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Laurent Wiltzius

University of Liechtenstein, laurent.wiltzius@hochschule.li

Alexander Simons

University of Liechtenstein, sander.simons@hochschule.li

Stefan Seidel

University of Liechtenstein, stefan.seidel@hochschule.li

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A Study on the Acceptance of ECM Systems

Laurent Wiltzius
University of Liechtenstein
Fuerst-Franz-Josef-Strasse
9490 Vaduz, Liechtenstein

Alexander Simons
University of Liechtenstein
Fuerst-Franz-Josef-Strasse
9490 Vaduz, Liechtenstein
+423 2651307

Stefan Seidel
University of Liechtenstein
Fuerst-Franz-Josef-Strasse
9490 Vaduz, Liechtenstein
+423 2651303

laurent.wiltzius@hochschule.li sander.simons@hochschule.li stefan.seidel@hochschule.li

ABSTRACT

The present paper summarizes selected results of the first author's Master's thesis for the student track at the *10th International Conference on Wirtschaftsinformatik* in Zurich, Switzerland. The thesis was co-supervised by the second and the third author. Building upon the technology acceptance model (TAM), the assignment was to investigate factors impacting on end users' acceptance of enterprise content management (ECM) systems. The study suggests twenty-two factors at the enterprise, process, technology, and content level that can influence ECM success. The results are grounded in both a systematic review of the literature on ECM, including related fields such as document management and records management, and an analysis of qualitative data collected from five ECM-adopting organizations. It is hoped that the findings will inform future Information Systems (IS) research on ECM acceptance. Practitioners can use the results in the process of planning and conducting their own ECM projects.

Keywords

Case study, content management, document management, enterprise content management, information systems success, literature review, technology acceptance.

1. INTRODUCTION

"Content, Content Everywhere" was the title of a recent *InformationWeek* article on the challenges that today's organizations face due to the rapidly increasing digital information flood [16]. These challenges include, among others, improving collaboration processes, avoiding a waste of time and money, fulfilling reporting obligations and standards, and ensuring information quality

[44]. The problem in itself is not new and, accordingly, prior Information Systems (IS) research has discussed several approaches for facing the challenges posed by the ongoing digitization of information; examples include document management [57], records management [28, 58], and (Web) content management [39, 45]. While these concepts tend to focus on specific, and often rather isolated, aspects of information management, enterprise content management (ECM) has emerged as the consolidation of these and further approaches, providing an integrated and modern perspective on information management [42, 44]. As such, the concept of ECM has been framed as "integrated enterprise-wide management of the life cycles of all forms of recorded information content and their metadata, organized according to corporate taxonomies, and supported by appropriate technological and administrative infrastructures" [38, p. 69]. Recently, ECM has been receiving much attention from the industry; *Gartner* estimates the yearly growth rate of the ECM software market to exceed 12 percent through 2010, adding up from \$2.6 billion in 2006 to more than \$4.2 billion [25]. Notwithstanding this palpable practical relevance, IS research has, except few examples, rarely endeavored to explore the somewhat elusive concept [62]. Much of the IS literature on ECM is design-oriented in nature [41, 42]; empirical ECM studies, however, are the exception, not the rule. As a result, a theoretically sound approach to ECM is still to be developed. Most notably, there is a lack of studies on end users' acceptance of ECM systems, thus leaving practitioners confronted with a void when planning and conducting ECM projects. The present paper, grounded in both a systematic review of the IS literature on ECM and qualitative interviews with representatives from five ECM-adopting organizations, intends to address this gap. Building upon the technology acceptance model (TAM), it identifies and explains factors that impact on the success of ECM initiatives.

The paper proceeds as follows. Section 2 provides the research background and introduces both ECM and TAM. Section 3 describes the research process and summarizes the literature review strategy and the procedures for collecting and analyzing the interview data. The sections 4 and 5 then present the results from both the literature review and the qualitative interviews, which are subsequently discussed in section 6. Section 7 concludes the paper with a summary and acknowledges limitations of the research.

2. RESEARCH BACKGROUND

2.1 Enterprise Content Management

The notion of ECM emerged with the turn of the millennium [8]. The *AIIM (Association for Information and Image Management International)* defines ECM as the “strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization’s unstructured information, wherever that information exists” [5]. Until now, the concept of ECM has received some attention from IS researchers. Tyrväinen et al., for example, examine its relevance for the IS discipline [62], and Munkvold et al. present a set of ECM-related challenges that deserve attention [38]. Nordheim and Päivärinta and Scott et al. present case studies on ECM implementation projects at *Statoil*, a Norwegian oil company [42], and *J.D. Edwards*, a global provider of enterprise resource planning and business-to-business software and services [51]. Smith and McKeen present the results from a focus group session on ECM and, on that basis, define ECM as “the strategies, tools, processes and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle” [54, p. 648]. In the present paper, ECM is understood as an integrated approach to information management [42, 44] that covers and aligns a variety of related concepts, for instance, document or content management, at an often enterprise-wide scale [65]. As such, the notion of ECM refers to the management of all types of information across an organization over their entire lifecycle, that is, from birth (creation) to death (deletion).

