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The business drivers behind ECM initiatives: a process perspective

Drivers behind
ECM initiatives

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Abstract

Purpose – The purpose of this paper is to identify organizational challenges that drive enterprise content management (ECM) adoption from a process point of view.

Design/methodology/approach – The presented results are grounded in both the academic literature on ECM and qualitative data from two case studies.

Findings – The study identifies and discusses 21 contemporary business challenges that drive ECM adoption along the content lifecycle (e.g. regarding the creation, storage, and retrieval of content).

Research limitations/implications – As the scopes of both the literature review and the case studies were limited, the presented account of ECM drivers is not considered exhaustive. The paper can, nevertheless, help researchers to further theorize about ECM adoption and investigate the role that content plays in business process management.

Practical implications – Practitioners are provided with empirically grounded knowledge on the drivers behind ECM adoption. They can, for example, use the results to justify and evaluate ECM investments, or determine the scopes and objectives of their ECM initiatives.

Originality/value – This study is important because the understanding is still vague as to what organizations strive to gain through implementing ECM and what results they can expect from the same.

Keywords Business process management, Document management, Enterprise content management, Process management, Content management, Drivers, Challenges

Paper type Research paper

1. Introduction

Enterprise content management (ECM) can be considered an integrated and modern approach to information management (Päivärinta and Munkvold, 2005) that covers and aligns established concepts such as document management (web) content management, and records management at an enterprise-wide scale (vom Brocke *et al.*, 2010). ECM further relates to a variety of other research fields, including knowledge management and information resource management (Munkvold *et al.*, 2006). As such, the concept of ECM includes “the strategies, tools, processes and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle”

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(Smith and McKeen, 2003, p. 648). Given the ever-expanding digital information flood that is increasingly challenging industry, it is not surprising that ECM has become an important topic for information and knowledge workers from various branches of trade (Päivärinta and Munkvold, 2005). In their last magic quadrant report on ECM, Gartner estimates the worldwide ECM revenues to grow at such a rate that they will reach \$5.7 billion by 2014 (Roe, 2010).

Notwithstanding the practical relevance of the concept, researchers have rarely endeavored to develop theories that explain or predict the impacts of ECM on individuals, groups, and organizations. Instead, most studies on ECM are design oriented in nature, thus proposing methods, standards, and tools for ECM implementation (Tyrväinen *et al.*, 2006). Päivärinta and Munkvold (2005, p. 3) put this problem as follows:

Unless we would assume that ECM brings up only positive consequences, there remains [...] a challenge to complement the success stories with in-depth studies on all possible impacts, including negative ones.

Except a few examples (Nordheim and Päivärinta, 2006; Scott *et al.*, 2004), researchers have not reported many empirical studies on strategic and enterprise-wide content management initiatives (Munkvold *et al.*, 2006). Industrial case narratives, in turn, frequently represent rather short and, by their very nature, less replicable essays authored by ECM vendors (also compare Andersen, 2008). In such essays it has, for example, been estimated that ECM can lead to better internal and external collaboration, value-added or new customer services and products, improved reliability and quality of content, more meaningful knowledge work, an improved organizational memory, direct cost savings, better fulfillment of external regulations and standards, as well as more efficient, effective, and flexible business processes (Päivärinta and Munkvold, 2005). Given this treatment of ECM as a solution for nearly all contemporary information management problems, 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. While prior work has mainly discussed the issues that emerge during the implementation and customization of ECM systems (in particular, Munkvold *et al.*, 2006), the business challenges that drive ECM initiatives still remain elusive. This article, which is grounded in qualitative data from two case studies, addresses this research gap with the following research question:

RQ1. What are organizational drivers behind ECM initiatives?

In order to seek answers to the above *RQ1* this article analyzes the two ECM case studies from a process point of view. As such, the study acknowledges the increasingly blurring boundaries between the concepts of ECM and BPM (Chambers, 2007). Because content is typically created and used in business processes, it plays a vital role in their execution and management (Frappaolo, 2008; Vidgen *et al.*, 2001). On the other hand, business processes are important in ECM, because an understanding of content-related activities is a crucial precondition for the successful customization of ECM systems (vom Brocke *et al.*, 2011):

What is needed is an alignment of business-critical information with the essential processes that define a company's business success – now commonly referred to as *content-process fusion*, a term coined by the Gartner Group in 2003. (Greenbaum, 2005, p. 2).

Ultimately, the objective of this article is to categorize ECM drivers on the basis of a content lifecycle model that is grounded in the academic literature. These lifecycle

phases are at the interface between the two concepts of ECM and BPM, because they describe content-related activities that business processes frequently rely on, for example, regarding the creation, storage, and retrieval of content. In line with prior empirical studies on ECM, former theory on the content lifecycle thus served as a lens for collecting and analyzing the data from the two case studies (Munkvold *et al.*, 2006).

The article proceeds as follows. Section 2 explains the research background and the meaning of ECM. Section 3 provides an overview of the research process. Section 4 presents the challenges that drove the ECM initiatives at the two case organizations. After discussing the study results and implications (Sections 5 and 6), the article concludes with a summary which also acknowledges limitations (Section 7).

