFC5	4.31	.973	.948	.984
Perceived Usefulness	PUS1	4.27	.960	.921	.984
	PUS2	4.28	.960	.921	.984
	PUS3	4.25	1.002	1.003	.984
	PUS4	4.25	1.013	1.027	.984
	PUS5	4.05	1.144	1.309	.985
Perceived Ease of Use	EUS2	3.95	1.121	1.257	.985
	EUS3	4.04	1.012	1.024	.984
	EUS4	4.10	1.110	1.231	.985
	EUS5	4.13	.979	.958	.984
Adaptability	DTY1	4.11	1.038	1.078	.984
	DTY2	4.11	1.081	1.168	.984
	DTY3	4.08	1.054	1.110	.984
	DTY4	4.09	1.047	1.097	.984
	DTY5	4.05	1.079	1.163	.984
ICT infrastructure	ICT1	4.18	.956	.913	.984
	ICT2	4.21	.930	.865	.984
	ICT3	4.22	.930	.864	.984
	ICT4	4.13	1.007	1.014	.984
	ICT5	4.15	.940	.884	.984
Laws and Legislations	LLG1	4.18	1.020	1.041	.984
	LLG2	4.19	1.004	1.009	.984
	LLG3	4.05	1.033	1.066	.984
	LLG4	4.14	1.009	1.018	.984
	LLG5	4.13	.995	.990	.984
Policies	PLC1	4.07	1.084	1.175	.984
	PLC2	4.10	1.053	1.108	.984
	PLC3	3.94	1.162	1.351	.984
	PLC4	4.26	.991	.981	.984
	PLC5	4.20	.979	.958	.984
Competitiveness Pressure	CPR1	4.26	1.009	1.018	.984
	CPR2	4.21	.991	.981	.984
	CPR3	4.28	.978	.957	.984
	CPR4	4.14	.959	.920	.984
	CPR5	4.09	1.041	1.083	.984
Intention to adopt	ADP1	4.13	.954	.911	.984
	ADP2	4.18	.945	.893	.984
	ADP3	4.18	.930	.866	.984
	ADP4	4.18	.966	.934	.984
	ADP5	4.18	.975	.950	.984
Performance	OPR1	4.49	.871	.759	.984
	OPR2	4.41	.913	.834	.984
	OPR3	4.44	.919	.844	.984
	OPR4	4.41	.934	.872	.984
	OPR5	3.30	.614	.378	.985

a scale between the constructs of the survey instrument is carried out in this research to establish the degree to which the items of survey instrument are identical. The survey instrument used in this study is discussed under six headings.

TABLE 5. Demographic results analysis.

Variable	Types	Frequency	Percent	Valid Percent
Gender	Male	339	93.1%	93.1%
	Female	25	6.9%	6.9%
	Total	364	100%	100%
Age	Less than 20 years	2	0.5%	0.5%
	20- 24 years	15	4.1%	4.1%
	25-29 years	102	28%	28%
	30-40 years	115	31.6%	31.6%
	41-50 years	113	31%	31%
	Over 50 years	17	4.7%	4.7%
	Total	364	100%	100%
Qualification	Diploma	11	3%	3%
	Bachelor	261	71.7%	71.7%
	Master	80	22%	22%
	PhD	12	3.3%	3.3%
	Total	364	100%	100%
Job	Lecturer	250	68.7%	68.7%
	Administration Staff	106	29.1%	29.1%
	Other	8	2.2%	2.2%
	Total	364	100%	100%
Experience	Less than two years	10	2.7%	2.7%
	2-4 years	92	25.3%	25.3%
	4-6 years	131	36%	36%
	6-8 years	79	21.7%	21.7%
	8-10 years	35	9.6%	9.6%
	More than 10 years	17	4.7%	4.7%
	Total	364	100%	100%

Cronbach's alpha coefficient range falls between the values of 0 and 1.0 (Leech et al., 2013). The scale of Cronbach's α used to measure the reliability of the survey items. This value should be greater than 0.7 [112], [113]. Table 3 shows the reliability, variance, standard deviation, and mean for measurement items. As previously stated, the five-point Likert scale ranges from (1) which signifies strong disagreement to (5) which signifies strong agreement. This study uses the Likert scale to measure variables throughout the model. The variation from the mean is measured by standard deviation. Table 4 provides a summary of the reliability analysis for measuring items for all model variables. The results in Table 4 show that all the variables attained acceptably reliable.