In order to categorize ECM success factors the present study draws on an ECM framework presented by Tyrväinen et al. (compare [62] in the following). The model was designed to stimulate and guide future research in the field. It comprises of four perspectives, namely: *content*, *technology*, *processes*, and *enterprise*. In the *content* perspective, three different views are distinguished: information, users, and systems. Research questions referring to the information view concern the identification, analysis, and representation of content as well as the use of appropriate metadata. The user view addresses issues including user identification, information needs, personalization, and content usage (creation, maintenance, distribution etc.). The systems view deals with content processing and storage, standards and formats, and interoperability of systems. The *technology* perspective is closely related to the systems view, but can be separated from it nevertheless: ECM systems not only integrate a number of technologies, including hardware, software, and standards, but also content and its users. Since ECM systems further operate in a specific organizational context, Tyrväinen et al. believe that the major focus of ECM research lies on systems rather than technologies. The *process* perspective involves both process development and deployment. Whereas the former mainly refers to the development of processes for implementing and maintaining ECM systems, the latter primarily concerns the implementation of the content lifecycle activities. Finally, the *enterprise* perspective describes the context for ECM and thus concerns organizational, social, and legal aspects in particular.

2.2 Technology Acceptance Model

Since the 1970s researchers have been interested in the identification of factors that impact on the integration of IS into business [35]. In the IS discipline, Davis’ TAM [17], which is an adapta-

tion of Fishbein and Ajzen’s theory of reasoned action [1, 23], has received much attention. TAM suggests two major constructs that impact on IS acceptance: perceived usefulness and perceived ease of use [17, 18, 19]. While perceived usefulness can be understood as “the degree to which a person believes that using a particular system would enhance his or her job performance,” perceived ease of use can be defined as “the degree to which a person believes that using a particular system would be free of effort” [18, p. 320]. While perceived ease of use directly impacts perceived usefulness, the theory suggests that both constructs influence the end user’s attitude towards using a system. This attitude, in turn, is considered to impact his or her behavioral intention to use the system, which, finally, impacts on actual system use (Figure 1).

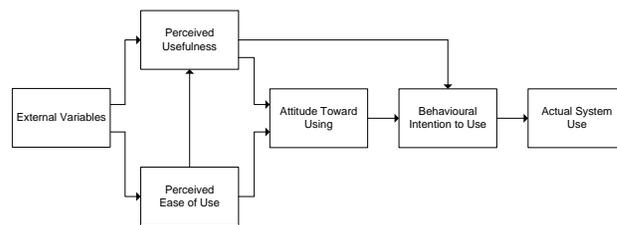


Figure 1: Technology Acceptance Model [19, p. 985]

During the past years, TAM has also been criticized by some authors. Lee et al., for example, write that “TAM’s simplicity makes it difficult to put into practice. Practitioners may not be well served by TAM” [34, p. 766]. Alan Dennis puts this problem as follows: “imagine talking to a manager and saying that to be adapted, technology must be useful and easy to use. I imagine the reaction would be ‘Duh!’ The more important questions are what makes technology useful and easy to use” [34, p. 766]. The focus of the present study on ECM adoption accordingly lies on the external variables construct of TAM, that is, the antecedents of both perceived usefulness and perceived ease of use.

3. STUDY OVERVIEW

The present paper summarizes selected results of the first author’s Master’s thesis. The working period counted 4.5 months and the thesis was submitted in August 2010. During that time period, the working progress was, with at least one of the supervisors, discussed on a weekly basis. At the most basic level, the research process can be divided into two major parts: literature review and qualitative interviews.

Literature review. The Master’s thesis was grounded in an unpublished literature review conducted by the second author. More than 100 of the most significant IS journals according to the consolidated list shared by the *Association for Information Systems (AIS)* were considered in that review [6], and three major IS conferences were further included (namely the *International* and the *European Conference on Information Systems* and the *Hawaii International Conference on System Sciences*). A backward search (i.e., a review of articles’ references) was conducted to not overlook relevant studies that have been published in other outlets [69]. None of the papers uncovered in this systematic literature search [13, 14, 33, 38, 41, 42, 43, 44, 49, 51, 54, 56, 62, 64, 65], however, put a focus on ECM acceptance—which suggests that there is a research gap related to the

adoption of ECM. The literature review was then extended to ECM-related fields, including knowledge management, information resource management, electronic document management, records management, (Web) content management, and enterprise resource planning systems. Since the concept of ECM relates to many of these and further approaches [38, 64], at least to some extent, the results presented in these studies were expected to also apply to the context of ECM. While the literature search was by no means exhaustive, it uncovered a substantially large list of articles that applied TAM to the study of the acceptance of ECM-related technologies. These literatures were then reviewed in order to identify factors that impact on both the usefulness and ease of use that end users of such systems perceive. The identified factors were finally organized based on the above described ECM perspectives, namely content, processes, technologies, and enterprise [62].