2. Research background

There is still much confusion around both the subject and scope of the nascent concept of ECM (Smith and McKeen, 2003). As a result, some authors even do “not attempt to tackle ECM” at all (Clark, 2008, p. 40). According to Blair (2004), the notion of ECM has been introduced with the turn of the millennium by Association for Information and Image Management (AIIM) International, a professional forum for information and knowledge managers (www.aiim.org/). On the basis of both Smith and McKeen’s (2003, p. 648) early definition of ECM introduced above (“the *strategies, tools, processes and skills* an organization needs to manage *all its information assets* (regardless of type) *over their lifecycle*”; emphasis added) and existing research in the domain, ECM can be characterized as an approach that integrates a variety of related concepts (e.g. document or content management) at an enterprise-wide scale.

Integration of all types of information

ECM is about managing the entirety of an organization’s information (“all its information assets”). The focus of ECM in particular lies on semi- or unstructured information (Blair, 2004), as it is, for example, also the belief of John F. Mancini, President of AIIM (as cited in Sinnett, 2006). Some researchers, however, also consider structured data relevant for ECM (Munkvold *et al.*, 2006; Nordheim and Päivärinta, 2006). In the context of ECM, the notion of content refers to both complete information products (e.g. web pages and documents) and single content components (e.g. text modules, graphics, or images) (compare Clark, 2008). As a function of granularity, such content components can range from entire text passages to separate sentences (Rockley *et al.*, 2003), which is perhaps why O’Callaghan and Smits (2005) consider ECM the synopsis of both document management and content management. In this article, all possible forms of digital information assets – regardless of their granularity level – are subsumed under the concept of content. Examples include (the content embedded in) web pages, records, budget documents, marketing materials, e-mails, reports, photographs, and drawings (but also new media such as audio and video).

Integration of technological and managerial issues

ECM is a managerial and technological approach (“strategies, tools, processes and skills”), which O’Callaghan and Smits (2005, p. 1271) put as follows: “The problem really has two facets: business issues, and technology issues”. ECM thus exceeds the many definitions available in practice that tend to focus on software products and technologies only (Tyrväinen *et al.*, 2006). The AIIM, for example, which revised their understanding

of ECM several times during the past few years, solely referred to technologies in their ECM definition until 2004. Recently, however, most conceptualizations of ECM, including the current one by AIIM (2011), also include managerial aspects (e.g. strategies or methods). vom Brocke *et al.* (2010), for example, differ between four distinct dimensions of ECM: tools, strategies, processes, and people. Tyrväinen *et al.* (2006) likewise distinguish four core perspectives that researchers can take when exploring the concept of ECM: content, processes, technologies, and the enterprise context.

Integration of the content lifecycle

ECM is about managing content over the entire lifecycle (“over their lifecycle”), reaching from content creation to deletion. ECM can hence be distinguished from related concepts that typically focus on individual lifecycle phases. Examples for such concepts are document management (storing and retrieving content), Web content management (publishing content), or records management (retaining content) (vom Brocke *et al.*, 2010). ECM, in contrast, suggests a holistic view on the content lifecycle (Smith and McKeen, 2003), which is also reflected by prior research. Munkvold *et al.* (2006, p. 85), for example, in their longitudinal study of an ECM initiative at a Norwegian oil company, state: “The Statoil data confirms the importance of a holistic focus on content life cycle, from capture/creation to long-term retention or deletion, as a core characteristic of ECM”. Against this background, the content lifecycle is also at the core of the present study.

3. Study overview

This article is part of a larger research endeavor that develops theory about the management of business processes that are highly dependent on content. Data are collected from five organizations that operate in different businesses and industries. The study in particular focuses on the impact that the adoption of ECM can have on an organization’s business processes and their management. The applied research strategy is that of interpretive case studies. Case studies examine “a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities” (Benbasat *et al.*, 1987, p. 370). There are different approaches to case study research (Eisenhardt, 1989; Klein and Myers, 1999; Oates, 2006; Yin, 2003). Interpretive case study research is an appropriate strategy of inquiry for this research because the phenomenon under investigation, namely ECM and the adoption thereof, is of high practical relevance and cannot be separated from the organizational context in which it is carried out (Benbasat *et al.*, 1987). Moreover, ECM is an emergent topic characterized by the absence of a broad theoretical base. Accordingly, an intimate connection to the data is desired and the phenomenon of interest should be studied in its natural setting. Considering the exploratory nature of this research, it is also not necessary to control any subjects or events (compare Benbasat *et al.*, 1987).

The purpose of this article is to present and discuss the challenges that drove the ECM initiatives at two of the studied case organizations. The first organization is an automotive supplier company that provides steering systems for carmakers. With over 4,000 employees in 16 locations worldwide, it generates a turnover of close to €1,000 Mio. The second organization is an innovative dental enterprise, with a comprehensive product portfolio for dentists and dental technicians. It has a global presence with 22 local subsidiaries and branch offices and supplies its products to more

than 120 countries around the world. It employs more than 2,300 people, altogether generating a turnover of approximately €400 Mio. Data sources in both organizations included interviews, corporate documents, presentations, minutes, and workshops with ECM project team members. A total of 12 persons were interviewed (six per organization), with an average interview length of around 60 minutes. The interviewees, selected by the two ECM project coordinators, filled key roles related to information management in different business units at the two case organizations. Data collection took place from December 2009 to May 2010; all interviews were audio-taped and fully transcribed. The transcripts were sent back to the informants in order to improve the validity of the results. The interviews were semi-structured and focused on the following areas:

- (1) current content management practices and systems;
- (2) perceived challenges and expected benefits; and
- (3) suggestions for improvement.

