Enterprise Content Management - A Literature Review

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ABSTRACT

Managing information and content on an enterprise-wide scale is challenging. Enterprise content management (ECM) can be considered as an integrated approach to information management. While this concept received much attention from practitioners, ECM research is still an emerging field of IS research. Most authors that deal with ECM claim that there is little scholarly literature available. After approximately one decade of ECM research, this paper provides an in-depth review of the body of academic research: the ECM domain, its evolution, and main topics are characterized. An established ECM research framework is adopted, refined, and explained with its associated elements and working definitions. On this basis, 68 articles are reviewed, classified, and concepts are derived. Prior research is synthesized and findings are integrated in a concept-centric way. Further, implications for research and practice, including future trends, are drawn.

Keywords

Enterprise Content Management, Literature Review, Research Framework, Content Management, Document Management, Knowledge Management.

INTRODUCTION

Huge amounts of content are produced at an increasing rate every year. The terms *information overload* and *content chaos* aptly describe the inefficient situation prevailing in many organizations (see vom Brocke, Simons, Cleven, 2011c). Employees, and especially information workers, search for documents and information in different repositories through the entire company. Documents are stored in different locations and systems, in different versions, languages and formats. Collaboration on documents and co-authoring is complicated; important documents are shared via email. The management of content on an enterprise-wide scale poses a challenge to companies. Even worse, unstructured data makes up 80% of the content (O'Callaghan and Smits, 2005). However, data and information quality of unstructured data is crucial because it contains important, innovative and decision-relevant information that is increasingly becoming a key business resource.

To solve the content chaos, enterprise content management (ECM) evolved as an integrated approach to information management (Päivärinta and Munkvold, 2005). ECM enables content to be managed on an enterprise-wide scale and has received a lot of attention from industry (Wiltzius, Simons, Seidel, 2011). The market for ECM is booming as more and more companies adopt it (vom Brocke et al., 2011c, p. 492). Commercial ECM solutions have become more sophisticated and executable over the years. However, ECM systems (ECMS) are not typically out-of-the-box; they are one of the most complex rollouts in an organization (vom Brocke et al., 2011c, p. 477).

In contrast to the significant attention from companies and practitioners, ECM only received little consideration from scholars. As an emerging field in information systems (IS) research, limited research has been conducted so far (Wiltzius et al., 2011). Most authors that deal with ECM claim that there is little academic literature available. After approximately one decade of ECM research and a slowly but steadily growing body of literature, this paper extensively reviews the current state of academic ECM literature. This in-depth review helps practitioners and scholars get started with the complex and multifaceted topic of ECM, shows the current state of the literature, and points out relationships. Further, research gaps and tendencies are shown and trends are forecasted. This paper seeks to answer the following research question:

      RQ: *What is the current state of ECM literature?*

Based on the recommendation of Webster and Watson (2002), the remainder of this paper is structured as follows: After explaining topic motivation and pointing out the paper's contributions in the introduction, the ECM domain is defined and further illustrated. Then, the underlying research design is presented together with the comprehensive literature search process and its boundaries. An established research framework for ECM is adopted, refined and explained together with its elements and working definitions. On this basis, the identified ECM research literature is reviewed and classified. Results of the review and main concepts are presented. A discussion of results and observations follows. Implications for further research and practice, including future trends, are drawn. Finally, a conclusion is provided with a short summary and outlook.

DEFINITION AND SCOPE OF ECM

About a decade ago the term ECM was introduced, although it is still not perfectly clear what lies beyond the concept. A single, fully acknowledged definition of what exactly ECM is and what it stands for does not exist (Grahlmann, Helms, Hilhorst, Brinkkemper, Amerongen, 2011). Moreover, the definition has evolved, which led to confusion and ambiguity (Smith and McKeen, 2003, p. 648). In the early years, the definition from the *AIIM* (*Association for Information and Image Management*) had a technical focus, but it was adapted to emphasize the importance of organizational aspects: "Enterprise Content Management (ECM) is 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." (AIIM website). From an academic point of view, Päivärinta and Munkvold (2005) concisely characterize it as an integrated approach to information management. A detailed discussion about the lack of consensus and a more comprehensive definition is given by Grahlmann et al. (2011).