Qualitative interviews. The results of the literature review were then discussed in semi-structured interviews with representatives from five ECM-adopting organizations that operate in different business areas and industries. With almost 20,000 employees in more than 120 countries, the first organization provides products and services to customers in the construction and building maintenance industries. Employing approx. 1,200 employees, the second organization provides heating and ventilation technology to customers in more than 50 countries. The third organization is an automotive supplier company that provides steering systems for carmakers and employs over 4,000 employees in 16 locations worldwide. The fourth organization is a small governmental department. With more than 2,000 employees, the fifth organization delivers products and services to dentists and dental technicians from more than 120 countries. The average length of the five interviews was around 60 minutes. The interviewees filled key roles related to information and document management at the case organizations. Data collection took place from June to August 2010; all interviews were audio-taped and fully transcribed. The interviews were semi-structured and organized on the basis of the acceptance factors identified in the literature review summarized below. The review leverages the four perspectives on ECM (enterprise, processes, technology, and content) for presenting these factors.

4. LITERATURE REVIEW RESULTS

4.1 Enterprise Level

In the IS literature, *top management support*, *defined purpose of ECM*, *information and communication*, and *corporate culture* are often considered to influence end users' acceptance of ECM-related systems (Table 1). First, active *top management support* not only ensures the availability of required resources and an alignment of the ECM project with strategic business goals [7, 49, 72]. It is further important for senior executives to inform their staff about the importance of ECM and, given the rather elusive character of the concept [54], to lead them by example [72]. Because the understanding is still vague as to what organizations strive to gain through implementing ECM systems, and what results they can expect from the same [4], a clearly *defined purpose of ECM* has been identified as another ECM success factor. Defining the purpose of ECM helps organizations to determine both trigger and goal of the initiative, to justify ECM

investments, and to encourage executive support [7, 38, 72]. Bals et al., for example, write that knowledge management initiatives "should have a clearly defined purpose and provide value for the business (either directly through monetary gains/savings or indirectly through improvements in cycle times)" [7, p. 3]. Most likely, this also applies to the management of enterprise content. Exemplary ECM objectives that have been identified by Pääväranta and Munkvold include better internal and external collaboration, value-added or new customer services and products, improved content reliability and quality, and more meaningful knowledge work [44]. ECM objectives have to be properly communicated, which has been conceptualized as the factor *information and communication* in prior literature. In essence, information and communication refers to spreading the word about the initiative on a regular basis, thus supporting feedback processes among ECM developers and users and, in turn, the entire change management process [9, 22, 70]. Bals et al. believe that appropriate levels of training, communication, and support can positively influence end users' acceptance of ECM systems [7, compare also 3]. When informing their staff about ECM, organizations also have to consider their *corporate culture*. If they perceive ECM initiatives as management 'dictates', for example, it is possible that end users will develop resistance against the project [49]. Finally, the adoption of ECM requires appropriate levels of trust and willingness to share among the users, factors that both are again determined by the corporate culture [7, 11, 29].

Table 1: Factors at the enterprise level

| Factor | Description | References |
|-------------------------------|---|------------------------------------|
| Top management support | Active support by senior management (e.g., leading by example, funding) | [7, 20, 21, 49, 52, 70, 72] |
| Defined purpose of ECM | Defining ECM objectives and benefits (e.g., search times, compliance) | [2, 7, 38, 72] |
| Information and communication | Keeping users informed on a regular basis (e.g., user support, maintenance) | [3, 7, 22, 27, 46, 66, 68, 70, 72] |
| Corporate culture | Establishing an ECM-friendly culture (e.g., willingness to share, trust) | [7, 11, 22, 29, 50, 52, 60] |

4.2 Process Level

At the process level, which relates to both the development and deployment of ECM systems, the literature review revealed four distinct factors that can impact both end users' perceived usefulness and ease of use: *involvement of end users*, *user training*, *transition management*, and *prototyping* (Table 2). The *involvement of end users* in the development process not only allows organizations to identify and consider their individual needs, but also to assess how they are doing business [53, 59]. Bridges writes that "[i]ncluding users in the evaluation process ensures a more meaningful product and its ultimate acceptance" [9, p. 31], and Downing reminds us that representatives from different ranks and departments should participate in this process [22]. Users can also serve as ECM change agents in order to spread and explain the benefits of ECM to their colleagues, which can further improve the perceived usefulness of the new system [21,

