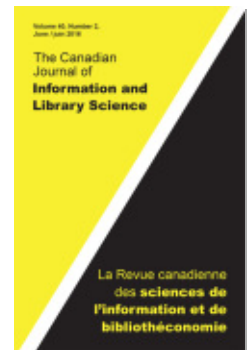




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Determinants of User Acceptance of Electronic Recordkeeping Systems: A User-Focused Empirical Study of System Characteristics / Caractéristiques déterminantes de l'acceptation des systèmes de gestion des documents électroniques par les utilisateurs: Une étude empirique orientée utilisateurs des caractéristiques des systèmes



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Determinants of User Acceptance of Electronic Recordkeeping Systems: A User-Focused Empirical Study of System Characteristics

Caractéristiques déterminantes de l'acceptation des systèmes de gestion des documents électroniques par les utilisateurs: Une étude empirique orientée utilisateurs des caractéristiques des systèmes

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Abstract: This article presents the findings of an empirical study exploring a set of system characteristics that influence users' acceptance of electronic recordkeeping systems. Thirty-four semi-structured interviews were conducted with general users (i.e., non-specialists in information and records management), from which 10 system characteristics were identified, for example, *sharing*, *integrated*, and *complete*. In addition, this study has identified three moderating factors (i.e., gender, organizational context, and occupational difference) that influence the strength of the relationship between the set of system characteristics and users' perceptions of electronic recordkeeping systems. Based on the results of this study and the Technology Acceptance Model, this article proposes a research model describing how the set of system characteristics and the moderating factors influence users' perceptions of electronic recordkeeping systems. Given that records management work is no longer purely the responsibility of information and records management specialists but rather is increasingly part of every employee's duties, it is vital to gain an understanding of the external variables that have an impact on users' perceptions of electronic recordkeeping systems and that may enhance users' intention to use these systems.

Keywords: user acceptance, electronic recordkeeping system, records management; information system, Technology Acceptance Model (TAM)

Résumé : Cet article présente les découvertes d'une étude empirique explorant un ensemble de caractéristiques systémiques qui influence l'acceptation par les utilisateurs des systèmes de gestion des documents électroniques. Trente-quatre entrevues

semi-dirigées ont été conduites avec des utilisateurs non-spécialistes (c.-à-d. non-spécialistes de gestion de l'information/archives), à partir desquelles dix caractéristiques des systèmes ont été identifiées, par exemple, le *partage*, l'*intégration*, la *complétude*, etc. En complément, cette étude a identifié trois facteurs modérateurs (c.-à-d. genre, contexte organisationnel, et différence occupationnelle) qui influencent la force de la relation entre les caractéristiques des systèmes et la perception des systèmes par les utilisateurs. À partir des résultats de cette étude et du modèle d'acceptation technologique (Technology Acceptance Model), cet article propose un modèle de recherche décrivant comment les caractéristiques des systèmes et les facteurs modérateurs influencent la perception des systèmes par les utilisateurs. Étant donné que le travail de gestion des documents n'est plus entièrement la responsabilité des spécialistes mais de plus en plus repartit sur l'ensemble des employés, il est vital de mieux comprendre les variables externes qui ont un impact sur la perception des systèmes de gestion documentaire, et qui peuvent induire les utilisateurs à utiliser ces systèmes.

Mots-clés : acceptation par les utilisateurs, systèmes de gestion des documents électroniques, gestion des documents, Modèle d'acceptation technologique (MAT)

Introduction

Information and records are considered essential components for enabling the conduct of business, maintaining transparent democracies, supporting accountability, and preserving individual and collective memory (Shepherd and Yeo 2003). The shift from paper-based records to digital records has transformed information and records management in many ways, with one important change being the increasing reliance on electronic recordkeeping systems for the management of information and records. One implication of this change is that, unlike in the paper-based environment, where a group of clerks, secretaries, and records managers would be responsible for filing and managing records created by the whole organization, in the digital environment all employees (i.e., those who are not information and records management specialists) are increasingly expected to manage the records they create using a variety of electronic recordkeeping systems. This change poses many challenges for information and records management work; for instance, it generates the need to change employees' mindsets so that they understand that the records they create belong to the organization rather than to themselves (Maguire 2005), and to "institutionalize" information and records management such that it is "systematized and drawn into the operational fabric, into the 'business as usual' of the organization" (Hase and Galt 2011, 38). Further, given the crucial role that electronic recordkeeping systems play in the management of digital information and records, a key issue is users' acceptance of these systems and, consequently, their willingness to use them. Indeed, both anecdotal and academic evidence has demonstrated the failure of electronic recordkeeping system projects (e.g., Ryan 2005; Maguire 2005). It is therefore important to understand how general employees perceive electronic recordkeeping systems and to ascertain what variables influence their acceptance of these systems. Unfortunately, while there have been numerous

studies on the acceptance and success of information systems from within the information systems field, similar studies in relation to electronic recordkeeping systems are as yet scarce.

This article aims to help address this knowledge gap by presenting an empirical study that intends to answer the following research question: What set of system characteristics influences users' perceptions of electronic recordkeeping systems? The remainder of this article is organized as follows: first, a brief review of existing studies on the factors influencing the success of information systems, external variables related to users' acceptance of information systems, the assessment of the success of records management programs, and the factors influencing the acceptance of electronic recordkeeping systems is presented; next, the methods used for data collection and data analysis are introduced; then, the research results and a discussion of their implications are presented; and, finally, the main findings of this study are summarized and possible areas for future research identified.

A review of existing studies

Factors influencing the success of information systems

Assessment of information system success has been a frequently studied topic in the field of information systems during the last four decades (Urbach, Smolnik, and Riempp 2009). Opinions differ as to what is the most reliable indicator of information system success, what are the determining factors influencing the acceptance of information systems, and what are the relationships between different variables that contribute to information system success. In terms of the best indicator of information system success, some studies have focused on individuals' intention to use or usage, while some have used implementation success at the organizational level as the indicator, and others have focused on task-technology fit (Venkatesh et al. 2003). As to the determining factors influencing user acceptance of information systems, some variables identified include usefulness, ease of use, experience, attitude toward using technology, extrinsic motivation, intrinsic motivation, compatibility, voluntariness, and so on. With regard to the relationships between different variables determining the success of information systems, some models present the variables as determining factors, the presence of which will lead to the success of the information systems, as exemplified by the Technology Acceptance Model (TAM) introduced by Fred D. Davis (1989); others, however, describe a more sophisticated process wherein a causal and/or process relationship exists among different variables, as exemplified by William H. DeLone and Ephraim R. McLean's (1992, 2003) model.

A variety of models have been developed to explain and predict information system success and users' acceptance of information systems. In addition to the TAM and DeLone and McLean's model, there exist Peter B. Seddon's (1997) respecification and extension of DeLone and McLean's model, as well as the Unified Theory of Acceptance and Use of Technology model (Venkatesh et al. 2003), an extension of the TAM. Theories from other fields have been drawn

on to help identify factors explaining and predicting users' interaction with information systems and the outcomes resulting from such interactions. Some examples include the Theory of Reasoned Action (Fishbein and Ajzen 1975), the Theory of Planned Behaviour (Ajzen 1985), and Innovation Diffusion Theory (Rogers 1962).

Among the models for assessing information system success, DeLone and McLean's model has been the dominant one since its initial introduction (Urbach, Smolnik, and Riempp 2009). Serving as a comprehensive taxonomy of information system success, DeLone and McLean's model is based on an extensive literature review, a combination of Claude E. Shannon and Warren Weaver's (1949) three levels of information, and Richard O. Mason's (1978) expansion of the effectiveness or influence level. This taxonomy consists of six discrete dimensions: system quality, information quality, use, user satisfaction, individual impact, and organizational impact, all of which have a *temporal* and *causal* influence in determining information system success. Among these dimensions, *system quality* measures the characteristics of the information system itself, including reliability, response time, resource utilization, and more; *information quality* measures the quality of the information system output, including accuracy, timeliness, relevance, usefulness, and more; and *use* measures the consumption of the output of an information system, which is susceptible to many different interpretations (DeLone and McLean 1992).

Ten years after the initial introduction of their model, DeLone and McLean (2003) updated and extended the model based on empirical evidence accumulated within those 10 years. In this second version of the model, the authors addressed the controversies regarding its combination of process and causal interpretation in one model, cleared up confusion surrounding their application of the term *use*, extended the model by adding the dimension of service quality (i.e., the assistance provided by the information system department with a variety of tasks), and replaced individual impact and organizational impact with the general term *net benefits* to accommodate the wide range of impacts (e.g., individual, organizational, and social) that information systems can bring about.