B. DEMOGRAPHIC DATA

Three hundred sixty-four respondents completed the questionnaires. The demographic characteristics analysis of the respondents showed that 93.1% were male and 6.9% were female. One hundred fifteen respondents (31.6%) were 30 - 40 years old. 2 respondents (0.5%) were less than 20 years old. The majority of the respondents (77.7%) had a bachelor's degree; the smallest minority (3%) had a diploma. The analysis results of the demographic profile of the respondents are presented in Table 5.

In the table, it is also shown that 250 respondents were lecturers (68.7%), while the remaining 106 were administrative staff (29.1%). Most of the respondents (36%) had 4 - 6 years' experience while the minority (2.7%) had the shortest experience of only two years.

C. ANALYSIS OF THE STRUCTURAL MODEL

The research hypotheses were examined during this stage, and the relations between the constructs were investigated. The PLS algorithm was applied through the Smart PLS 3.0 to achieve this objective.

Table 6 shows that the values were sufficient [114]. The values for factor loading ranged from 0.748 to 0.928. The composite reliability produced satisfactory results that were above 0.70. The values ranged from 0.692 to 0.898. The Cronbach results were between 0.667 and 0.906, so the results were satisfactory. The average variance extracted (AVE) also received a value of at least 0.5 and ranged from 0.505 to 0.698. Table 6 below illustrated the results of the confirmatory factor analysis (CFA).

The results of path coefficients and the results of the hypotheses are illustrated in Figures 2 and 3, respectively.

This study employed the UTAUT and TOE models. The results described the relationships between the exogenous,

TABLE 6. Constructs, items, and confirmatory factor analysis results.

Latent Variable	Items	Loading	Cronbach α	CR	AVE
Attitude	ATT1	0.798	0.889	0.918	0.693
	ATT2	0.795			
	ATT3	0.876			
	ATT4	0.843			
	ATT5	0.847			
Knowledge and Skills	KSK1	0.827	0.877	0.911	0.672
	KSK2	0.817			
	KSK3	0.884			
	KSK4	0.825			
	KSK5	0.740			
Self-Efficacy	EFC1	0.697	0.817	0.873	0.580
	EFC2	0.709			
	EFC3	0.764			
	EFC4	0.786			
	EFC5	0.843			
Perceived Usefulness	PUS1	0.842	0.903	0.928	0.720
	PUS2	0.848			
	PUS3	0.860			
	PUS4	0.829			
	PUS5	0.863			
Perceived Ease of Use	EUS2	0.697	0.667	0.801	0.505
	EUS3	0.613			
	EUS4	0.848			
	EUS5	0.662			
Adaptability	DTY1	0.845	0.892	0.921	0.698
	DTY2	0.833			
	DTY3	0.841			
	DTY4	0.832			
	DTY5	0.827			
ICT infrastructure	ICT1	0.750	0.864	0.903	0.650
	ICT2	0.759			
	ICT3	0.870			
	ICT4	0.823			
	ICT5	0.823			
Laws and Legislation	LLG1	0.773	0.885	0.916	0.686
	LLG2	0.842			
	LLG3	0.855			
	LLG4	0.820			
	LLG5	0.850			
Policies	PLC1	0.860	0.889	0.919	0.694
	PLC2	0.836			
	PLC3	0.894			
	PLC4	0.803			
	PLC5	0.766			
Competitiveness Pressure	CPR1	0.824	0.900	0.927	0.716
	CPR2	0.880			
	CPR3	0.863			
	CPR4	0.870			
	CPR5	0.791			
Intention to adopt	ADP1	0.820	0.901	0.927	0.717
	ADP2	0.826			
	ADP3	0.886			
	ADP4	0.850			
	ADP5	0.849			
Performance	OPR1	0.861	0.906	0.930	0.728
	OPR2	0.861			
	OPR3	0.861			
	OPR4	0.861			
	OPR5	0.861			

endogenous, and dependent variables. The results for each research hypotheses are summarized in Table 7.

The study examined the level of the relationships among the adoption factors (individual factors, technological factors,

TABLE 7. Summary of the results for the research hypotheses.