ECM is a multifaceted topic emerging around several related and preceding disciplines. With an enterprise-wide scope, it combines and integrates several concepts that were previously separate IS research fields. Document management (DM) and electronic document management (EDM) were prevalent before the adoption of a more granular concept of content. For the work-intensive management of websites, web content management (WCM) was introduced. Standalone WCM solutions are still useful for sophisticated web projects. To manage knowledge assets of an enterprise, knowledge management (KM) and information management (IM) evolved. Business process management (BPM) and workflow management (WfM) support the execution of business processes and workflows. To ensure compliance and preserve static documents, records management (RM) is used for permanent storage. Rich media, such as audio and video files, is managed by digital asset management (DAM). These partly overlapping concepts and research areas all deal with content, documents, and information in some way. Due to the lack of integration and a rather limited scope of the systems (e.g. for single processes or departments), content silos were formed within enterprises.

Figure 1. Word Cloud of ECM IS Research Literature

To illustrate the topics and issues of ECM, a word cloud of ECM research literature was compiled. The literature that is reviewed within this paper was processed: First, the text of all articles that were available in digital form (more than 95%) was extracted and saved in plain text. Then, author information and the lists of references were removed and the text was converted to singular form and lower case only. For purposes of illustration, the abbreviation ECM was replaced by the full term. On this basis, the number of hits was generated. Words that occur more frequently appear larger. Finally, generic (e.g. *the*, *of*, *and* etc.) and gap-filling words (e.g. *however*, *also*, *first*, etc.) were removed from the cloud. The word cloud in Figure 1 shows the most relevant issues and topics in the literature for this research domain. The twenty most relevant words for ECM include: content (3762 hits), management (2263), information (1962), system (1955), process (1739), document (1445),

business (1312), organization (1205), research (1024), user (920), technology (801), knowledge (798), enterprise (754), service (689), data (611), application (609), implementation (547), record (533), access (506), and solution (505). ECM itself, with 3040 hits, was the second most frequent term after content.

RESEARCH DESIGN AND LITERATURE SEARCH PROCESS

With a coherent review of ECM research in the IS domain, this paper focuses on accumulating ECM knowledge. The underlying research design consists of two phases: the literature search process, and the systematic review of the relevant literature. The first phase focused on identifying the relevant academic ECM literature. The quality of literature reviews is strongly influenced by the literature search process (vom Brocke, Simons, Niehaves, Riemer, Plattfaut, Cleven, 2009, p. 1). To ensure methodological rigor, the recommendation of Webster and Watson (2002) were adhered and the search process was transparently documented according to the guidelines of vom Brocke et al. (2009).

Methodological rigor is particularly derived from validity and reliability (vom Brocke et al., 2009, p. 3). The validity of a literature search process is based on the selection of databases, publications, keywords, period covered, and the application of forward and backward search (Webster and Watson, 2002; vom Brocke et al., 2009, p. 3). Reliability aims at the replicability of the literature search (vom Brocke et al., 2009). It is necessary to comprehensively document the search procedure and transparently present it. The reader needs to know, how, where and to what extent the body of literature was combed.
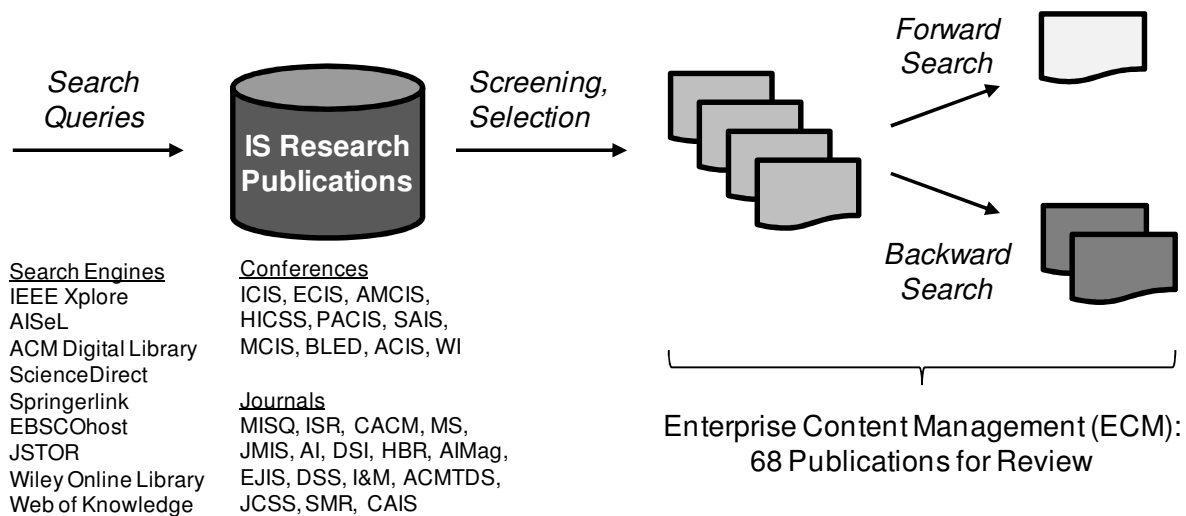