Throughout these three parts, the interviews were organized on the basis of a content lifecycle model, which is described in the following section. This is in line with prior studies on ECM that used the content lifecycle as an initial guide to the collection of data (Munkvold *et al.*, 2006). The software tool NVivo was used in order to analyze and code the data, where the content lifecycle again informed the study in that it sensitized the researchers for what is important in the data (Klein and Myers, 1999).

4. Study results

4.1 Overview

A multitude of content lifecycle models exist in both research and practice. Päivärinta and Munkvold (2005) provide a very detailed picture of the activities within the content lifecycle, including capturing, creating, reviewing, editing, distributing, publishing, storing, archiving, and deleting enterprise content; McNay (2002) more generally differentiates between creating, approving, delivering, and managing content; and Smith and McKeen (2003) highlight the importance of capturing, organizing, processing, and maintaining content. Grounded in these and related works, this article distinguishes the following lifecycle phases: creating, capturing, editing, reviewing, storing, retrieving, and retaining content. While this model is by no means exhaustive, it exhibits a level of generality that we believe can accommodate a broad range of further lifecycle phases that other researchers consider potentially relevant (e.g. content distribution and approval as, for example, proposed by Päivärinta and Munkvold (2005).

While the seamless integration of ECM and BPM systems is increasingly coming into the focus of software vendors (IBM, 2009), a gap still exists in research between the two approaches (vom Brocke *et al.*, 2011). However, it has been argued that “[f]ailure to integrate content with business processes causes great inefficiencies in business today, such as redundancy and lost time and opportunity in locating key information scattered across the enterprise” (Jedd, 2008, p. 20). As indicated, this article provides a process-centric perspective on ECM. The above lifecycle phases describe activities that are typically part of business processes (vom Brocke *et al.*, 2011). Whenever content is handled within a business process (i.e. it serves as an input for, is transformed by, or is the output of an activity or a set of activities), one or more of the lifecycle phases are involved. As such, they are at the interface between the two concepts of ECM

and BPM (vom Brocke *et al.*, 2011). The different phases ultimately “change the content and affect not only how it is used in the organization, but also possibly the way organizations are able to operate” (Iverson and Burkart, 2007, p. 411). Against this background, the above described content lifecycle model is used in the following to describe the challenges that drove the ECM initiatives at the two case organizations. In doing so, the informants’ viewpoints and experiences are combined with the academic literature on this matter in order to create an overview that is grounded in both prior research and current business practice.

4.2 Content creation

Contemporary organizations are typically facing several challenges regarding content creation. The case study data suggest that these challenges particularly relate to: (1) the recreation of existing content (2), information quality, and (3) content reuse.

(1) *Avoiding the recreation of existing content.* First, organizations increasingly experience the problem of recreating content that already exists. Rockley *et al.* (2003, p. 7), for example, mention the case of a company that “spent a lot of time, money, and resources essentially creating, re-creating, and re-creating the same content”, and the relevance of avoiding the recreation of existing content was also indicated by several of the interviewees (quotes are translated from German to English by the authors), for example:

I trust this happens too often [recreating existing content]. This is, however, a more general problem that not only occurs at our company.

(2) *Improving the quality of information.* Respondents further mentioned potentially dangerous consequences of recreating existing content, in particular an information quality loss. Lee *et al.* (2002) remind us that information quality can be measured in different ways, including, for example, the accuracy, completeness, essentialness, clarity, or precision of information. Two measures in particular appear relevant regarding the creation of content: the timeliness and consistency (vom Brocke *et al.*, 2010). Regarding the timeliness of content one respondent made the following statement:

The digital information flood is increasing in such a way that everyone knows: Something that was new yesterday can be outdated today.

As to the consistency of content, duplicating existing content multiple times can result in different versions that are very likely to be inconsistent with one another – a problem that many companies experience today, as the following statement exemplifies:

Inconsistencies among documents today exist in all companies – one can say what he wants.

(3) *Reusing content from existing documents.* Inconsistent content, however, not only results from recreating prior information, but also from reusing content inappropriately, as the majority of documents are typically not created from scratch, but rather generated from the retrieval and reuse of existing content. Employees often do so by copying content from existing documents, pasting it into new ones, and finally editing it therein (Rockley *et al.*, 2003, p. 24). Such a manual copy-and-paste approach to creating content, however, can result in inconsistencies that not only matter in economic, but also in legal terms (e.g. if content includes legally binding information, such as product warranties):

All the documents we publish [in the Marketing department] – for example, in the Internet, in an operating manual, or in a brochure – contain so-called “guaranteed product characteristics”. If these documents are corrupted this might also draw legal consequences.

In addition, the inappropriate reuse of content may cause a mismatch with the context in which the content is used. This cannot only impact the clarity or appropriateness of the created document, but also its ultimate correctness. One respondent said:

[...] documents are frequently created via copy-and-paste. This, however, bears a high risk, for example, when a document becomes legally relevant: The document might appear consistent and correct [...] there’s only this one little mistake resulting from a copy-and-paste error. Such cases are, of course, very unlikely – but they could indeed happen and would cost us a lot of money.

4.3 Content capture

Obviously, in order to avoid the recreation of content and support content reuse, organizations must empower their employees to access existing content. By implication, content that is not captured can hardly be found. The implementation of ECM systems thus often represents a massive attempt to collect and digitize content (Smith and McKeen, 2003). The efficiency of content capture is influenced by the specific type of content in particular. The case study data suggest that, at the most basic level, content can be characterized on the basis of both its origin (internal vs external) and its format (digital vs paper). The relevance of both characteristics becomes apparent in the following statement:

Mostly, we maintain correspondence with our suppliers and customers [...] electronically. Of course, however, we also exchange paper documents.