Hypothesis		ß	T-value	Support	R^2
Intention to Adopt					0.850
H1	Individual Factors → Intention to Adopt ERMS	0.140	2.68	**Supported**	
H1a	Attitude ⇢ Intention to Adopt ERMS	0.940	35.35	Supported	
H1b	Efficacy ⇢ Intention to Adopt ERMS	0.923	97.36	Supported	
H1c	Knowledge and Skills ⇢ Intention to Adopt ERMS	0.945	105.50	Supported	
H2	Technological Factors → Intention to Adopt ERMS	0.176	2.30	**Supported**	
H2a	Perceived Usefulness ⇢ Intention to Adopt ERMS	0.892	52.03	Supported	
H2b	Perceived Ease of Use ⇢ Intention to Adopt ERMS	0.797	23.80	Supported	
H2c	Adaptability ⇢ Intention to Adopt ERMS	0.937	98.68	Supported	
H2d	ICT infrastructure ⇢ Intention to Adopt ERMS	0.964	165.39	Supported	
H3	Environmental Factors → Intention to Adopt ERMS	0.629	9.381	**Supported**	
H3a	Laws and Legislations ⇢ Intention to Adopt ERMS	0.955	114.17	Supported	
H3b	Policies ⇢ Intention to Adopt ERMS	0.954	138.51	Supported	
H3c	Competitiveness Pressure ⇢ Intention to Adopt ERMS	0.952	135.48	Supported	
Organization's Performance					0.649
H4	ERMS Adoption → Organization's Performance	0.806	27.76	**Supported**	

and environmental factors) to identify the factors influencing ERMS adoption. The analysis examined the fit between the structure sub-models comprising the proposed framework and the hypotheses. Before conducting this analysis, the content validity and the construct reliability were tested; the tests results showed a good fit. The measurement framework validity was gauged by the presence of discriminant validity, convergent validity, and composite reliability. Added to this, each factor's Cronbach's alpha was calculated to determine their internal consistency. SEM analysis was used to estimate the goodness-of-fit estimation of the correlations among exogenous factors. The findings showed that all measurement conditions were successfully met.

The standardized coefficients (R^2) for all of the correlations were found to be significant, with the items effect size in the ERMS framework components revealed to be achieved. In other words, all the indices met the recommended values; this shows that the framework has an excellent fit.

This study empirically tested the relationships between the individual factors (attitude, efficacy, knowledge, and skills), the technological factors (perceived ease of use, perceived usefulness, adaptability, and ICT infrastructures), environmental factors (legislation, policies, and competitiveness pressure) and the adoption of ERMS. The study also identified the role of ERMS adoption in enhancing the organization's performance of HPE institutions. The results showed how the consequences of such adoption could affect organizational performance among end-users of ERMS in the institutions of HPE in developing countries. All the hypotheses and sub-hypotheses were supported by the data.

The findings open up a new line of research into the systemic integration of ERMS. Analysis of the results suggests that the holistic adoption of the system explains more variance than its modules. The synergistic interactions of factors at different adoption stages and their differential impacts on performance suggest that ERMS researchers need to explore these interactional relationships further.

In short, knowing the factors that influence the success of ERMS adoption and acting to address them is only one step in the right direction. The specific identification of the factors influencing ERMS adoption for enhancing the overall performance in HPE institutions involved the examination of the level of relationship among the adoption factors (technological factors, organizational factors and environmental factors). The analysis comprised the measure of fit of the structure sub-models comprising the proposed framework and hypotheses. Before such analysis was carried out, the content validity and construct reliability were tested and the test results showed good fit. The measurement framework validity was gauged based on the presence of unidimensionality, discriminant validity, convergent validity and composite reliability. Added to this, each factor's Cronbach's alpha was calculated to determine their internal consistency and SEM analysis was utilized to estimate the goodness-of-fit estimation of the correlations among exogenous factors. The related findings showed that the entire measurement conditions were successfully met.

The findings indicate that the individual, technological and environmental factors should be taken into consideration as a determinant of ERMS adoption in HPE sector and that it influences individuals and organization alike in different levels (operational, tactical and strategic).