While DeLone and McLean's model concentrates on the process and variables through which information systems will bring about positive impacts on organizations, the TAM focuses on the factors and processes that describe and explain individual users' acceptance of information systems. The TAM hypothesized that perceived usefulness and perceived ease of use were the fundamental determinants of user acceptance of information systems, which influenced users' usage behaviour through influencing their intention to use the information systems, and that the effect of external variables (e.g., system characteristics, development process, and training) on users' acceptance of information systems was mediated by these two factors (Venkatesh and Davis 2000). *Perceived usefulness* is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance," and *perceived ease of use* is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis 1989, 320). These two items measure users' perceptions of or

beliefs about information systems. Davis (1989) developed a list of measurement scale items for perceived usefulness and perceived ease of use and refined them using two empirical studies. Both study results confirmed the correlations between perceived usefulness and perceived ease of use and self-reported indicants of system use. Moreover, perceived usefulness was found to be more strongly linked to usage than was perceived ease of use. Since the publication of the TAM, its capacity for explaining the variance in system usage has been tested in many empirical studies.

Viswanath Venkatesh and Davis (1996, 2000) later extended the TAM by identifying the antecedents of perceived ease of use and perceived usefulness. For perceived ease of use, experiments involving 108 subjects and six different systems supported Venkatesh and Davis's hypotheses that an individual's perception of a particular system's ease of use is influenced by the individual's general computer self-efficacy and that the influence of another variable—that of objective usability—will be in effect only after direct hands-on experience with the system (Venkatesh and Davis 1996). In regard to perceived usefulness, Venkatesh and Davis (2000) hypothesized that subjective norm, image, job relevance, output quality, and result demonstrability were the determinants of perceived usefulness, with experience and voluntariness being the moderating factors between subjective norm and perceived usefulness, and between subjective norm and intention to use. This extended model of the TAM was later identified as the TAM 2. Empirical tests of this model in four organizations at three points of implementation (i.e., after initial training, one month after implementation, and three months after implementation) explained 40%–60% of the variance in usefulness perceptions and 34%–52% of the variance in usage intentions.

In the early twenty-first century, recognizing that user acceptance of new technology is one of the most mature research areas in the field of information systems and that there are a multitude of models in use in this area, Venkatesh and his colleagues proposed to formulate a synthesized model—the Unified Theory of Acceptance and Use of Technology. In this synthesized model, similar variables from previous models were compared, and high-level constructs were used to summarize their essence. Four variables were identified as the determinants of behavioural intention: performance expectancy, effort expectancy, social influence, and facilitating conditions, with gender, age, experience, and voluntariness of use being the moderating factors (Venkatesh et al. 2003).

External variables and users' acceptance of information systems

Arguing that beliefs and attitudes are the core constructs in determining individuals' acceptance of new information technology, Davis, Richard P. Bagozzi, and Paul R. Warshaw (1989) suggested that the impact that external variables (e.g., individual differences, situational constraints, and managerially controllable interventions) will have on individuals' acceptance of information technology is mediated by users' internal beliefs, attitudes, and intentions to use information technology. Yet, other than acknowledging the role external variables have played in the TAM, Davis and his colleagues did not explicate the process by

which external variables influence individuals' beliefs and attitudes (Agarwal and Prasad 1999). Further, other than system design features, the TAM did not specify the list of external variables that would indirectly or directly influence the acceptance of information technologies (Davis 1993). This gap in the model limited its practical implications in terms of supporting managers to proactively influence the acceptance of information technology by implementing appropriate measures.

Fortunately, subsequent research has explored the categories of external variables that have an impact on individuals' acceptance of information technology, mostly employing the TAM as the theoretical framework. The three main categories of external variables identified are organizational support, individual differences, and system characteristics, and most of the research is conducted on a specific type of information technology. For instance, aiming to develop and test an integrated conceptual model of microcomputer usage, Magid Igbaria, Tor Guimaraes, and Gordon B. Davis (1995) used the TAM as the conceptual foundation and extended it by adding three external factors: individual characteristics (i.e., user training and user computer experience), organizational support (i.e., end-user support and management support), and system characteristics (i.e., functionality, equipment performance, interaction, environment, and the quality of the user interface). Their empirical study confirmed not only the validity of the TAM but also the influence of these three external factors on users' acceptance of microcomputer usage through two mediating variables: perceived ease of use and perceived usefulness. Ritu Agarwal and Jayesh Prasad (1999) investigated whether individual differences are germane to the acceptance of new information technologies and to the process through which the influences of individual differences are executed. Agarwal and Prasad defined *individual differences* as "user factors that include traits such as personality and demographic variables, as well as situational variables that account for differences attributable to circumstances such as experience and training" (362). More specifically, employing the TAM as the conceptual foundation, Agarwal and Prasad used empirical studies to test how individual-differences variables including role with regard to technology, tenure in workforce, level of education, participation in training, and prior similar experiences influenced behavioural intentions through perceived usefulness, perceived ease of use, and attitude. The study generated mixed results. The mediating role of beliefs was confirmed. While three variables (i.e., role with regard to technology, level of education, and prior similar experiences) had significant effects on perceived ease of use, only one variable (i.e., participation in training) had a direct effect on perceived usefulness.

Other research, though also recognizing individual differences and system characteristics as external variables influencing users' intention to use information systems, usually defines these variables differently, depending on the types of information systems studied. For instance, focusing on external factors influencing users' acceptance of digital libraries, and using the TAM as a theoretical framework, Weiyin Hong et al. (2001) examined the effects of individual differences and system characteristics on users' intention to use digital libraries. The

variable of individual differences was further divided into two sub-variables: computer self-efficacy and knowledge of search domains, while the variable of system characteristics was further divided into three sub-variables: relevance, terminology, and screen design. Empirical data collected from 585 users of the digital library at the Open University of Hong Kong confirmed the significant effects that individual difference and system characteristics have on users' intention to use digital libraries. In a similar study conducted by Keenan A. Pituch and Yao-kuei Lee (2006) on e-learning systems, however, the variable of system characteristics was interpreted to comprise three dimensions: functionality, interactivity, and response time, while the variable of individual differences, termed *user characteristics* in this particular study, was interpreted to comprise two dimensions: self-efficacy and Internet experience. Moreover, unlike previous research, Pituch and Lee's (2006) study found that while system characteristics had a significant influence on users' beliefs regarding and intention to use e-learning systems, the influence of individual differences was not substantial.

The above studies have essentially validated individual differences and system characteristics as the two main categories of external variables influencing—either directly or indirectly via beliefs—users' intention to use new information technologies. Yet it is also evident that there are great inconsistencies in terms of the meaning and components of these two categories, varying according to the type of information system studied. This sensitivity to context makes it hard to generate a universal set of external variables applicable across different information systems.

Assessing the success of records management programs

Assessing the success of records management programs is an essential area of study in the field of records management and archives. An informed understanding of the current state of its records management program enables an organization to deploy effective measures to improve records management and is usually a preliminary step for new projects. Many frameworks and guidelines have been introduced by archival authorities and scholars to help organizations navigate, benchmark, and improve their records management programs. These frameworks and guidelines usually adopt different perspectives, therefore yielding different insights into the records management program under assessment.

The types of assessment most popular in the records management field aim to benchmark, either quantitatively or qualitatively, the performance of an organization's records management program against established standards, best practices, or legislation. This can be identified as an audit approach. In other words, this type of assessment focuses on the compliance with and "effectiveness" of records management programs, or "the measure of how the programme performed in meeting its original objective" (JISC InfoNet 2009). An example of the audit approach is the Records Management Capacity Assessment System (RMCAS), developed by the International Records Management Trust in partnership with the World Bank. The RMCAS is a diagnostic and prescriptive model that aims to, first, assess records management policies, procedures, and resources

against established international standards; second, identify strengths, weaknesses, and risk areas in records management; and, finally, build the link between the assessment results and training and capacity-building materials that can be used to improve records management (Griffin 2004). Unlike other audit tools, as will be discussed below, the RMCAS benchmarks both the core records management function areas (i.e., disposition, tracking, access, storage and preservation, classification, capture and registration, and life cycle) and the organization's capacity, environment, and infrastructure in supporting records management (i.e., awareness and ownership, records management program management, resources and training, business function–records management integration, information and communications technology–records management (ICT-RM) integration, and laws, policies, and procedures). By asking a list of assessment questions, the RMCAS first gathers data on the state of the records management program in one particular organization, next evaluates the data against good-practice statements as derived from three international standards (i.e., ISO 15489, the National Archives of Canada's Information Management Capacity Check, and the European Commission's Model Requirements for the Management of Electronic Records), and then determines the records management program's capabilities according to a ranking system composed of five levels (i.e., levels 1 to 5).