Challenges related to the capturing of content can concern: (4) the execution of paper-based processes and (5) the capturing of externally created content.

(4) *Improving paper-based processes.* Both of the studied organizations are characterized by a high level of innovation, where it is the rule rather than the exception that employees create paper documents. Examples include freehand sketches, hand written protocols, or meeting notes. Capturing (i.e. scanning) paper files thus marks an important task in today’s information management. Such documents frequently cover information of high strategic relevance (e.g. creative ideas, designs, or preliminary solutions):

We do not just work with our CAD system [computer aided design] in order to develop new designs. Very often, we rather meet personally and brainstorm together. In such meetings we create, for example, freehand sketches that are scanned afterwards and finally get organized in folders.

Because such documents carry an enormous innovative potential, it is essential for organizations to develop and implement an effective way to systematically capture them. The case study data suggest that typically these documents do not follow any predefined structures, which complicates their storage and retrieval. The reduction of paper-based processes thus marks another important information management challenge for today’s organizations:

The question is what types of paper documents we need in the end. Couldn’t we just transfer them into a digital format and an integrated file system?

(5) *Capturing content from external sources.* A general content management challenge is that some of the required metadata can be collected automatically (e.g. author, date, title), while others must be provided by the authors themselves (e.g. summary,

purpose, relevance) (O'Callaghan and Smits, 2005). Munkvold *et al.* (2006) accordingly distinguish two key challenges related to capturing content: a maximally automated production of metadata and awareness of the importance of metadata among content producers. Content can originate from both inside and outside the company, and very often, it is much easier to capture internally created content as compared to external content. This is because internal content often follows predefined templates and, hence, it is likely that much metadata can be collected automatically. Moreover, metadata can directly be specified by the content producers.

The challenge of capturing externally created content becomes even more paramount with respect to external content that organizations are supplied with in paper format. Examples include incoming paper invoices, hardcopy contracts, faxes, and letters. Such content must be properly organized so that it can be easily retrieved later on (e.g. for reconstructing prior business transactions and cases):

We are currently implementing a new [...] database in which contracts and all relevant correspondence can be filed electronically in order to enable quick and comprehensive overviews.

4.4 Content editing

There are several reasons for editing content, including updating content that is obsolete, repurposing content for different audiences and contexts, or simply revising content in terms of language or orthography. Three challenges particularly relate to content editing: (6) efficiently revising content (7) updating content in different documents, and (8) keeping up-to-date with external content.

(6) *Efficiently revising content.* As with the capturing of content, the efficiency of content editing is influenced by the particular type of content. Content differs, for example, with regard to the frequency of change:

In the first instance, the change frequency is subject to the specific type of document. While some documents are created once and then largely remain unaltered, others are corrected and changed at a very high frequency rate. Presentations, for example, are frequently customized to meet specific customer needs and may possibly get translated into other languages.

During the case studies it further became apparent that the urgency of editing content is, among others, largely influenced by both the reasons for revising the content and its intended audience. If content in a customer document (e.g. a product manual), for example, proves corrupted, the urgency of updating it is probably higher as compared to some internal documents. Editing such content, however, frequently is both inefficient and cost intensive for organizations:

It is very time-consuming and cost-intensive to implement such revisions. Imagine a user manual [...] the main question here is: Do we have to change, reprint, and destroy the outdated version right away? Or later when it gets reprinted anyway?

(7) *Updating content in different documents.* Things become even more difficult when content is embedded in different documents: product descriptions, for instance, are usually contained in various information products, including instruction manuals, sales presentations and catalogues, or marketing flyers and brochures (vom Brocke *et al.*, 2010). It is in the early stages of the product lifecycle in particular, when such documents are subject to change. Obviously, implementing required changes in all relevant materials is critical:

Have these changes been considered for all product labels and packages? In every single product manual? In all the advertising materials?

(8) *Keeping up-to-date with external content.* As indicated, companies heavily rely on externally created documents, including safety regulations, customer requirements, and legal norms. Such documents are often changed at an irregular but high frequency, and organizations need to keep up-to-date with such standards. Not in all cases, however, they are provided with the relevant updates; it is very likely that they must actively retrieve the required information about modifications:

The problem with Material Safety Data Sheets is that our vendors do not necessarily inform us about updates. They rather share them online so that we have to check them ourselves.

4.5 Content review

In order to face the above challenges, content is reviewed on a regular basis. Challenges that relate to the reviewing process concern: the efficiency of collaborative reviewing endeavors (10) the reliability of content approvals, and (11) the monitoring and updating of fixed-term content.

(9) *Implementing efficient reviewing procedures.* Content reviewing proves difficult in particular when different people are involved in the review process. One of the interviewees, for example, mentioned the risk of overlooking corrections during a collaborative reviewing procedure:

Regarding a brochure, for example, there is a certain risk that reviewers do not check the complete document again but only single passages [...] corrections in other parts may then get lost [...]

(10) *Ensuring the reliability of content approvals.* The data further suggest that a lack of awareness of the importance of regularly reviewing content may lead to inefficiencies. In particular, releasing content too early can result in unnecessary and time-consuming review cycles. The following statement exemplifies this:

I also feel that some of our employees do not take the review and approval process too seriously at the moment [...]. Of course, we also had to change our documents in the past, but mostly because of product revisions and new findings. In contrast, change requests today frequently occur right after document approval [...]