VIII. CONTRIBUTION

A significant portion of literature dedicated to ERMS adoption was carried out in healthcare sector, while the education sector is largely untouched. Therefore, this study is an attempt to minimize the gap in the literature and in practice concerning ERMS in the developing countries, where HPE executives have a tendency to ignore the needs, which could lead to influence successful ERMS adoption. Studies concerning ERMS and its relationship with organization's performance are also scarce. Therefore, the findings of this study are expected to contribute not only theoretically but

TABLE 8. Questionnaire items.

No	Factor	Item	Question
1	Attitude	ATT1	I get a frustrating feeling when I think of using ERMS.
2		ATT2	I believe that using ERMS is useful.
3		ATT3	I believe that using ERMS is a good idea.
4		ATT4	I like using ERMS.
5		ATT5	I prefer ERMS to any other manner.
1	Knowledge and Skills	KSK1	I have the required skills in organizational overview knowledge (organizational objectives, purpose, opportunities, constraints, internal and external functioning).
2		KSK2	I have general knowledge (ERMS concepts, policies and plans, existing IS applications and IS potential ability).
3		KSK3	I have technical skills (methods and techniques required to perform implantation tasks).
4		KSK4	I have ERMS product knowledge (IS products in the marketplace, regarding purpose, design, required procedures, impacts on individuals).
5		KSK5	I have organizational unit knowledge (work units' objectives, purpose, functions, links with other groups and problems).
1	Efficacy	EFC1	I am confident to use the ERMS if I have a lot of time to accomplish the tasks for which the system is provided.
2		EFC2	I am confident to use the ERMS if there is no one around to show me how to do it.
3		EFC3	I am confident to use the ERMS as long as someone shows me how to do it.
4		EFC4	I had used similar packages before this one to do the same job.
5		EFC5	I am confident to use the ERMS if I have just built-in.
1	Perceived Usefulness	PUS1	ERMS enhances my work effectiveness.
2		PUS2	ERMS increases my productivity in my work.
3		PUS3	ERMS enables me to accomplish tasks more quickly.
4		PUS4	ERMS makes my work easier.
5		PUS5	ERMS gives me greater control over my work
1	Perceived Ease of Use	EUS2	ERMS is easy to use.
2		EUS3	ERMS is flexible.
3		EUS4	It is easy to get information using ERMS to do what I want to do.
4		EUS5	It is easy to detect and correct errors in student records using ERMS.
1	Adaptability	DTY1	Better adaptability in combining businesses.
2		DTY2	Possible level of customization in general organization.
3		DTY3	Better adaptability in realigning businesses.
4		DTY4	Better adaptability in restructuring businesses.
5		DTY5	Possible level of customization for the specific organization.
1	ICT infrastructure	ICT1	Provides a high degree of interconnectivity.
2		ICT2	Is sufficiently flexible to incorporate electronic connections to external parties.
3		ICT3	Provides remote users with seamless access to centralized data.
4		ICT4	Captures data that is made available to everyone in our organization in real time.
5		ICT5	Provides a high degree of interconnectivity.
1	Laws and Legislations	LLG1	There is a lack of security rules, policies, and privacy laws.
2		LLG2	Because of differences in legislation, organizations might lose control of data if ERMS provided by a supplier hosting data outside the country are used.
3		LLG3	There is no legal protection in the use of ERMS.
4		LLG4	The laws and regulations that exist nowadays are sufficient to protect the use of ERMS.
5		LLG5	Legislations and rules are essential to comply with government requirements.
1	Policies	PLC1	Helps the system in complying with legal and regulatory requirements.
2		PLC2	Is easy to understand
3		PLC3	Covers the whole system functions
4		PLC4	Implementable
5		PLC5	Cost-effective.
1	Competitiveness Pressure	CPR1	My job frequently requires me to rely on the ERMS.
2		CPR2	My everyday work tasks require me to need the support of the ERMS frequently.
3		CPR3	I frequently have to use the ERMS to meet my work obligations.
4		CPR4	I'm expected to use the ERMS all the time to meet my work obligations.
5		CPR5	ERMS is vital to ensure competitiveness.
1	Intention to Adopt	ADP1	I would use an E-Government system for gathering information.
2		ADP2	I would use the services provided by the ERMS.
3		ADP3	I would not hesitate to provide information to an E-Government system.
4		ADP4	I would use an E-Government system to inquire about online service.
5		ADP5	I would strongly recommend that others E-Government and IT services.
1	Organization's Performance	OPR1	Our overall competitive position is strong in our business sector.
2		OPR2	The profitability of our organization is reasonable relative to the overall performance of our business sector.
3		OPR3	Compared to the time before the adoption, I judge the quantity of the work to be much better with ERMS.
4		OPR4	ERMS provide efficient management that will enhance the overall performance.
5		OPR5	The ERMS provide effective management to plan the work so that it is done on time.

also practically. A detailed view of the contributions in terms of theory and practice are presented in the next sub-sections.