Another example of the audit approach is the Generally Accepted Recordkeeping Principles model developed by ARMA International (formerly the Association of Records Managers and Administrators) to determine the maturity level of an organization's information governance. It ranks information governance maturity on five different levels—sub-standard, in development, essential, proactive, and transformational—and describes the characteristics of eight essential areas (i.e., accountability, compliance, transparency, availability, integrity, retention, protection, and disposition) at each level. Organizations can pinpoint their maturity level by comparing their information governance with the characteristics of each area at each level. Similarly, the aim of the Records Management Maturity Model created by JISC InfoNet (2013) is to help higher education institutions in England and Wales assess their records management programs against the Lord Chancellor's Code of Practice (2002) on the management of records, issued under section 46 of the Freedom of Information Act 2000 in the United Kingdom. This model comprises 33 statements on records management, each of which can be ranked on four different levels (i.e., absent, aware, defined, and embedded).

Another type of assessment aims to determine an organization's needs and requirements for recordkeeping and then use this information to build an appropriate recordkeeping system. A notable example of this is the Australian Design and Implementation of Recordkeeping Systems (DIRKS) manual, which "provides a comprehensive approach to system design that will help you to develop systems with adequate recordkeeping functionality that are specific to and that meet your particular business needs" (New South Wales Government 2007). The DIRKS methodology was later incorporated into the influential ISO 15489. Based on traditional system design methodologies, the DIRKS methodology comprises eight steps: preliminary investigation, analysis of business activity,

identification of recordkeeping requirements, assessment of existing systems, identification of strategies for recordkeeping, design of a recordkeeping system, implementation of a recordkeeping system, and post-implementation review. Despite the tremendous amount of detail that the “DIRKS Manual” provides in terms of how to implement the methodology and its influence, the manual was removed from the National Archives of Australia website and has no longer been recommended for use by agencies since 2007. Adrian Cunningham (2011) attributed the failure of the manual to the fact that the National Archives of Australia “managed to antagonize a large number of government agencies unnecessarily by insisting upon an overly complicated and rigid set of DIRKS implementation processes for identifying and documenting business functions and activities, and their associated record-keeping requirements” (26).

Despite the popularity of the above two types of assessment methodology in the records management field, these methodologies are not without problems. Benchmarking and evaluating the compliance of a records management program with standards, legislation, or best practices can help obtain a comprehensive overview of the state of the program, including its weaknesses and strengths, as well as determine its degree of robustness and demonstrate the organization’s accountability in managing records. These two approaches are inadequate, however, when it comes to helping the organization understand the causes of the situation and the best way to go about improving it (Oliver and Foscariini 2014).

For many years the set of records management standards originating from Australia has been the dominant approach guiding records management across the world. Yet, regardless of how perfect the standards are and how sophisticated the supplementary tools, electronic records management continues to be a significant challenge for many organizations (McLeod and Childs 2013). Julie McLeod and Sue Childs (2013) identify electronic records management as a “wicked” problem, defined by 10 characteristics as articulated by W. J. Horst Rittel and M. Melvin Webber (1973), such as the lack of a definitive formulation of the problem, no criteria for knowing when the/a solution has been found, solutions that are not true or false but rather good or bad, no immediate or ultimate test of a solution, and so on. The Accelerating Positive Change in Electronic Records Management project led by Julie McLeod from Northumbria University investigated “the design of an organizational-central architecture for managing electronic records from three perspectives—people, processes and technology” (McLeod and Childs 2013, 108). Nine key headline findings emerged from this project, many of which relate to people issues. The project later used the Cynefin framework (Snowden 2010) to make sense of the solutions and issues identified and to help decision makers choose the appropriate solutions and strategies for records management (McLeod and Childs 2013). Unlike other assessment methodologies discussed above, the combination of the Cynefin framework and the strategic electronic records management (ERM) framework developed by the project doesn’t regard records management as a simple problem; instead, it is based on the understanding that “the ERM challenge

is complex, contextualized and contingent,” categorizing the identified problems and then accordingly taking appropriate actions to address the problem.

Similarly acknowledging the crisis facing archives and records management professions, Frank Upward and colleagues introduced a new “disciplinary base” for understanding records management and designing methods to address the recordkeeping crisis (Oliver et al. 2009, 2010; Upward et al. 2013). This new disciplinary base for records management is identified as recordkeeping informatics, which deals with the “management and processing of recorded information derived from agents in action” (Upward et al. 2013, 38). Embracing Australian continuum thinking and recordkeeping metadata as the two key building blocks, recordkeeping informatics includes three facets of recordkeeping analysis: organizational culture analysis, business process analysis, and archival access (Upward et al. 2013). Among these three facets of analysis, the assessment of organizational culture is guided by the Information Culture Framework developed by Gillian Oliver and Fiorella Foscarini (2014). Recognizing that organizational culture is a critical factor to be taken into account when implementing a recordkeeping system, Oliver and Foscarini anticipated that the Information Culture Framework would supplement traditional audit assessment methodologies and assist organizations in obtaining an information-centric, contextualized understanding. The framework is a three-layer pyramid with factors contributing to an organization’s information culture residing in each layer. The bottom layer represents factors that are fundamental to organizational information culture and are often resistant to change, such as the value accorded to records, as well as information preferences; the middle layer represents the skills, knowledge, and expertise of employees relating to information management, such as information-related competencies and awareness of environmental requirements; and the top layer represents factors that are significant for recordkeeping and are easy to change, including information technology governance and trust (Oliver and Foscarini 2014).

The assessment of records management programs is a thriving area that has attracted considerable academic attention. Various assessment methods have been developed over the decades to assist the evaluation of records management programs. Many of the assessment methods are predominantly audit oriented, aiming to demonstrate the records management program’s compliance with standards, legislation, or best practices. The success of a records management program is therefore measured in terms of its degree of compliance with these standards. The emergence of other assessment approaches has supplemented the audit-oriented approach by offering a holistic understanding of the records management ecology. Yet an obvious defect in existing assessment methods is that few regard the success of electronic recordkeeping systems as an integral component of the records management program being assessed.

Factors influencing the success of electronic recordkeeping systems

An electronic recordkeeping system is “an electronic information system that meets an agency’s recordkeeping needs”; more specifically, it is “an electronic

information system in which records are collected, organized, and categorized to facilitate their preservation, retrieval, use, and disposition” (NARA 2000). An array of electronic recordkeeping systems have been developed over the decades to manage organizational information and records. These systems range from focused solutions such as the Electronic Records Management System (ERMS) and Electronic Documents Management System to multi-module systems such as Enterprise Content Management, Enterprise Knowledge Management, and the Electronic Documents and Records Management System (EDRMS) (Nguyen, Swatman, and Fraunholz 2008). Throughout this article, the term *electronic recordkeeping systems* will be used to represent the array of different solutions.

As a type of information system designed on the basis of the functional requirements and specifications of records management, electronic recordkeeping systems play a crucial role for the management of an organization’s digital records. A series of functional requirements, standards, and specifications have been formulated over the decades to assist in the development and evaluation of electronic recordkeeping systems, including the DoD 5015.2-STD (Design Criteria Standard for Electronic Records Management Software Applications), the Model Requirements for Electronic Records and Document Management, and ISO 16175 “Principles and Functional Requirements for Records in Electronic Office Environments.” As more and more organizations go paperless, electronic recordkeeping systems are becoming an integral component of the dozens of information systems needed by organizations.

An electronic recordkeeping system is different from the information systems that have been examined in prior TAM studies in several ways. First, an electronic recordkeeping system is designed to perform records management functions that are specific to the records management group and not directly relevant to staff’s everyday work, such as filing and metadata. Second, the target user group of an electronic recordkeeping system includes a wide range of users with diversified occupational responsibilities, differing technology competencies, and unique personalities. Third, an electronic recordkeeping system may integrate several functions into one, including a database, a business process-enabling program, and a records management program. These differences between electronic recordkeeping systems and other information systems render the applicability of the findings concerning the acceptance and success of information systems uncertain.