(11) *Monitoring and updating fixed-term content.* Reviewing processes, however, are not only necessary when content is edited. Organizations must also be aware that some content assets have an expiry date. Examples include images (that companies are, due to licensing issues, only allowed to use for a certain time period) or internal and external patents and contracts:

Our contracts are mainly long-term, which is why they sometimes have to be updated even during their run time, for example regarding prices or quantities [...] the resulting effort can be significant [...]

4.6 Content storage

Content storage and retrieval processes are at the core of any ECM strategy. Smith and McKen (2003, p. 652) put this as follows: “content is useless if it cannot be easily searched or navigated”. We could identify four ECM drivers regarding content storage, namely implementing: (12) a corporate taxonomy and (13) efficient version control as well as avoiding, (14) redundancies in content storage, and (15) content and knowledge losses.

(12) *Developing a corporate taxonomy.* The first step in making content searchable is to implement a corporate taxonomy, which categorizes content hierarchically and “defines the identities of information and record sources” (Bridges, 2007, p. 39). The development of a corporate taxonomy represents an important standardization challenge for organizations, because the file systems they use are often organized very differently across their various departments:

Regarding content that is not project-related [...] our departments have implemented somehow isolated applications and different storing solutions in the past [...]

The case study data suggest, however, that a corporate taxonomy should not only provide employees with standardized guidelines that enable efficient information sharing among different departments, but also with sufficient freedom to store content in a way that best fulfills their individual and departmental requirements:

I think this is a balancing act [...] I consider it counterproductive to take all the freedom from the people. Corporate guidelines are important nevertheless [...]

(13) *Controlling different versions of content.* Another important aspect of storing content is that of version control. Rockley *et al.* (2003, p. 84) write that “[s]oftware management tools can automate version control, but otherwise, it must be manually enforced”. In such cases, organizations must safeguard sufficient expertise and awareness at the level of the individual employee. Failure in this regard can cause the distribution of outdated or incorrect content as the following example highlights:

Just recently, a colleague wasn’t in the office and I therefore had to answer her inquires. Later she informed me that I had forwarded an outdated document version [...]

(14) *Avoiding redundant storage of content.* Another challenge regarding the storage of content is that of avoiding redundancies in filing. In one of the studied organizations, for example, pictures and reports of the same version were stored in different project folders. Storing multiple copies of the same content cannot only result in higher storage costs but also in inconsistent content. One respondent said:

How can one make sure that documents are not stored redundantly?

(15) *Avoiding content and knowledge losses.* Data safety is another content management issue for today’s companies which obviously do not want their content to get lost. Content therefore must be stored on shared and secure drives. The development of strategies for disaster recovery plays a vital role in the avoidance of content losses (e.g. damages by fire or water); sometimes, however, employees also store content locally on personal hard drives (or other types of external media). In case the employee leaves the company, so does the content – and thus his or her knowledge:

Technically, our product managers can store their documents locally [...] if they, however, do so and leave the company, a huge part of their knowledge leaves us as well [...]

4.7 Content retrieval

Storing content enables the later retrieval, which involves several organizational challenges, including: (16) accessing content (17) searching for content, and (18) content exchange.

(16) *Efficiently accessing content.* As to the retrieval of content, it is particularly important for organizations to protect their content against unauthorized access

(since it often carries knowledge of competitive advantage). Chiu and Hung (2005) mention potentially dangerous consequences of a poorly designed content access, for example, unauthorized disclosure, modification, and destruction of information. For companies that particularly rely on their innovation processes, access control is of utmost importance for protecting content against theft and espionage:

[...] espionage is an important topic [...] especially for us, as the market leader [...]. I've heard of several companies [...] whose] products have been plagiarized in the nearer past [...]

Chiu and Hung (2005, p. 1) 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”. At an enterprise-wide scale it is, however, not easy to determine appropriate privileges for accessing content. Obviously, the security level increases with higher levels of access restrictions. High-security levels, however, can in turn also prevent employees from efficiently accessing and using the content they need in their daily work:

As to the editing of content, I basically support very strict access regulations. In contrast, I think reading content should be possible for more employees. Needless to say, I do not speak of confidential documents here, for example, contracts [...]

(17) *Searching for content and documents.* The efficiency of content access is largely determined by the search mechanisms that employees can use for retrieving content. There are several approaches to searching for content, including tables of contents, indexes, and fulltext searches (O’Callaghan and Smits, 2005). During the case studies it became apparent that search practices widely differ at an inter- and intra-organizational level. Often, searching content is perceived as being inefficient:

We have different databases in our company that I already searched without success [...] some of the search fields these databases offer are certainly not ideal.

Selecting and implementing appropriate sets of search mechanisms thus marks an important challenge for information managers. It must be distinguished as to whether employees are aware of existing content or not when they search for it; typically, a content search proves more time-consuming in the latter case. If an employee is not able to find content it is further possible that he or she forwards a content request to a colleague who either knows where to find the required information or possesses the privileges for accessing it:

When I need a document I often simply ask a colleague for it.

(18) *Exchanging content.* However, such a manual – often e-mail-based – approach to content exchange comes along with the risk of processing outdated information. Imagine, for instance, the same employee would require the same document at a later time again. Then he or she would perhaps not ask for it again, but rather build on the version that was forwarded in the first place. Since the document might have been updated in the meantime, it turns out that creating awareness among content users for content exchange is another challenge in current information management practice. A respondent said:

Today, much content exchange is through e-mail [...]