52]. In addition, many IS authors consider *user training* to play a salient role in the adoption of ECM-related systems [e.g., 20, 36, 55, 46]. Here, it is particularly important to ensure that employees with different IT skills can use the ECM system [31]. Scheer believes that, due to possible system extensions and new employees, user training is an ongoing endeavor [50]. In this line of thought, Maguire writes: “You can’t do enough training. When people stopped using the system, they should have been offered refresher training and encouragement to continue using the system” [36, p. 156]. The implementation of ECM, hence, is a change management challenge for organizations. In particular, it is very likely that the implementation of a new ECM system requires organizations to replace their old content management system(s) with the new one. Regarding document and records management systems, Garrido writes the following: “Still, users experienced a major change: moving from the use of departmental shared network drives, which provided them with the flexibility to design folder structures according to their preferences, to an EDRMS [electronic document and records management system] that imposed certain structures and control over the creation of folders [...]” [24, p. 181]. *Transition management* thus not only aims at preserving content and migrating it from the old into the new system, but also with the parallel running of both these systems in order to make things easier for the users, for instance, by slowly introducing them to the new ECM system [21, 24, 55, 72].

Table 2: Factors at the process level

| Factor | Description | References |
|--------------------------|--|-------------------------------------|
| Involvement of end users | Including the users in the ECM development process (e.g., change agents) | [9, 21, 22, 52, 53, 59, 66] |
| User training | Educating the future users of the ECM system (e.g., different IT skills) | [3, 10, 20, 22, 27, 36, 46, 55, 70] |
| Transition management | Replacement of the old system with the new one (e.g., flexibility vs. control) | [21, 24, 41, 55, 72] |
| Prototyping | Prototyping the system together with the end users (e.g., look and feel) | [9, 21, 41, 44, 46, 49, 68] |

Prototyping has also been identified as a factor that can improve end users’ acceptance of an ECM system. In their study of a huge number of ECM case narratives shared by *AiIM*, Päivärinta and Munkvold found that “[i]n several cases prototyping of the systems together with future users was considered crucial for successful adoption, as ECM technologies involve potential to renew traditional thinking and practices around document management, content publication, and/or web site management. Without look-and-feel prototypes adapted to particular organizational contexts, these opportunities will often not be comprehended, leaving the users unmotivated to change their existing practice” [44, p. 7].

4.3 Technology Level

The Real Story Group, an analyst group that focuses on the evaluation of content-related technologies, analyzed 33 solutions available at the ECM market, and separated them into major suite vendors (with capacities that provide a plethora of func-

nalities for multiple industries; e.g., *Documentum (EMC)* or *Open Text*) and ECM specialists (targeting particular vertical industries and functional needs; e.g., *HP* and *Objective Corporation*) [61]. Consequently, at least two major approaches to implementing ECM can be distinguished: the acquisition and customization of a huge commercial ECM software package and the implementation and integration of different smaller content management solutions across an organization. Two factors were accordingly identified in the literature review that can influence the acceptance of ECM systems at a technological level, categorized as *functional customization* and *systems interoperability*. Nordheim and Päivärinta consider customization as the ‘fit’ of an ECM software package into the business environment [41], which is mainly why it can have an enormous impact on ECM acceptance. The authors believe that *functional customization*, i.e., the adaptation of an ECM software package regarding an organization’s requirements, refers to ECM system functionalities concerning content structuring, metadata modeling, taxonomy, and templates (categorized under the notion of content model management); functionalities for managing user roles and supporting the content lifecycle, e.g., content access, versioning, distribution, and retention (categorized as content storage and retrieval management); and, finally, workflow support (categorized as process support and automation) [41]. *Systems interoperability* can be defined as “the ability of two or more systems or components to exchange information and to use the information that has been exchanged” [30, p. 114]. Rockley et al. write that “[t]oo often, content is created by authors working in isolation from other authors within the organization,” a problem they call the ‘content silo trap’ [47, p. 5]. In today’s organizations it is very likely that content silos particularly occur between different departments because they frequently use rather isolated content management applications and very different approaches to storing and retrieving content. Given the enterprise-wide scope of ECM, the interoperability of existing document and content management systems thus appears to be another success factor for ECM initiatives. In addition, the study of the literature revealed two further properties that ECM systems must satisfy: *simplicity* and *security* (Table 3). As to the former, Päivärinta and Munkvold, for example, identify the development of “user-friendly, intuitive, and integrated user interfaces to content management, seamlessly integrated with ‘front-end’ content production and browsing solutions” to be a core challenge in enterprise-wide content management initiatives [44, p. 6]. In this line of thought, Maguire suggests organizations that invest in records management to choose a system that is “as simple as possible to use,” [36, p. 156] and also Downing considers simplicity a core acceptance factor in electronic document management (“[...] minimize the number of clicks and keystrokes needed to save or retrieve documents”) [22, p. 45]. This, in turn, can reduce both the need for training and the duration of the transition phase, while further ensuring that the system can be used by people with different IT skills [31, 36].