Articles on the implementation of electronic recordkeeping systems, and the factors influencing the success of their implementation, did not appear before the past decade. With the exception of a few academic studies, most of these works are cases published by practitioners discussing their experiences and lessons learned. A few common factors highlighted across these cases are training (Di Biagio and Ibricu 2008; Gregory 2005; Maguire 2005; Johnston and Bowen 2005), engaging “key users” (Di Biagio and Ibricu 2008) or “power users” (Smyth 2005), the user-friendliness of the technology (Maguire 2005; Wiltzius et al. 2014), advance communication with users to raise their awareness of the project (Smyth 2005; Di Biagio and Ibricu 2008; Gregory 2005), and other factors. Although these cases provide invaluable data and evidence regarding

the factors influencing the successful implementation of electronic recordkeeping systems, in the absence of systematic evaluation and a theoretical foundation, the ability to generalize from these experiences to gain insight into other electronic recordkeeping system projects is greatly limited, and their theoretical contribution is minimal.

Among those few aforementioned exceptions to this rule are the PhD dissertations of Johanna Gunnlaugsdottir (2006), from the University of Tampere, and Matthew James Lewellen (2015), from Victoria University of Wellington. Employing a qualitative approach, Gunnlaugsdottir (2006) studied the implementation and use of ERMS in eight organizations in Iceland, aiming to discover “which implementation factors influenced a successful outcome and the actual use as well as the perceived objectives of the implementation” (5). The study identified three major factors that strongly correlated with the implementation outcome: support by top management, cooperation between the information technology and records management functions in the system development and training, and the training of the users, who should receive both basic training in records management and comprehensive training in using the system. In comparison, employing a quantitative approach frequently used in the information systems field, Lewellen (2015) explored “the factors that influence a user’s intention to use an electronic recordkeeping system” (i). Lewellen first created a conceptual model based on technology acceptance, organizational context, and knowledge interpretation literature; compared with the TAM, the model that Lewellen formulated contained three additional factors hypothesized to influence users’ intention to use an electronic recordkeeping system: social influence, perceived value of records, and perceived power security. Next, Lewellen tested the proposed model using a survey instrument; the research data show that the three most important constructs influencing users’ intention to use electronic recordkeeping systems are the perceived value of records, effort expectancy, and social influence. Lewellen’s work represents the first effort to not only use methodology commonly used in the field of information systems to study the acceptance of electronic recordkeeping systems but also draw explicitly on TAM as the conceptual foundation from which to build theoretical models, as Lewellen acknowledged that “although a significant body of research has been dedicated to studying system use in various situations, no research in the information systems discipline has yet focused specifically on electronic recordkeeping and its unique set of use-influencing factors” (i). On the one hand, Lewellen’s research confirms the applicability of the TAM in explaining and predicting the acceptance of electronic recordkeeping systems; on the other hand, this research also indicates the uniqueness of electronic recordkeeping systems and the necessity to take this uniqueness into account when using the TAM.

In addition to the works previously mentioned, there have also been studies that explore the independent variables that influence the implementation outcome of automated records management systems, and some of these have acknowledged their reference to DeLone and McLean’s model. For instance, using four

dimensions from DeLone and McLean's model (i.e., system quality, information quality, service quality, and user satisfaction), Fang-Ming Hsu, Tser-Yieth Chen, and Shuwen Wang (2009) surveyed the efficiency of and user satisfaction with EDRMS in e-government in Taiwan. They found that independent variables influencing the efficiency of EDRMS include the agency's position within the government hierarchy (e.g., central agencies versus local agencies, upper agencies versus lower agencies) and the agency's function (e.g., business agencies versus administration agencies). In another work, Hsu, Paul Jen-Hwa Hu, and Hsin-chun Chen (2008) studied how alignment choices in the implementation of ERMS vary among agencies with different purposes, geographical locations, and positions within the overall government hierarchy, and how different alignment choices lead to different implementation outcomes. Their research shows that the alignment between business and ERMS can affect the performance of ERMS and eventually the performance of the organization. While these two studies mainly focus on exploring the independent variables that influence the implementation outcomes of EDRMS, the use of DeLone and McLean's model indicates its applicability in assessing the success of electronic recordkeeping systems.

This literature review provides an overview of assessment and acceptance of information systems in general and electronic recordkeeping systems in particular. Yet it also reveals major gaps in the study of acceptance of electronic recordkeeping systems. The acceptance of information systems in general has been well studied, such that not only have a series of theoretical models been formulated to explain and predict the acceptance of information systems, but external variables that influence users' intention to use information systems have also been extensively studied. Yet academic study of the acceptance of electronic recordkeeping systems did not even begin until the past decade, let alone begin to utilize the theoretical contribution made in the field of information systems. Recognizing this significant gap, this article aims to contribute to knowledge in this area by presenting a research study that examines one external variable (i.e., the set of systematic characteristics) that influences users' intentions to use electronic recordkeeping systems. Based on the literature review, this study presumes that the TAM is valid in explaining the acceptance of electronic recordkeeping systems, and further that external variables influence users' intention to use electronic recordkeeping systems, via users' beliefs or perceptions. To reiterate our research question: What is the set of system characteristics that influences users' perception of electronic recordkeeping systems?

Methods

To answer our research question, a semi-structured interview approach was adopted to collect data. This method enables the researcher to gain insight into how research participants view the world, without "pigeon-holing" their responses (Bryman 2012, 471). Owing to the lack of existing studies concerning external variables that influence users' perception of electronic recordkeeping systems, this research opted for a qualitative approach intended to identify these variables from scratch.

This advantage to using a qualitative approach to investigate something that has not yet been well studied has been commonly acknowledged.

A combination of purposive and convenience sampling strategies was employed to recruit research participants. Given its focus on general users, only those who were not information and records management specialists qualified to participate in this study. Potential participants were identified as employees who were not information or records management specialists within their enterprises. In this research, *enterprises* are defined as business organizations, either state owned or not. Government organizations are excluded from this research; differences between government and non-government organizations, such as regulations and organizational culture, demand separate attention, and therefore separate studies.

Using one researcher's network, the project sent out invitations to current part-time master of business administration (MBA) students and alumni of the Business School at Nankai University, China, to participate in the study. In total, 34 participants were recruited, among whom 18 are current part-time MBA students and 16 are alumni of the Business School. Participants come from different types of enterprises (e.g., state owned, foreign funded, and privately owned) and hold different types of positions (e.g., marketing, human resources, administration, and research and development). Of the interviewees, 16 are male, and 18 are female. Eight interviewees come from state-owned enterprises, 12 from foreign-funded enterprises, and 14 from privately owned enterprises. In terms of their positions, 4 interviewees hold research and development positions, 8 hold marketing positions, 10 hold human resources positions, and 12 hold administrative positions. Interviewees' ages range from 25 to 45.

Interviews were conducted over the phone in the summer of 2014. Each interview lasted 20–30 minutes. An interview guide was developed before the interviews to ensure that relevant themes of the research would be covered, while still allowing for unexpected themes to emerge during the interviews. Interview questions centred on the following areas: obtaining demographic information from the participants; asking the participants to recall their use of organizational electronic recordkeeping systems (or information and records) in the past, to describe whether they have been able to effectively access the information and records they have needed, and to consider what impact this information and these records have had on their work; asking the participants to envision an ideal example of an electronic recordkeeping system or of information and records management; and asking participants to give recommendations to improve the current electronic recordkeeping system or information and records management in their organizations. Questions from the last three areas aimed to solicit interviewees' evaluation of the information and records management in their organizations from three different perspectives (i.e., complaints, strengths, and recommendations) and uncover new characteristics. The interview guide was pilot tested with colleagues and revised before the interviews. Interviews were audio-recorded and transcribed. Transcripts were anonymized, and each interview transcript was identified by the unique ID assigned to the interviewee

(e.g., M1, M2, . . . M16; F1, F2, . . . F18, where *M* represents male interviewees and *F* represents female interviewees).

Open coding was performed on the data collected. Each interview transcript was first broken down into the smallest meaningful units and identified with a unique number. The *smallest meaningful unit* is defined as a segment of data that conveys information about electronic recordkeeping systems or information and records management and that cannot be divided further; it can be one sentence or a paragraph. For instance, in interview transcript M1, we identified 36 smallest meaningful units. The fourth one—"there is a lack of a sharing platform in the system"—is identified as M1-4. The smallest meaningful units were then interpreted and coded. For instance, meaningful unit M1-4 is coded as "system sharing." To ensure reliability, three trained coders first coded independently, then discussed their coding results and finalized the codes. The codes were constantly compared, and similar ones were grouped into categories describing the characteristics emphasized by general users. The number of codes in each category was counted as well. For instance, meaningful units M1-4, M3-1, M4-2, and F1-2 are all about sharing, and they were grouped into one category identified as "sharing"; the frequency of codes in the category "sharing" were counted.