4.8 Content retention

Finally, we could identify three further ECM drivers that mainly relate to content retention: (19) ensuring compliance (e.g. retention time, format, and access) (20) aligning paper and electronic archives, and (21) deleting content.

(19) *Ensuring external and internal compliance.* One of the ECM drivers most frequently mentioned in the literature is compliance (Andersen, 2008, p. 65). Legal obligations and standards that are relevant for content management in particular concern the retention of content. Content retention requirements, which can also originate from both customers' and internal demands, cause challenges that concern internationally operating companies in particular, as these have to consider the legal obligations of different countries. A respondent mentioned the example of product development documentations:

Product development documentation, for example, not only has to be retained as long as the product is distributed on the market, but also for a couple of years after the product has been withdrawn from sale. The retention period, however, widely differs between countries.

According to the German revenue code, for instance, certain types of content must further not be changed or manipulated retroactively and have to be both relatable to prior business transactions or projects and quickly available if required (sections 146 and 147). Obviously, meeting all required standards marks a challenge in retaining content. Munkvold *et al.* (2006, p. 80) write in their study of the Statoil case:

Statoil also needs to carefully comply to a number of external regulations and guidelines for document storage and archival. [...] In a largely distributed enterprise, these challenges are far from trivial.

These and related issues also became apparent during the case studies, for example:

Clear and structured archiving is especially important regarding law cases [...] we have to safeguard that such documents are filed appropriately [in order to enable a quick retrieval later on].

(20) *Aligning paper and electronic archives.* Another ECM issue is to determine whether to retain content in an electronic or paper form. Retaining documents in both formats can lead to redundant, and thus inefficient, archives:

Which documents do we have to print and file in paper form? It is a double effort to retain documents both electronically and paper-based [...]

It thus appears challenging for organizations to efficiently archive both electronic and paper files. This, in turn, requires the alignment of the digital and physical archives among different departments:

Some departments use their electronic file structures for organizing their paper documents, while others retain their paper documents very differently [...]

(21) *Deleting content.* Once the retention period of content has expired, it can be deleted by law. As indicated, the reduction of paper represents a common ECM driver, for example, in order to give room for storage (vom Brocke *et al.*, 2011). Deleting electronic documents, however, comes with its own challenges. The ongoing digitization of content – together with the decreasing storage costs – can mislead companies into storing content until doomsday:

I have heard of companies that don't any longer delete information at all.

Data protection acts, however, forbid the storage of content for an unlimited period (e.g. regarding content that covers personnel or customer data). The development of an efficient strategy for deleting content thus marks a last challenge the data suggest:

The collection of content involves a great deal of expense. On the other hand – and this should not be underestimated – there are certain records that we have to destroy at some point in time.

5. Discussion

In summary, the two case studies allowed the researchers to identify 21 contemporary ECM drivers along the content lifecycle, which were further grounded in a review of the academic literature on ECM. Table I provides an overview.

The presented results are interesting in several respects. In particular, the ECM drivers we could identify during the case studies (inductively derived from the empirical data) support our initial conceptualization of ECM (deductively developed with the help of the academic literature on ECM). The results confirm that the nascent concept of ECM is highly integrative in nature in that it covers and aligns several related approaches such as document or content management in at least three distinct ways.

Integration of technological and managerial issues

First, we characterized the concept of ECM as an approach that requires both technological and managerial competencies. Indeed, many of the identified drivers appear rather business related (e.g. information quality, content reuse, or compliance) than technology related (e.g. content security or access). Likewise, Munkvold *et al.* (2006) identify several challenges that evolve around the implementation and customization of ECM systems which are only partly software related, and Tyrväinen *et al.* (2006) suggest researchers to explore the concept of ECM from various perspectives, out of which only one is technological. vom Brocke *et al.* (2011) put it as follows: “The various ECM challenges organisations are confronted with when adopting ECM cannot solely be solved on the basis of technologies.” This is in contrast to the many ECM definitions used by practitioners, which often tend to limit the concept to technologies only (Tyrväinen *et al.*, 2006). Because ECM thus relates to both software and management issues, it not only constitutes a relevant topic for researchers from both the computing and the business administration disciplines, but in particular for the academic discipline of information systems (Benbasat and Zmud, 2003; Tyrväinen *et al.*, 2006).

Integration of all types of information

Second, we described ECM as an approach that captures all of an organization’s information assets, regardless of type, format, source, and granularity, which is also supported by the case study data. The identified drivers relate to very different types of information, for example, external vs internal content, paper vs digital files, and entire information products vs single content components. In addition, the data suggest that ECM mainly focuses on unstructured, or at least semi-structured, content and not so much on structured data (except for metadata, of course). This we believe confirms that the biggest proportion of an organization’s digital assets are only weakly structured today and cannot be easily arranged in columns and rows as it is the case in traditional database schemes (Mancini, 2004; as quoted in Sinnott, 2006, p. 61). Gartner, for example,