Search Queries → **IS Research Publications** → *Screening, Selection* → *Forward Search* / *Backward Search*

Search Engines
IEEE Xplore
AISeL
ACM Digital Library
ScienceDirect
Springerlink
EBSCOhost
JSTOR
Wiley Online Library
Web of Knowledge

Conferences
ICIS, ECIS, AMCIS, HICSS, PACIS, SAIS, MCIS, BLED, ACIS, WI

Journals
MISQ, ISR, CACM, MS, JMIS, AI, DSI, HBR, AIMag, EJIS, DSS, I&M, ACMTDS, JCSS, SMR, CAIS

Enterprise Content Management (ECM): 68 Publications for Review

Figure 2. Literature Search Process

The systematic literature search process, explored databases, and academic outlets are shown in Figure 2. Excerpts of the detailed documentation can be found in the appendix. In addition to a diligent search with nine scholarly search engines and within the journals stated above, an explorative search using Google Scholar was conducted. For all search queries, *Enterprise Content Management* OR *ECM* was used as keyword (exact phrase as search key). When possible, the search results were documented separately for hits in title, abstract, and full text. The time period considered was not narrowed down due to the youth of the ECM research field. To ensure that high-quality papers were identified, special care was taken to include high-impact journals according to the *AIS* ranking and well-known conferences. However, literature was not limited to these sources so that other outlets were considered on equal terms.

After approximately 900 potentially relevant articles were identified, the articles were screened and relevant ones were selected. To ensure a broad range of scientific articles, the screening was rather mild: it was based on title, abstracts and if necessary, a glance through the full text. All English academic articles that deal with ECM were included. Papers that were not in English (e.g. some Spanish, German and Chinese articles) and that did not deal with ECM as a central aspect were filtered out (e.g. *ECM* was found in the references or in an enumeration). To avoid biased literature, vendor papers and whitepapers were excluded. A forward and backward search was conducted based on the included articles (Webster and Watson, 2002). Articles identified by these approaches underwent the screening and selection processes. Finally, the list was narrowed down to 68 relevant articles.

In the second phase of the research design, the relevant literature was reviewed diligently. All papers were read in detail and analyzed using open and axial coding (Flick, 2006; Myers, 2009). An established ECM research framework was used to

classify the papers and the main concepts (Tyrväinen, Päivärinta, Salminen, Iivari, 2006) and working definitions were created (see next section). Within this deductive coding strategy, provisional codes based on the framework and prior research served as a starting point. Additional codes were generated inductively using axial coding after a critical mass of papers had been analyzed. These inductive codes (e.g. drivers/benefits) were used to refine the categories of the ECM research framework (see Figure 3).

All relevant literature was classified and categorized according to the specified categories (see Table 1 and 2 for results). To ensure objectivity, an additional researcher classified the articles independently according to abstracts and an inspection of the entire article. The categorization from the two sets of researchers exhibited significant conformity. In case of deviations, the particular classification was discussed until a consensus was reached. The classification was also verified by generating hit lists of the categories for each paper individually and a table was compiled with the count for each category and paper.