The study contributes new knowledge to the ERMS field. In addition to the above contributions, the study also

highlighted ERMS functions that support HPE performance. The findings are expected to provide an insight into the context of future studies. Moreover, this study explained the complex relationships between various factors and the ERMS adoption. Several studies using UTAUT or TOE model largely ignored ERMS in education and therefore, this study contributes to theory by doing so.

This study attempted to bridge the gap in previous research through its empirical investigation of the ERMS adoption factors that impact the overall performance in HPEs within the context of Yemen as one of the developing countries. In spite of its global importance, there is little knowledge regarding these factors that could assess the intention to adopt ERMS.

The findings of such research can be regarded as fundamental for future strategies in developing a framework for ERMS adoption in the public sector of developing countries. This means that a plan for successful investment in this area can be gained through investigating these factors that assess the intention to adopt ERMS.

In addition, there are a few studies that investigated the factors through the information technology models in the public education sector of developing countries such as Yemen. Thus, this research attempted to cultivate this model among managers and employees in the universities and the education sector by proposing a model that investigates the impact of these factors in the sector. Based on literature review, this study is one of the genuine empirical studies that investigate the factors that could assist in the adoption process among HPE institutions of the developing countries including Yemen.

This study intended to be a valuable source for further empirical and conceptual research on the ERMS and technology adoption. Besides its general contribution through identifying, conceptualizing and implementing the emerged key adoption factors that predict the intention and the actual performance in the public education sectors, the results can be replicated in further investigation of the phenomenon in a different context. It provides further understanding of the behavior and attitude of the employees in universities towards the technology adoption. Finally, the findings of the present study confirmed that the factors were an essential contribution to guide the successful implementation of ERMS in the HPE institutions of Yemen.

Studying factors that contribute to successful ERMS adoption in developing countries like Yemen does not only serve the development of technology in Yemen but can contribute to the body of knowledge in the area for technology adoption. This research will be of significance in several areas and provide new knowledge to academics and practitioners.

According to the literature review, there are some studies that use a combined TOE and UTAUT model to study factors that lead to technology adoption in various contexts. However, as per researcher's knowledge, no studies have been conducted on ERMS adoption in the context of the developing countries in general and Middle Eastern region in particular. Subsequently, the current study is significant because it adds new information to the existing literature by combining TOE with UTAUT. Thus, the model that will be generated from this research is supposed to be a useful tool for academics to understand these factors in the future.

Thus, the proposed model provides better understanding of factors that assist in proper adoption of ERMS. The validity of the model was confirmed in the context of public education sector (HPE institutions) in Yemen.

IX. CONCLUSION

The relevance of e-records has driven researchers to examine the factors influencing ERMS adoption to improve management and decision making in organizations in light of efficiency and effectiveness. Several pieces of research have been utilized for such examination in the hopes of promoting ERMS adoption, and in this paper, the author provided an understanding of the factors that influence ERMS adoption from the HPEs perspective. This study's findings are expected to promote awareness among public records management of the system's importance in managing educational records and emphasizing the requirement for the sufficient appropriation of individual, technological and environmental factors needed for successful ERMS adoption. From this paper's results, HPE institutions should be aware of the factors that can drive the development of strategies and formulate guidelines for employees to accept ERMS and use the system consistently in their daily tasks. It is hoped that the findings can provide a deeper insight into organizations of other domains regarding the factors that must be focused on for the successful system adoption. The paper urges more studies to examine the ERMS role in decision making and the formation of a robust framework for the process of its adoption. In this paper, a framework is brought forward as a guide to system implementation and adoption. The reviewed prior literature indicated the relationship between successful ERMS adoption and the proper structure to guide such adoption.

APPENDIX

See Table 8.

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