Results

System characteristics that influence users' perceptions of electronic recordkeeping systems

The data analysis revealed 10 system characteristics frequently discussed by interviewees, as shown in table 1. The criterion for the inclusion of these characteristics is their frequency of appearance in the interviews. These characteristics are significant to a user's perception of electronic recordkeeping systems and will therefore influence the user's intention to use the electronic recordkeeping system. In the rest of this section, these characteristics will be discussed one by one in order of significance, from the one most frequently discussed to the least frequently discussed.

The characteristic most frequently discussed by interviewees is *sharing*, that is, the availability of appropriate means to facilitate enterprise-wide or within-department barrier-free exchange of documents and records. It was mentioned 67 times across 34 interviews. Some interviewees complained that "there are some difficulties in the sharing of customer data" (M1) or that there was "a lack of a sharing platform" (M3). Others said, "We always simply rely on e-mails, QQ group, flash disk, and other ad hoc means for real-time feedback and sharing . . . We haven't any sharing platform" (F1), and "it [i.e., the lack of a sharing platform] is very inconvenient . . . It has significantly reduced our work efficiency" (F3). Interviewees also recognized that information sharing would enable information feedback and documentation.

Another characteristic identified by interviewees is *integrated*. Integration can occur between an electronic recordkeeping system and other line-of-business

Table 1: The set of system characteristics that influence users' perception of electronic recordkeeping systems

System characteristics	Frequency	Definition
Sharing	1.97	Appropriate means (e.g., sharing platforms, e-mails) are available to assist enterprise-wide (or within-department) barrier-free exchange of documents and records.
Integrated	1.56	An enterprise-wide document and records management program is in place for documents and records from different departments so that they can be managed in one interface.
Complete	1.21	Documents and records from each department of the organization are centrally and uniformly managed and will not be lost because of employee turnover.
Customized	1.15	The records and documents provided by the Electronic Documents and Records Management System are relevant to users' work.
Timely	0.82	The system can respond in a timely fashion to users' documents and records requests.
Streamlined	0.44	System-to-system modules and modules within the system can be integrated well, and consistency of documents and records maintained.
Secure	0.44	The integrity of documents and records can be protected from unintended or intended compromise.
Organized	0.41	Documents and records are classified and organized to facilitate use.
User-friendly	0.38	Personal habits have been taken into account in system design to facilitate retrieval and use of documents and records.
Continuous	0.38	Documents and records can be accumulated to facilitate long-term use.

Note: Frequency in this table refers to the number of times each system characteristic was mentioned per interviewee across all interviewees. The figure has been rounded to the second decimal place.

applications, or among line-of-business applications. It was mentioned 53 times across 34 interviews. The central problem, as discussed by our interviewees, is that existing information systems are mostly built without consideration of the future and are isolated from each other, thereby becoming separate system silos that cannot communicate with each other. As interviewee M5 remarked, "there is a lack of an overall plan in the design of these systems; the office automation, financial, and human resource systems are used in parallel without effective integration. It is troublesome that we need to switch between different systems to get the information." Another interviewee expressed that "to improve work efficiency, it is crucial that different tasks can be performed on one interface" (F3). Similarly, interviewee F4 said, "It would be great if we could access customer information, product test results, and contract from one interface."

Complete means that all organizational information and records, regardless of their formats and the information systems in which they reside, are all managed and covered by the electronic recordkeeping system, thereby preventing organizational information loss from employee turnover and individual mistakes, and promoting the accumulation of organizational information assets. This characteristic was mentioned 41 times across 34 interviews. Some interviewees acknowledged that "the content [information] in our system is very comprehensive, covering almost every aspect of our daily work" (M5), while others complained that

“while some administrative documents and information can be accessed through this system, research and development information [e.g., some technical experiences information] is not available ... [and] the management and preservation of research and development information is a mess” (M1). One interviewee commented that the lack of an organization-wide electronic recordkeeping system would leave the organization’s information at the mercy of individuals. *Customized* is a characteristic indicating that the information and records as well as the functionality provided by an electronic recordkeeping system should match the business needs of users. This characteristic was mentioned 39 times across 34 interviews. Existing electronic recordkeeping systems oftentimes are designed to be comprehensive and, as a result, become too complicated and have too many functions that are not useful to the majority of users. These complexities can place an additional burden on users. One issue, as interviewee M2 complained, is that “the information pushing is overly frequent; some information is not relevant to the employee’s work. A considerable amount of time is taken to tell useful information from the rest.” Interviewee F5 raised a complaint about the report function, which is “not practical, and useless.” Others complained that their information needs could not be satisfied by their information systems (M6).

Timely describes the system’s ability to respond to users’ requests promptly. This characteristic was mentioned 28 times across 34 interviews. Our data show that the speed of current systems cannot satisfy users’ expectations. Interviewee M2 complained, “As employees from different branches of the company around the world are using the same system, the system is really slow ... I hope that the system can be much faster in the future.” Having enjoyed the fun and convenience that information technology has offered them in their private lives, users often have equal, if not higher, expectations of the information technology in their workplaces. If this expectation is not fulfilled, disappointment arises.

Streamlined refers to the smooth connection between different modules of the same system or between different systems. This ensures that information and records in different modules or systems can be updated simultaneously and remain consistent after there is a change in one module or system. Otherwise, as interviewee F12 notes, “each step of the documents and records management does not function smoothly” and “the connection between different models does not function well [such that a] large amount of money and time has been spent to fix the issues” (F10). Moreover, “if information is not updated simultaneously in related modules, this could result in information-sharing difficulties” (F7). A streamlined system is important to ensure that business processes can be carried out smoothly, thereby guaranteeing the accuracy of documents and records and the consistency of information across different departments within the organization. This characteristic was discussed 15 times across 34 interviews.

Secure, as defined by our interviewees, is closely associated with the centrality and uniformity of information and records. Organizational information and records can be preserved securely with the help of both advanced technologies

and good records management programs (supported by an electronic record-keeping system), but in our study users emphasized the latter more, stressing the importance of an organization-wide records management program that makes records management independent of individuals. Interviewees recognized the risks of information and records being managed by and concentrated in the hands of individuals, which makes organizational information and records vulnerable to alteration and prevents their integrity from being guaranteed. For instance, interviewee F14 mentioned that “potential risk increases if all customer information is managed by an individual rather than the organization.” This characteristic was mentioned 15 times across 34 interviews.

The frequency with which the characteristics “organized,” “user-friendly,” and “continuous” appeared is roughly equal. *Organized* indicates that organizational information and records are managed and classified centrally and uniformly in the electronic recordkeeping system so as to facilitate later retrieval, use, and interpretation. This characteristic was mentioned 14 times across 34 interviews. “Organized” as a characteristic is closely related to the installment of an organization-wide records management program. Only when a centralized and uniform organization-wide records management program is in place and is followed well will the information and records be organized. However, some interviewees believe “the documents and records pushed by the systems are not well organized” (e.g., M3, M12, and F15). *User-friendly* indicates that the design of the electronic recordkeeping system has taken personal habits into consideration and thus will support and enable the use of the system. This characteristic was mentioned 13 times across 34 interviews. Some interviewees remarked that “the design of the system should consider personal habits . . . Otherwise, it will be inconvenient and troublesome to use documents and records” (e.g., M9, M13, and F12). *Continuous* emphasizes the importance of accumulation and long-term preservation of organizational information and records to serve long-term use. This characteristic was mentioned 13 times across 34 interviews. Some interviewees complained, “It is difficult to accumulate information only through individuals” (e.g., M3, M11, and F17). One expressed the hope that “these managed information and records can be found and reused years later” (M10).