Table 3: Factors at the technology level

| Factor | Description | References |
|--------------------------|---|--------------|
| Functional customization | Adaptation of an ECM software package (e.g., content storage and retrieval) | [41, 42, 50] |

| | | |
|--------------------------|--|--------------------------------------|
| Systems interoperability | Ability of ECM-related systems to exchange and use content (e.g., content silos) | [27, 30, 41, 49] |
| Simplicity | Designing the ECM system in a user-friendly manner (e.g., efficiency) | [10, 12, 22, 31, 36, 40, 43, 44, 49] |
| Security | Assuring the confidentiality, integrity, and availability of content (e.g., espionage) | [13, 54, 59, 62] |

Finally, ECM-adopting organizations also have to safeguard the *security* of ECM systems. Here, it is particularly important for them to develop and implement efficient and effective access control mechanisms. Chiu and Hung understand access control “as the mechanism by which users are permitted access to resources according to the authentication of their identities and the associated privileges authorization” [13, p. 1]. At an enterprise-wide scale, however, it is not easy to determine appropriate privileges for accessing content. The better content is prohibited the higher is the security level; in turn, however, a high security level can also prevent employees from efficiently using the content they need in their daily work. Accordingly, the security level of an ECM system can also impact end users’ acceptance: “The significance of security of the ECM architecture and technology is accentuated since ECM may include sensitive information [...]. This content may be of strategic value to the enterprise so that it is vital that the content is not lost, that it is kept up-to-date and that it is not disclosed to unauthorized people” [62, p. 631].

4.4 Content Level

Tyrväinen et al. write that “In any piece of ECM research, the content perspective is involved in some way” [62, p. 628]. In this literature review four factors have been identified that can influence the acceptance of ECM end users at the content level: *content audit and classification*, *content lifecycle implementation*, *corporate taxonomy development*, and *content tagging* (Table 4). *Content audit and classification* can be considered an ECM success factor because it serves as a foundation for the entire initiative, which vom Brocke et al. put as follows: “the diligent analysis of content is [...] prerequisite for ECM adoption success and represents a highly complex and challenging task” [65]. Because this includes an analysis of existing information behaviors and needs [54], the involvement of end users again appears important. O’Callaghan and Smits mention several questions that need to be answered in a content audit, including: how much information is available? How many types of content are there? Who manages and owns which content? Who uses what content? How does content get reused and repurposed? What content must be stored, in what form, and for how long? What systems are currently used for managing content? [43, p. 1275]. The delivery of appropriate answers regarding these issues is crucial for successful content collection and management. Most of these questions can be related to the lifecycle of content. In IS research, a multitude of content lifecycle models exist. Päiväranta and Munkvold, for example, distinguish various activities within the content lifecycle, including capturing, creating, reviewing, editing, distributing, publishing, storing, archiving, and deleting content [44]. Munkvold et al. argue that the concept of ECM puts a holistic focus on these phases [38]—as compared to related approach-

es that rather tend to support individual lifecycle activities, for example, document management (storage and retrieval), Web content management (publication), and records management (retention) [64]. Accordingly, *content lifecycle implementation* requires organizations to implement ECM in a way that, from content creation to deletion, best supports their employees in their daily information work. Many of the above content lifecycle phases have been addressed in prior IS studies on the acceptance of ECM-related technologies. Due to space limitations, however, the following only focuses on the implementation of content search: “content is useless if it cannot be easily searched or navigated” [54, p. 652]. There are several approaches to searching for content, among them tables of contents, indexes, and full-text searches [43, p. 1272]. As to the former, content retrieval can require organizations to enable their users to efficiently browse content [24, 68]. The classification of content via indexes enables connections between different content assets, which O’Callaghan and Smits describe as follows: “The value of ‘associating’ a given content object with other content refers to search situations in which the user does not know exactly what he/she is looking for (‘fuzzy requests’)” [43, p. 1276]. In such cases, recommendations can further support ECM end users in their endeavors to find content [26, 53]. An alternative to indexing content are full text searches on the basis of keywords [43]. Very likely, the success of content searches impacts end users’ acceptance of ECM systems, which is why the selection and implementation of appropriate search mechanisms plays a salient role in ECM adoption. The first step in making content searchable is to implement a corporate taxonomy, which in essence categorizes content hierarchically and “defines the identities of information and record sources” [9, p. 39]. In their study of the *Statoil* case, Munkvold et al. accordingly identify *corporate taxonomy development* as a contemporary ECM challenge [38]. The main problem is that different people and departments develop and use very different taxonomies [43]. The development of a corporate taxonomy thus represents an important standardization and change management challenge because it imposes structures and control over the creation and storage of documents [24]. At *Statoil*, the concept referred to “the logical structuring of the overall information resource from varying viewpoints (e.g. in terms of shared electronic folders and other such categorizations), and the guidelines on how to do that” [38, p. 81]. As such, the development of a corporate taxonomy can fulfill various purposes; in particular, it can serve as a basis for an automatic generation of metadata [38].