Content lifecycle phases	ECM drivers	Description
Creating	Avoiding the recreation of existing content	Recreating existing content is likely to result in a loss of both efficiency (e.g. writing and searching for content) and information quality (e.g. inconsistent duplication of content)
	Improving the quality of information	In many organizations, the quality of digital information can be improved in various ways; in particular, content can prove outdated, inconsistent, and/or inappropriate
	Reusing content from existing documents	A manual copy-and-paste approach to content reuse is prone to error and can cause both economic (e.g. time and money) and legal problems (e.g. warranty)
Capturing	Improving paper-based processes	Paper documents, which often do not follow any predefined structures, have to be properly scanned and filed, because they frequently cover information of high strategic relevance (e.g. creative ideas)
	Capturing content from external sources	External content (that organizations are often supplied with in paper form) has to be captured in a way that enables its efficient retrieval (e.g. for reconstructing prior business transactions)
Editing	Efficiently revising content	Some documents are edited at a very high-frequency rate; implementing the required revisions can, however, prove cost and time intensive (e.g. destroying outdated paper files)
	Updating content in different documents	It is often difficult to update all occurrences of contents that are embedded in different documents across an enterprise (e.g. product descriptions in marketing materials)
	Keeping up-to-date with external content	Organizations have to keep up-to-date with external content (e.g. safety regulations, customer requirements, and legal norms), which is often changed at an irregular but high frequency
Reviewing	Implementing efficient reviewing procedures	In particular in collaboration-intensive settings, corrections can get lost during the review process; this can cost organizations time and money, and information quality may also decrease
	Ensuring the reliability of content approvals	A lack of awareness of the importance of regularly reviewing content may lead to inefficiencies; in particular, releasing content too early can result in unnecessary and time-consuming review cycles
	Monitoring and updating fixed-term content	Some content assets have an expiry date that organizations have to keep an eye on; for example, images (licensing issues) or internal and external patents and contracts
Storing	Developing a corporate taxonomy	Departmental file systems are typically organized very differently; the development of a corporate taxonomy thus represents an important standardization challenge for organizations
	Controlling different versions of content	Version control can occur automatically, but sometimes it must be manually implemented; this requires sufficient expertise and awareness at the level of the individual employee

Table I.
Overview of ECM drivers

(continued)

Content lifecycle phases	ECM drivers	Description
Retrieving	Avoiding redundant content storage	In particular in collaboration-intensive settings, storing multiple copies of the same content cannot only result in higher storage costs but also in inconsistent content
	Avoiding content and knowledge losses	Content must be stored on shared and secure drives to avoid a waste of knowledge (e.g. employee losses) and support disaster recovery (e.g. damages by fire or water)
	Efficiently accessing content	It is important for organizations to protect their content against unauthorized access (e.g. espionage) and to determine appropriate privileges for accessing content
	Searching for content and documents	Organizations have to provide their employees with appropriate search tools (e.g. tables of contents, content indexes, recommendations, and full-text searches)
Retaining	Exchanging content	Manual, often e-mail-based approaches to content exchange can result in the processing of outdated content; companies thus have to create awareness among the workforce for content exchange
	Ensuring external and internal compliance	Organizations have to comply with content retention requirements that originate from both customers' and internal demands, as well as with legal obligations regarding the archiving of content
	Aligning paper and electronic archives	Retaining content in both digital and paper format can lead to both redundancies and inefficiencies. Organizations thus have to properly organize their digital and physical archives
	Deleting content	The ongoing digitization of content can mislead companies into storing their contents until doomsday, which is forbidden by data protection acts (e.g. regarding personnel or customer data)

Table I.

estimates that 75-80 percent of an organization's digital assets are unstructured (as quoted in O'Callaghan and Smits, 2005). In this line of thought, Blair (2004, p. 65) writes that "ECM focuses on unstructured information, that is, the free-form content that exists outside the confines of databases or systems with fixed routines and pathways". In this regard, our results differ from those of some prior studies on ECM. Chu *et al.* (2009), for example, write that ECM integrates the management of structured, semi-structured, and unstructured content, and Nordheim and Päiväranta (2006) also acknowledge the relevance of integrating semi- and unstructured data with the management of formal databases. While we acknowledge that such integration can be of importance in ECM implementation, we could not find it immediately supported by the interview data.

Integration of the content lifecycle

Third, we characterized ECM as an approach that takes a holistic view on the content lifecycle, which is not only supported by most of the academic literatures on ECM (Munkvold *et al.*, 2006; Smith and McKeen, 2003), but also by the qualitative data gained from the two case studies. It further becomes obvious that many of the identified drivers are not independent of one another, but are rather interrelated in various ways. Our analysis suggests, for example, that an uncontrolled approach

to content reuse can, among others, result in low quality content, inefficient search processes, and poor version control. As such, the integrated management of all the lifecycle phases that content goes through obviously plays an important role in ECM success. This is in contrast to related approaches that often focus on individual functions only, for example document management (storage and retrieval) or web content management (publishing) (vom Brocke *et al.*, 2010).

Finally, the results further illustrate the enterprise-wide scope of ECM, as it has also been accentuated in prior research (Smith and McKeen, 2003; Nordheim and Päivärinta, 2006; vom Brocke *et al.*, 2011). While, in the past, the implementation of related tools primarily focused on the departmental level, organizations are increasingly challenged to balance information needs at the individual, group, departmental, and organizational level. The development of a corporate taxonomy, for example, represents a contemporary standardization challenge for organizations. The alignment of organizational and departmental information management requirements has to allow for efficient yet compliant content storage, retrieval, and exchange processes within and between an organization's different departments.

In all these respects, the results can hopefully contribute to both distancing the concept of ECM from related approaches and further establishing it as a distinct field of research. The next section explains the article's implications in more detail.