Moderating factors between system characteristics and users' perceptions of electronic recordkeeping systems

Previous studies have acknowledged the contingency relationship between external variables and users' beliefs about information systems and have identified a list of moderating factors (e.g., gender, age, experience, and voluntariness) (Venkatesh et al. 2003). This study hypothesized that the strength of the relationship between the set of system characteristics and users' perceptions of electronic recordkeeping systems would vary across three moderating factors: gender, organizational context, and occupational differences. To verify this hypothesis, this research further calculated the frequency of each system characteristic mentioned by different user groups, classified based on the three hypothesized factors, as shown in table 2; thus, for the factor gender, interviewees were

Table 2: Average frequency of system characteristics as mentioned by different user groups

System characteristics	Moderating factors									General
	Gender		Organizational context			Occupation				
	Male	Female	State-owned	Foreign-funded	Privately owned	Research and development	Marketing	Human resources	Administration	
Complete	1.31	1.11	1.25	0.92	1.43	0.50	1.50	1.30	1.17	1.21
Sharing	2.19	1.78	1.38	1.75	2.50	1.00	2.25	2.30	1.83	1.97
Timely	0.94	0.72	1.13	0.75	0.71	1.00	1.00	0.50	0.92	0.82
Streamlined	0.50	0.39	0.38	0.50	0.43	0.50	0.50	0.40	0.42	0.44
Integrated	1.63	1.50	2.25	1.50	1.21	0.75	1.25	2.10	1.58	1.56
User-friendly	0.38	0.39	0.88	0.08	0.36	0.50	0.38	0.50	0.25	0.38
Customized	1.19	1.11	1.63	1.75	0.36	2.00	0.88	1.00	1.17	1.15
Organized	0.38	0.44	0.50	0.67	0.14	1.00	0.25	0.30	0.42	0.41
Secure	0.38	0.50	1.13	0.08	0.36	1.25	0.38	0.20	0.42	0.44
Continuous	0.31	0.44	1.00	0.00	0.36	1.25	0.25	0.30	0.25	0.38

Note: Frequency in this table refers to the number of times each system characteristic was mentioned per interviewee in each user group. The figure has been rounded to the second decimal place.

grouped into two groups—male and female—and the average frequency with which each system characteristic was mentioned by the two groups was calculated. Similarly, for the factor organizational context, interviewees were divided into three groups based on the type of enterprise they work in—state owned, foreign funded, or privately owned—and, for the factor occupational differences, interviewees were divided into four groups based on the positions they hold in their enterprise—research and development, marketing, human resources, and administration.

Like the “Frequency” column in table 1, the “General” column in table 2 represents the frequency of each characteristic across all employee groups; this column is included to provide a baseline for comparison: for each system characteristic, the more the average frequency for each employee group deviates from the general frequency, the more significant the factor’s influence.

Regarding the moderating effect of gender on the relationship between system characteristics and users’ perceptions of electronic recordkeeping systems, overall, the frequencies of different system characteristics vary slightly among male and female interviewees. While male interviewees placed more emphasis on *complete* ($1.31 > 1.11$), *sharing* ($2.19 > 1.78$), *timely* ($0.94 > 0.72$), *streamlined* ($0.50 > 0.39$), *integrated* ($1.63 > 1.50$), and *customized* ($1.19 > 1.11$) (as indicated by the higher average frequencies with which these characteristics were mentioned by male interviewees than by female interviewees), female interviewees placed more emphasis on *user-friendly* ($0.39 > 0.38$), *organized* ($0.44 > 0.38$), *secure* ($0.50 > 0.38$), and *continuous* ($0.44 > 0.31$).

By contrast, the frequencies with which different characteristics were mentioned vary greatly among different organizational contexts. Interviewees from privately owned enterprises placed more emphasis on *complete* ($1.43 > 1.25 > 0.92$) and *sharing* ($2.50 > 1.75 > 1.38$) than did interviewees from state-owned and foreign-funded enterprises. Interviewees from state-owned enterprises emphasized more the characteristics of *timely* ($1.13 > 0.75 > 0.71$), *integrated* ($2.25 > 1.50 > 1.21$), *user-friendly* ($0.88 > 0.36 > 0.08$), *secure* ($1.13 > 0.36 > 0.08$), and *continuous* ($1.00 > 0.36 > 0.00$) than did interviewees from foreign-funded and privately owned enterprises. It appears from the data that the frequencies of *streamlined* ($0.50 > 0.43 > 0.38$), *customized* ($1.75 > 1.63 > 0.36$), and *organized* ($0.67 > 0.50 > 0.14$) are the highest among interviewees from foreign-funded enterprises.

There is also great variance among different job positions regarding the system characteristics of electronic recordkeeping systems that interviewees emphasized. For instance, while interviewees from marketing positions mentioned *complete* ($1.50 > 1.30 > 1.17 > 0.50$), *timely* ($1.00 = 1.00 > 0.92 > 0.50$), and *streamlined* ($0.50 = 0.50 > 0.42 > 0.40$) most frequently, they mentioned *customized* ($0.88 < 1.00 < 1.17 < 2.00$), *organized* ($0.25 < 0.30 < 0.42 < 1.00$), and *continuous* ($0.25 = 0.25 < 0.30 < 1.25$) least frequently. By contrast, while interviewees from research and development positions mentioned *complete* ($0.50 < 1.17 < 1.30 < 1.50$), *sharing* ($1.00 < 1.83 < 2.25 < 2.30$), and *integrated* ($0.75 < 1.25 < 1.58 < 2.10$) least frequently, they

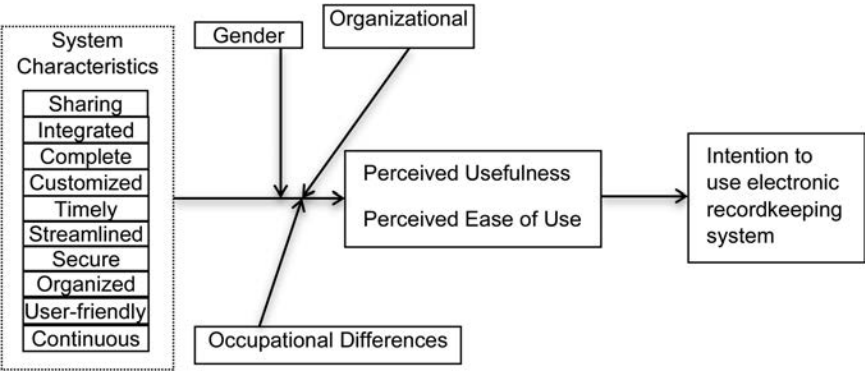


Figure 1: Research model

scored the highest on the characteristics *timely* ($1.00 = 1.00 > 0.92 > 0.50$), *streamlined* ($0.50 = 0.50 > 0.42 > 0.40$), *user-friendly* ($0.50 = 0.50 > 0.38 > 0.25$), *customized* ($2.00 > 1.17 > 1.00 > 0.88$), *organized* ($1.00 > 0.42 > 0.30 > 0.25$), *secure* ($1.25 > 0.42 > 0.38 > 0.20$), and *continuous* ($1.25 > 0.30 > 0.25 = 0.25$). Interviewees from administrative positions mostly scored close to the average frequency across all interviewees, as indicated in the “General” column. One possible explanation for these variations among different occupations is the different nature of various positions; for instance, research and development work is usually focused and does not require an overview of the operation of the whole organization.

Based on the results of the empirical data and the TAM, this study proposes a research model (see figure 1) to describe the set of system characteristics that influence users’ perceptions of electronic recordkeeping systems, and three moderating factors (i.e., gender, organizational context, and occupational differences) that affect the strength of the relationship between system characteristics and users’ perceptions of electronic recordkeeping systems. This model is grounded in the TAM, wherein users’ behavioural intention is determined by their beliefs about (or perceptions of) the information system, which, in turn, are influenced by external variables. In the original TAM and its subsequent extensions, users’ beliefs about (or perception of) the information system is further divided into two sub-variables—perceived usefulness and perceived ease of use; moreover, the relationships between these two sub-variables, and the influence of external variables on either of them, constitute a major area of study. In the research model developed by this study, the fundamental theoretical premise that external variables influence users’ perception of an information system, which in turn affects users’ intention to use the information system, is employed; yet, though this research model has acknowledged the distinction between perceived usefulness and perceived ease of use, this study did not further examine the relationship between these two variables and the relationship between each of the system characteristics and either of the variables. Rather, the main focus of this

study is to qualitatively identify the set of system characteristics that influence users' perceptions of electronic recordkeeping systems. In terms of the moderating effect of the three factors—gender, organizational context, and occupational difference—this study focuses on how these factors influence the strength of the relationships between the set of system characteristics and users' perceptions of electronic recordkeeping systems rather than the existence of such relationships. In other words, the effects of the set of system characteristics on users' perceptions of electronic recordkeeping systems don't remain constant across all contexts; rather, they vary across genders, organizational contexts, and different occupations.

Despite the theoretical foundation and qualitative evidence for this proposed model, the model requires further quantitative study to test its validity before it can be used to predict and explain the acceptance of electronic recordkeeping systems.

Discussion

This study is one of few in the field of records management that draws on the TAM in studying users' acceptance of electronic recordkeeping systems. Though this study did not directly focus on testing the validity of the TAM for predicting and explaining the acceptance of electronic recordkeeping systems, the research model proposed by this study, and any future testing of this model, will contribute directly to this project. From this perspective, this study opens up avenues for future research to utilize the achievements in the information systems field to explore the acceptance of electronic recordkeeping systems and to contribute to the ongoing development of the TAM by studying the acceptance of one specific type of information system—that is, electronic recordkeeping systems.