Table 4: Factors at the content level

| Factor | Description | References |
|----------------------------------|---|------------------------------|
| Content audit and classification | Analyzing content and its usage (e.g., users, systems, reuse) | [11, 20, 32, 43, 54, 64, 65] |
| Content lifecycle implementation | Supporting the content lifecycle (e.g., creating, and distributing content) | [24, 38, 44, 46, 48, 54] |
| Corporate taxonomy development | Categorizing content hierarchically (e.g., browsing, indexing) | [9, 12, 24, 26, 38, 53, 67] |
| Content tagging | Collecting and defining appropriate metadata (e.g., author, creation) | [26, 40, 51, 53, 55, 58] |

| | | |
|--|--------|--|
| | (date) | |
|--|--------|--|

The definition and use of metadata, that is, *content tagging*, has been identified as another success factor of ECM implementation. In general, metadata can be understood as “information about content” [54, p. 653] that adds meaning and semantics to it. The problem is that some metadata can be collected automatically (e.g., author, date, title), while others must be provided by the authors themselves (e.g., summary, purpose) [43, p. 1281]. In line with that, Munkvold et al. distinguish two key challenges around the generation of metadata: a maximally automated production of metadata and awareness of the importance of metadata among content producers [38]. Very probably, the more of the required metadata can be collected automatically the higher is the acceptance of ECM.

In summary, for each of the considered perspectives on ECM, the literature review revealed four ECM success factors. The following section details the opinions, views, and comments from the five interviewees on these factors.

5. INTERVIEW RESULTS

5.1 Enterprise Level

All interviewees supported the relevance of *top management support*. In particular, the data suggest that a lack of executive support can reduce ECM initiatives to simple IT projects, thus neglecting the enterprise-wide scope of ECM, involving processes, technology, and people. At the same time, however, gaining top management support was considered a noteworthy challenge of ECM implementation, in particular because of the rather elusive character of the concept. The identification of ECM objectives and benefits, for example, and their illustration on the basis of concrete business examples, were considered difficult by some of the interviewees, as was the justification of ECM investments. This, however, represents a crucial precondition for gaining top management support, which, in turn, ensures the availability of required personnel resources and financial funding. The interviewees also acknowledged that organizations must clearly define the *purpose of ECM*. In particular, it was considered important to explain to the users how the system will improve their daily work, what benefits ECM holds for the company, and what ECM objectives are pursued. Note that the objectives of the ECM initiatives at the case organizations significantly differed, reaching from supporting content retention and compliance to implementing single source publishing and content reuse. Accordingly, it appears important for ECM-adopting organizations to clearly define the scope of ECM, because otherwise it will become difficult for the employees to understand what they can expect from it. Similarly, all the interviewees deemed *information and communication* crucial in ECM adoption. Interviewees said, for example, that it is equally important for organizations to inform their staff before and during the rollout. In both cases they considered the level of transparency in communication crucial. There are different approaches to informing employees, among them presentations and company magazines. Documentation, however, was likewise considered key to communicate project progress, for instance, by publishing time schedules, protocols, project descriptions, and updates on the Intranet. It further became apparent during the interviews that

knowledge about the *corporate culture* plays a salient role in the context of ECM implementation. Tampering with work habits can cause unhappiness among the employees, which, in turn, can result in reluctance against the new system. This spans from single users to entire work units that, in the past, may have developed their own approaches to storing and retrieving content, but are now directed towards the use of a corporate ECM system. Depending on the prevailing corporate culture, it can also be necessary to invoke a change of the same. Interviewees mentioned that, even with a pronounced corporate culture, the recognition of local cultural differences is important, as not everybody can be treated equally. Consequently, there will be instances where organizations need to provide their local branches with content management flexibilities to enable them to compete in their markets. The data suggests that the implementation of appropriate information and communication mechanisms is crucial to allow for cultural shifts and awareness of local differences alike.

In addition, the respondents mentioned another factor that can impact ECM success, which was conceptualized as *monitoring and evaluation*. Monitoring and evaluating the ECM initiative allows for both justifying ECM investments and conducting ECM system maintenance.

5.2 Process Level

The interviewees said that the *involvement of end users* is a vital factor for ECM acceptance as it allows for considering their individual needs in the design of an ECM system. In particular, the selection of key users, or so-called ECM champions, from different departments was considered important, because they can facilitate communication between their colleagues and the ECM project team (e.g., by forwarding individual and departmental requirements and change requests to the developers). However, even more important is that they can also serve as change agents, who create enthusiasm among their colleagues (e.g., by explaining the benefits of the ECM initiative to them). During the further course of the ECM implementation, ECM champions can also act as counterparts for other employees if these need help in using the ECM system. In addition, it was said that their involvement often enables constructive criticism, which can result in better system designs. While the selection of key users can thus be regarded a crucial facilitator of ECM initiatives, respondents also highlighted the role of *user training*. First, users need to be practically trained on how to apply the new ECM system. Second, it was deemed crucial to also show them the positive impacts the system can have on their job performance. The interviewees further considered it important to ensure a high quality of training, as otherwise employees may lose their trust in the system and, consequently, the willingness to use it in their daily work. User training should generally go beyond pre-implementation, so as to continuously support users. Notwithstanding the palpable importance of user training, however, it was repeatedly mentioned that end users’ acceptance must be gained before the roll-out stage. While training is needed to accustom the users to the new system, it was also suggested that a transition period, wherein the old and the new system run in parallel, is crucial. *Transition management* allows the users to familiarize with the new system, recognize its benefits, and vo-