6. Implications

Implications for research

Because ECM is a very immature research topic, 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. Nordheim and Päivärinta (2006), for example, analyzed a variety of ECM case narratives shared by practitioners and vendors and identified several objectives presented within these papers. These objectives, however, often remain rather broad and thus difficult to pursue for organizations. In contrast, the ECM drivers presented in this article are less general and can therefore better assist researchers in further theorizing about ECM adoption. While it is, for example, often argued that the implementation of ECM systems can improve information quality, this study suggests that it is mainly the consistency and timeliness of information that can be enhanced, which is also in line with more skeptical studies in the field (Clark, 2008). Andersen (2008), for instance, is concerned that the appropriateness of content might suffer from an automated reuse of content, and vom Brocke *et al.* (2010) believe that content reuse can have a bad influence on the creativity that employees can unfold in content-related work processes. While such conclusions appear logical and reasonable, they still lack empirical tests, which we believe can be supported by this study.

In addition, we explored the very nature of ECM. In particular, we identified three distinct properties of ECM in a literature review and found them also supported by the empirical data. To our best knowledge, research has not yet formulated a generally accepted conceptualization of ECM (Pullman and Gu, 2008), and the presented results can help fellow researchers to further shape our understanding of ECM. At a very basic level, ECM can be characterized as an enterprise-wide approach to information management that:

- includes all types of information;
- supports the management of all lifecycle phases; and
- is both managerial and technological in nature.

The article can hopefully also inform related streams of research, for example, document management and knowledge management. Because content can be considered a knowledge container (Chu *et al.*, 2009; Nordheim and Päivärinta, 2006), there is obviously a close relationship between ECM and the management of explicit knowledge. With reference to Alavi and Leidner's (2001) knowledge management framework, Munkvold *et al.* (2006) argue that ECM in particular focuses on the knowledge storage and retrieval processes (and not so much on the human-centric processes of knowledge creation and application). They accordingly consider knowledge management an approach that is, on the one hand, closely related to ECM, but also more comprehensive on the other. They acknowledge, however, that the scope of ECM can even be broader than the one of knowledge management, because ECM not only targets content that is necessarily informational, but also digital goods that do not carry any knowledge at all (e.g. music files) (Tyrväinen *et al.*, 2006). Regardless, however, how ECM exactly touches the boundaries of knowledge management, researchers in this particular field are well-advised to consider the new possibilities provided by modern ECM systems in their future studies on the creation and dissemination of organizational knowledge.

Finally, the same holds true for BPM research:

Understanding how content is generated by which people and systems, as well as how it is shared, routed, approved, and transformed within a business process, is critical to developing a set of BPM requirements for routing, business rules, integration, monitoring, and analytics (Chambers, 2007, p. 37).

Accordingly, this article has adopted a process-oriented perspective on ECM and it may thus also make a useful step toward bridging the gap between the two concepts of ECM and BPM. vom Brocke *et al.* (2011) consider these two approaches strongly related, but at the same time, they write that their mutual integration marks a challenge for researchers from both fields. It is hoped that this article provides a foundation for studying the role that content plays in the execution and management of business processes, and vice versa.

Implications for practice

In the practice of ECM, there is also a significant confusion around the meaning and boundaries of the concept. Smith and McKeen (2003, p. 657) write:

Organizations have only begun to grapple with what is involved with ECM. At present, there is no clear definition of what it means, how it should be done and who should do it.

It is only recently that Hooper (2009) likewise called for an ECM definition in *Infonomics*, a journal published by AIIM International. In fact, one of the main challenges related to implementing ECM largely remained unexposed in this research: given the many ECM-related concepts available in both research and practice, companies increasingly feel confused about which terminology to use. This article can mitigate this challenge by informing organizations why to engage in ECM and what results they can expect from it. Practitioners can thus use the results for planning, executing, and evaluating their own ECM initiatives, for example, regarding the justification (*ex ante*) and evaluation (*ex post*) of ECM investments, which has been identified as a major ECM success factor (Munkvold *et al.*, 2006).

7. Conclusion

On the basis of a content lifecycle model we presented and discussed 21 contemporary ECM challenges that drive ECM adoption. The results were grounded in both qualitative data from two case studies and the academic literature on ECM. It is hoped that the article can support both researchers in further theorizing about ECM adoption and practitioners in determining the scope and objectives of their own ECM initiatives. There are some limitations to the presented findings. First, data were collected from only two case organizations. Consequently, the identified drivers will not necessarily apply to all business environments. Very probably, some researchers would also prefer a quantitative rather than qualitative approach to studying the drivers behind ECM. In addition, the case organizations' understanding of ECM partly differed, which is mainly why the drivers that led to the ECM initiatives in both organizations also did to some extent. Differences regarding these drivers were, however, not indicated in this article. Besides, it is very likely that some ECM drivers remained unexposed during the study. Factors related to costs, for example, were interestingly absent from the study, and we also neglected possible negative consequences of ECM implementation (e.g. reluctance to change). Because the considered lifecycle phases are logically interconnected there are also possible overlaps in the presented categorization. It is very likely that other researchers would have chosen a different classification scheme. The presentation of the ECM drivers was further grounded in the academic literature on ECM. Note that the analysis of these literatures is not considered to be exhaustive. Finally, we only outlined the ECM drivers anticipated by the respondents. It will be interesting to see whether the implementation of ECM systems can hold the promise of realizing the expected benefits. Since this article is part of a larger research endeavor, future research will address many of these shortcomings.

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Further reading

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