This study has identified a set of system characteristics that influence users' perceptions of electronic recordkeeping systems. A comparison between this set of system characteristics and the set of system characteristics identified by previous studies (e.g., Igbaria, Guimaraes, and Davis 1995; Hong et al. 2001; Pituch and Lee 2006) yields very few similarities. One possible explanation for such divergence on system characteristics is that, unlike other variables, system characteristics are unique to the type of information system studied; therefore, the set of system characteristics that are beneficial for the acceptance of one type of information system may not be generalizable to another type of information system. This is increasingly the case for complex information systems, which, unlike simple software applications (e.g., e-mail, word processing, and spreadsheet software) that act as basic tools to facilitate the performance of tasks, are designed to perform a set of business functions, usually consisting of a set of business processes, activities, and transactions. Therefore, complex information systems are usually a combination of business processes, databases, the function they are meant to support, and other basic information technology tools.

A close examination of the set of system characteristics identified by this study shows that users care more about whether an electronic recordkeeping

system can enable them to utilize the organization's information and records effectively (i.e., benefits of good information and records management) to facilitate their current work, rather than whether the electronic recordkeeping system can protect the characteristics that are essential to records' capacity to serve as evidence (e.g., authenticity, reliability, and usability), as defined by various national and international standards. For instance, users stressed that electronic recordkeeping systems had to be designed such that records could be shared across the organization, that records in the electronic recordkeeping system had to be complete, and that the system and records delivered had to be customized to meet their specific function needs.

This discrepancy between the set of system characteristics that influence users' perceptions of electronic recordkeeping systems and those dictated by national and international records management standards reflects a long-standing dilemma in records management, that is, a discrepancy between the perceptions of records and information managers and those of general users regarding what good information and records management should look like. For records and information management professionals, the primary mission is that records should be captured, classified, disposed of, accessed, and managed in such a way that organizations can show their compliance with policies (industrial, juridical, and professional), legislation, and standards and that the evidential nature of records can be protected; however, for general users, the primary goal is that they can get their work done and that information and records management assists them in completing their work. One practical implication of this discrepancy is that when one is defining functional requirements for an electronic recordkeeping system, or selecting an electronic recordkeeping system, in addition to taking into account the functional requirements for records management purposes, it is also vital to examine whether the system has the 10 characteristics identified by this study as important to general users. Also, when persuading users to use an electronic recordkeeping system, instead of focusing on the benefits it can bring to electronic records management, it is vital to communicate to users the benefits it can have for their own work. This dual focus on the perceptions of both information and records management professionals and general users of electronic recordkeeping systems is especially important for the acceptance and success of an electronic recordkeeping system.

Three moderating factors have been identified by this study. Yet, unlike other studies, which focus on the influence of moderating factors on the existence of the relationship between system characteristics and users' perceptions of information systems, this study believes that these moderating factors influence the strength of the relationship between system characteristics and users' perceptions of electronic recordkeeping systems. Two of the three moderating factors have been mentioned by previous studies. For instance, in the Unified Theory of Acceptance and Use of Technology model developed by Venkatesh et al. (2003), gender is identified as a moderating factor between three of the four external variables and users' perceptions of information systems. In the conceptual research model proposed by Lewellen's (2015) dissertation, organizational

context is identified as an external variable that influences users' perception of EDRMS; moreover, Lewellen (2015) further specifies that organizational context consists of two variables: perceived power security and social influence. Though this study did not specify the components of organizational context, it points out the possibility that, in addition to being an external variable, organizational context may also work as a moderating factor that influences other external variables' effect on users' perceptions of information systems. The effect of occupation on users' perceptions of information systems was not explicitly examined in previous studies. Yet this study shows that it is a significant factor moderating the relationship between the set of system characteristics and users' perceptions of electronic recordkeeping systems. It is important to take these moderating factors into consideration when designing or selecting an electronic recordkeeping system and conducting training.

This study has some limitations. First, it did not obtain information concerning the degree of maturity of the records management programs at the interviewees' organizations and/or the interviewees' previous interaction with electronic recordkeeping systems, which may shed some additional light on moderating effects on the relationship between the set of system characteristics and these users' perceptions of electronic recordkeeping systems. Further, though this study proposed a research model based on qualitative data, this research model has not yet been tested in this study. Quantitative studies should be carried out in the future to test the research model before it is widely used.

Conclusions

Understanding the external factors that influence the acceptance of electronic recordkeeping systems is critical for increasing their uptake and, consequently, contributing to the improvement of electronic records management. The present article has presented an exploratory study, which utilizes the TAM as a theoretical framework and explores the set of system characteristics that influence users' perceptions of electronic recordkeeping systems. Three moderating factors (i.e., gender, organizational context, and occupational differences) that influence the strength of the relationship between the set of system characteristics and users' perceptions of electronic recordkeeping systems have also been identified. A comparison between the results of this study and other similar studies in the field of information systems has identified both similarities and differences. A research model was proposed based on the results of this study. Nevertheless, more research is needed to test the validity of this research model. This study represents one of the few efforts in the field of records management that draw on theoretical achievements in the field of information systems to understand electronic recordkeeping systems. It opens up many avenues for research in both fields.

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References

- Agarwal, Ritu, and Jayesh Prasad. 1999. "Are Individual Differences Germane to the Acceptance of New Information Technologies?" *Decision Sciences* 30 (2): 361–91. <http://dx.doi.org/10.1111/j.1540-5915.1999.tb01614.x>.
- Ajzen, Icek. 1985. "From Intentions to Actions: A Theory of Planned Behavior." In *Action Control: From Cognition to Behavior*, ed. Julius Kuhl and Jürgen Beckmann, 11–39. New York: Springer. http://dx.doi.org/10.1007/978-3-642-69746-3_2.
- Association of Records Managers and Administrators International. 2014. *The Generally Accepted Recordkeeping Principles*. Lenexa, KS: ARMA International. <http://www.arma.org/r2/generally-accepted-br-recordkeeping-principles>. Accessed 23 May 2016.
- Bryman, Alan. 2012. *Social Research Methods*. 4th ed. New York: Oxford University Press.
- Cunningham, Adrian. 2011. "Good Digital Records Don't Just 'Happen': Embedding Digital Recordkeeping as an Organic Component of Business Processes and Systems." *Archivaria* 71:21–34.
- Davis, Fred D. 1989. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology." *Management Information Systems Quarterly* 13 (3): 319–40. <http://dx.doi.org/10.2307/249008>.
- . 1993. "User Acceptance of Information Technology: System Characteristics, User Perceptions and Behavioral Impacts." *International Journal of Man-Machine Studies* 38 (3): 475–87. <http://dx.doi.org/10.1006/imms.1993.1022>.
- Davis, Fred D., Richard P. Bagozzi, and Paul R. Warshaw. 1989. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models." *Management Science* 35 (8): 982–1003. <http://dx.doi.org/10.1287/mnsc.35.8.982>.
- DeLone, William H., and Ephraim R. McLean. 1992. "Information Systems Success: The Quest for the Dependent Variable." *Information Systems Research* 3 (1): 60–95. <http://dx.doi.org/10.1287/isre.3.1.60>.
- . 2003. "The DeLone and McLean Model of Information Systems Success: A Ten-Year Update." *Journal of Management Information Systems* 19 (4): 9–30.
- Di Biagio, Maria Luisa, and Bernice Ibiricu. 2008. "A Balancing Act: Learning Lessons and Adapting Approaches Whilst Rolling Out an EDRMS." *Records Management Journal* 18 (3): 170–79. <http://dx.doi.org/10.1108/09565690810916429>.
- The European Commission. 2001. *Model Requirements for the Management of Electronic Records*. Brussels: The European Commission. http://ec.europa.eu/archival-policy/moreq/index_en.htm. Accessed 23 May 2016.
- Fishbein, Martin, and Icek Ajzen. 1975. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.
- Gregory, Keith. 2005. "Implementing an Electronic Records Management System." *Records Management Journal* 15 (2): 80–85. <http://dx.doi.org/10.1108/09565690510614229>.
- Griffin, Andrew. 2004. "Records Management Capacity Assessment System (RMCAS)." *Archival Science* 4 (1-2): 71–97. <http://dx.doi.org/10.1007/s10502-005-6991-9>.
- Gunnlaugsdottir, Johanna. 2006. "The Implementation and Use of ERMS—a Study in Icelandic Organizations." PhD diss., University of Tampere.