luntarily switch to the new system. Nonetheless, a final date should be communicated so as to create an incentive to rapidly familiarize with the new system. In addition, respondents said that such parallel operation allows both the adoption to departmental and local requirements and the migration of data from the old into the new system. They further approved the concept of *prototyping* as a means to present and test the functionalities during the development phase. However, it was also indicated that mockups and prototypes should be kept as simple as possible so as to avoid presenting features that cannot be integrated in the final product.

Finally, with regard to the process level, respondents also highlighted the importance of process knowledge. It was argued that a detailed understanding of existing procedures and processes not only is prerequisite for identifying room for improvement but also sets a baseline for the functionalities the new system must provide. As such, it was conceptualized as *business process analysis*. In addition, the interviews also considered *project management* to have an impact on ECM success. Project delays and changes in the project team, for example, can result in losses of both knowledge and confidence towards the project team.

5.3 Technology Level

The interviewees supported the two major approaches to implementing ECM systems that were identified in the literature review, i.e., the customization of a huge ECM software package and the development and integration of smaller content management solutions. As to *functional customization*, interviewees acknowledged that ECM systems feature many different functions that, however, are not necessarily relevant to all employees and business units. One of the interviewees described the dilemma that comes with the implementation and customization of corporate ECM systems: on the one hand, the implementation of different content management solutions at a departmental level is likely to best fulfill their individual needs but also to result in inefficiencies at a global scale. While, on the other hand, the implementation of a single ECM system at an enterprise-wide level can eliminate these inefficiencies, at least to some extent, this also requires the departments to give up their former freedom in content storage and retrieval. Note that customization was further estimated to raise the costs for technical maintenance. With regard to content reuse in particular, respondents pointed to the need of integrating existing applications, and *systems interoperability* was accordingly confirmed as another ECM success factor. Many of the case organizations use various applications for document and content management at a departmental level. Their integration with each other, or with the new ECM system, was consequently considered a core task in ECM implementation. Here, project portfolios might assist organizations in planning and conducting ECM-related projects at an enterprise-wide scale. The interviewees further said that the *simplicity* of an ECM system is important for its success. Enabling intuitive use by designing the system in accordance with existing usability standards consequently marks a core task in ECM implementation. Finally, respondents also emphasized the role of *security*. First, it must be granted that the stored data still can be accessed after a few decades, independently of the used format. Second, appropriate security settings (e.g., clearance, access rights) have

to ensure that users can only access the content assets that correspond to their information needs (thus also avoiding information flooding).

The data further suggest that *collaboration* plays an important role in ECM. Interviewees said that integrating collaboration tools into an ECM system can foster acceptance. In addition, *workflow support*, which allows a process-centric perspective on content management, was deemed important by the respondents.

5.4 Content Level

The interviewees considered a diligent analysis of content a crucial precondition for ECM adoption. As indicated, *content auditing and classification* not only involves the identification of content assets but also an assessment of their usage (e.g., content users and owners or involved systems). Picking up on the digital information overload that employees have to face every day, the respondents mentioned various types of content (e.g., office documents, audio and video files, or images). Some of them further stated that, at the most basic level, auditing content requires organizations to decide which content assets should be part of the ECM system and which ones should not. However, it is similarly important for them to identify the different systems that content resides in. While the interviewees considered the identification of content users important, they drew particular attention to the necessity of defining responsibilities for content. Such responsibilities can, for example, reduce the risk that employees might use content as an instrument of power by not sharing it with their colleagues. It was suggested to define responsibilities for content on the basis of the associated business processes: An ECM implementation often impacts the way business is done and, consequently, it can induce a shift in work tasks. That being said, some users will face more work (e.g., scanning documents), while others are freed from the same (e.g., filing paper documents). Obviously, such workload shifts can influence the success of ECM implementation. The preliminary analysis of business processes, however, was considered to allow organizations to reveal shifts in workload, thus enabling them to adapt their organizational structures if necessary. In addition, the interviewees also saw *content lifecycle implementation* to have an impact on ECM success, which the following again illustrates for the retrieval of content. As indicated, some of the informants considered an efficient reuse of content particularly important in ECM implementation. This, however, requires that existing content can be found by the users, for example, through the use of a search tool. Challenges that were mentioned with regard to content search include both the response times and the quality of the search results. Another way to retrieve content is browsing that, however, requires users to have a certain level of experience and to be familiar with the underlying file structures. Within this context, respondents further distinguished between associations and recommendations. While associations, that serve as links between content, are automatically conducted based on existent metadata, recommendations are made by the users themselves. Accordingly, the selection and implementation of an appropriate set of search mechanisms was deemed relevant for ECM success. As suggested by prior IS literature, *corporate taxonomy development* therefore plays a distinct role, for example, to support both browsing and the generation of metadata. In addition, however, the respondents deemed it also relevant to define corporate