- Hase, Stewart, and Julian Galt. 2011. "Records Management Myopia: A Case Study." *Records Management Journal* 21 (1): 36–45. <http://dx.doi.org/10.1108/09565691111125099>.
- Hong, Weiyin, James Y. L. Thong, Wal-Man Wong, and Tam Kar-yan. 2001. "Determinants of User Acceptance of Digital Libraries: An Empirical Examination of Individual Differences and System Characteristics." *Journal of Management Information Systems* 18 (3): 97–124.
- Hsu, Fang-Ming, Tser-Yieth Chen, and Shuwen Wang. 2009. "Efficiency and Satisfaction of Electronic Records Management Systems in E-Government in Taiwan." *Electronic Library* 27 (3): 461–73. <http://dx.doi.org/10.1108/02640470910966907>.
- Hsu, Fang-Ming, Paul Jen-Hwa Hu, and Hsinchun Chen. 2008. "Business-Technology Alignments in E-Government: A Large-Scale Taiwan Government Electronic Record Management Systems Study." In *Digital Government: E-Government Research, Case Studies, and Implementation*, ed. Ramesh Sharda, Stefan Voß, and Hsinchun Chen, 585–613. Boston: Springer. http://dx.doi.org/10.1007/978-0-387-71611-4_28.
- Igbaria, Magid, Tor Guimaraes, and Gordon B. Davis. 1995. "Testing the Determinants of Microcomputer Usage via a Structural Equation Model." *Journal of Management Information Systems* 11 (4): 87–114. <http://dx.doi.org/10.1080/07421222.1995.11518061>.
- International Standards Organization. 2016. *ISO 15489-1: 2016. Information and Documentation – Records Management – Part 1: Concepts and Principles*. Geneva: ISO.
- . 2010. *ISO 16175 Principles and Functional Requirements for Records in Electronic Office Environments*. Geneva: ISO.
- JISC InfoNet. 2009. "A Common Framework for Measuring the Impact of Records Management." <http://docs.niwa.co.nz/library/public/Bailey2009.pdf>. Accessed 23 May 2016.
- . 2013. *Records Management Maturity Model*. <http://repository.jisc.ac.uk/6098>. Accessed 23 May 2016.
- Johnston, Gary P., and David Bowen. 2005. "The Benefits of Electronic Records Management Systems: A General Review of Published and Some Unpublished Cases." *Records Management Journal* 15 (3): 131–40. <http://dx.doi.org/10.1108/09565690510632319>.
- Lewellen, Matthew James. 2015. "The Impact of the Perceived Value of Records on the Use of Electronic Recordkeeping Systems." PhD diss., Victoria University of Wellington.
- Library and Archives Canada. 2015. *Information Management Capacity Check Tool and Methodology*. <http://www.bac-lac.gc.ca/eng/services/government-information-resources/tools/Pages/information-management-capacity-check-tool-methodology.aspx>. Accessed 23 May 2016.
- Lord Chancellor's Office. 2002. *Code of Practice on the Management of Records under Section 46 of Freedom of Information Act*. London: Lord Chancellor's Office.
- Maguire, Rachael. 2005. "Lessons Learned from Implementing an Electronic Records Management System." *Records Management Journal* 15 (3): 150–57. <http://dx.doi.org/10.1108/09565690510632337>.
- Mason, Richard O. 1978. "Measuring Information Output: A Communication Systems Approach." *Information & Management* 1 (4): 219–234.

- McLeod, Julie, and Sue Childs. 2013. "A Strategic Approach to Making Sense of the 'Wicked' Problem of ERM." *Records Management Journal* 23 (2): 104–35. <http://dx.doi.org/10.1108/RMJ-04-2013-0009>.
- The National Archives and Records Administration (NARA). 2000. "Context for Electronic Records Management [ERM]." <http://www.archives.gov/records-mgmt/initiatives/context-for-erm.html>. Accessed 23 May 2016.
- New South Wales Government. 2007. "DIRKS Manual." 2016-05-22. <https://www.records.nsw.gov.au/recordkeeping/advice/designing-implementing-and-managing-systems/dirks-manual/dirks-manual>. Accessed 23 May 2016.
- Nguyen, Thuy-Linh, Paula M. C. Swatman, and Bardo Fraunholz. 2008. "Standing on the Shoulders of Giants: Are ERP Success Factors Relevant for EDRMS Implementation?" In *BLED 2008 Proceedings*. Paper 6, 523–536. Kranj, Slovenia: University of Maribor. <http://aisel.aisnet.org/bled2008/6>.
- Oliver, Gillian, Joanne Evans, Barbara Reed, and Frank Upward. 2009. "Achieving the Right Balance: Recordkeeping Informatics, Part 1." *IQ* 25 (4): 18–21.
- . 2010. "Achieving the Right Balance: Recordkeeping Informatics, Part 2." *IQ* 26 (1): 42–44, 52.
- Oliver, Gillian, and Fiorella Foscari. 2014. *Records Management Information Culture: Tackling the People Problem*. London: Facet.
- Pituch, Keenan A., and Yao-kuei Lee. 2006. "The Influence of System Characteristics on E-Learning Use." *Computers and Education* 47 (2): 222–44. <http://dx.doi.org/10.1016/j.compedu.2004.10.007>.
- Rittel, W. J. Horst, and M. Melvin Webber. 1973. "Dilemmas in a General Theory of Planning." *Policy Sciences* 4 (2): 155–69. <http://dx.doi.org/10.1007/BF01405730>.
- Rogers, Everett M. 1962. *Diffusion of Innovations*. New York: Free Press of Glencoe.
- Ryan, David. 2005. "The Future of Managing Electronic Records." *Records Management Journal* 15 (3): 128–30. <http://dx.doi.org/10.1108/09565690510632300>.
- Seddon, Peter B. 1997. "A Respecification and Extension of the DeLone and McLean Model of IS Success." *Information Systems Research* 8 (3): 240–53. <http://dx.doi.org/10.1287/isre.8.3.240>.
- Shannon, Claude E., and Warren Weaver. 1949. *The Mathematical Theory of Communication*. Urbana: University of Illinois Press.
- Shepherd, Elizabeth J., and Geoffrey Yeo. 2003. *Managing Records: A Handbook of Principles and Practice*. London: Facet.
- Snowden, Dave. 2010. *Summary Article on Origins of Cynefin*. <http://cognitive-edge.com/articles/summary-article-on-cynefin-origins>. Accessed 23 May 2016.
- Smyth, Zoë A. 2005. "Implementing EDRM: Has It Provided the Benefits Expected?" *Records Management Journal* 15 (3): 141–49. <http://dx.doi.org/10.1108/09565690510632328>.
- United States Department of Defense. 2007. *DoD 5015.2-STD Design Criteria Standards for Electronic Records Management Software Applications*. <http://www.dtic.mil/whs/directives/corres/pdf/501502std.pdf>. Accessed May 23, 2016.
- Upward, Frank, Barbara Reed, Gillian Oliver, and Joanne Evans. 2013. "Recordkeeping Informatics: Re-figuring a Discipline in Crisis with a Single Minded Approach." *Records Management Journal* 23 (1): 37–50. <http://dx.doi.org/10.1108/09565691311325013>.
- Urbach, Nils, Stefan Smolnik, and Gerold Riempp. 2009. "The State of Research on Information Systems Success—A Review of Existing Multidimensional Approaches."

- Business and Information Systems Engineering* 1 (4): 315–25. <http://dx.doi.org/10.1007/s12599-009-0059-y>.
- Venkatesh, Viswanath, and Fred D. Davis. 1996. "A Model of the Antecedents of Perceived Ease of Use: Development and Test." *Decision Sciences* 27 (3): 451–81. <http://dx.doi.org/10.1111/j.1540-5915.1996.tb00860.x>.
- . 2000. "A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies." *Management Science* 46 (2): 186–204. <http://dx.doi.org/10.1287/mnsc.46.2.186.11926>.
- Venkatesh, Viswanath, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. 2003. "User Acceptance of Information Technology: Toward a Unified View." *Management Information Systems Quarterly* 27 (3): 425–78.
- Wiltzius, Laurent, Alexander Simons, Stefan Seidel, and Jan vom Brocke. 2014. "Factors in the Acceptance of Enterprise Content Management Systems." In *Enterprise Content Management in Information Systems Research*, ed. J. vom Brocke and A. Simons, 37–61. Berlin: Springer Berlin Heidelberg. http://dx.doi.org/10.1007/978-3-642-39715-8_3.