standards on content handling. Such standards describe, for example, what content is to be kept in the ECM system and how it will be distributed within the company. In this line of thought, the usage of predefined storage structures and content templates was further mentioned as they can ensure consistency, establish maintenance cycles, avoid redundancies, and reduce the workload for tagging the content with keywords. This latter possibility was considered particularly relevant by the respondents. *Content tagging* means to generate appropriate metadata for characterizing content objects in order to allow other users to retrieve them later on. Respondents agreed that the use of metadata must be mandatory to fully leverage the potentials of ECM systems. So as to facilitate the use of metadata, ECM systems should provide easy-to-use tagging mechanisms. There are several approaches to content tagging, for example, automatically generating metadata or suggesting it to content producers, who can then choose which metadata characterize a given content object best. Interviewees considered metadata especially important for content versioning, which is of particular relevance in collaboration intensive settings, where multiple persons may work on the same file. Along with the ability to review what changes were made, automatically informing the users about updates was considered core ECM functionality. While the ability to track content in such a way is associated with higher levels of transparency, it was, at the same time, indicated that high levels of transparency may also cause reluctance among the employees, as they may feel supervised. Consequently, *content tracking* was considered another crucial ECM success factor.

In summary, the interviewees not only supported the relevance of the sixteen ECM acceptance factors identified in the literature review but also mentioned another six factors that organizations should consider when implementing ECM. These are monitoring and evaluation (enterprise level), business process analysis and project management (process level), collaboration and workflow support (technology level), and content tracking (content level).

6. DISCUSSION

Legris et al., in their critical literature review, identify three major shortcomings of prior TAM research [35]. First, many of the studies drawing on TAM involved students instead of business representatives. The present study, which also builds on prior literature on ECM and related fields, is grounded in data collected from interviews with project members from five real-life ECM initiatives. Second, Legris et al. identify a lack of TAM studies on business process applications [35]. At least to some extent, the present paper adopts a process-oriented perspective, which is mainly because ECM systems make extensive use of workflow components [65]. Third, Legris et al. conclude that most IS research does not measure actual but only self-reported use, which, admittedly, also holds true for the present study [35].

All factors that were identified based on the literature review were also supported by the interview data, thus approving their relevance in the context of ECM implementations. This may be explained by the intimate relationship between ECM and related concepts such as document management, records management, and content management. ECM builds upon, and extends, many of these concepts [38, 65].

The study has also produced a number of additional factors that were not identified in the literature review, which can impact on ECM adoption success, namely monitoring and evaluation, business process analysis, project management, collaboration, workflow support, and content tracking. While this may be due to the limited scope of the review, the relevance of these factors may also be explained by the emergence of ECM as an organizational phenomenon, involving technological and content-related issues and processes at the individual, group, and organizational levels [38, 42, 62]. Factors such as collaboration and workflow support, for example, reflect that enterprise content is created, stored, used, and applied in organizational work processes, often involving different departments and work units. Similarly, monitoring and evaluation become increasingly important as content is used by many different people, thus producing challenges such as redundancies and inconsistencies that require mitigation and avoidance. The relevance of business process analysis and project management shows that, in order to successfully adopt ECM, organizations need to leverage well-established management approaches that enable them to handle the complexities of such organization-wide endeavours.

It must be noted that the above additional factors are solely based on the small number of interviews that were conducted in the course of this research. It will be necessary to conduct further empirical studies to determine their relevance in the context of ECM adoption.

7. CONCLUSION

Grounded in both a systematic review of the literature and an analysis of qualitative data collected from five ECM-adopting organizations, this paper presented and discussed twenty-two factors that can impact the usefulness and ease of use that end users of ECM systems perceive. While some of them are likely to apply to a number of technologies (e.g., information and communication, user training), others can be considered ECM-specific (e.g., content lifecycle implementation, corporate taxonomy development). There are some limitations to the presented findings that must be acknowledged. First, as with the scope of the literature review, the list of ECM acceptance factors presented in this paper is not considered exhaustive. Second, no distinction has been made as to whether these factors impact end users' perceived usefulness or ease of use—or eventually both. Third, the categorization of these factors was grounded in an ECM framework that distinguishes four perspectives on ECM: content, processes, technologies, and enterprise context. Other researchers would probably have chosen different dimensions or levels of analysis (e.g., factors at the individual, group, organizational, or market level). Finally, future research is needed to test and refine the presented results.

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