A FRAMEWORK FOR ECM RESEARCH

To stimulate and guide further research in the ECM field, Tyrväinen et al. (2006) introduced a framework with four perspectives: enterprise, content, processes, and technology. This framework is widely accepted and has been applied by numerous scholars. It was used for this review as well and was further refined based on the reviewed literature and the application of coding techniques. The resulting extended framework for ECM research (Figure 3) was elaborated with regard to the enterprise perspective and two further perspectives were added: drivers and potential benefits of ECM adoption, and ECM research itself.
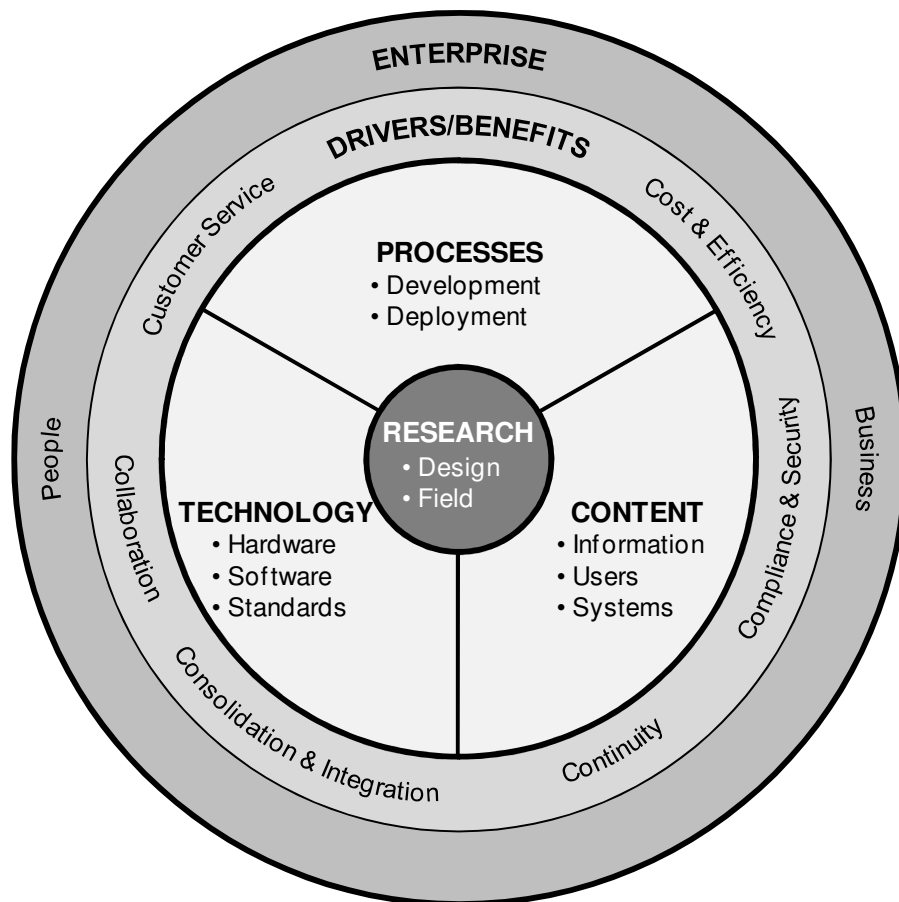
Figure 3. Extended Framework for ECM Research (based on Tyrväinen et al., 2006; vom Brocke et al., 2011c)

Working definitions

Based on prior ECM literature, working definitions are created to describe the research perspectives of the framework (Webster and Watson, 2002). For this purpose, Tyrväinen et al. (2006), Wiltzius et al. (2011), and Grahlmann et al. (2011) are used in particular, along with insights gained within the literature study. The working definitions follow subsequently:

Enterprise: The *enterprise perspective* provides the context and deals with organizational, social, legal, and business issues of content management (Tyrväinen et al., 2006). Two views can be distinguished within this perspective: the *business* and the *people view*. Business processes, economic, and commercial issues are the central topics of the business view. As a counterpart, the people view deals with organizational, cultural, political, social, and legal issues emerging around the stakeholders of the enterprise and in particular its employees. People-centric issues relate to groups, not individuals. Group behavior, adoption, cultural change, and change management are examples of the people view.

Drivers/Benefits: Closely related to the enterprise perspective are the *drivers/benefits* of ECM. The drivers and objectives of an ECM initiative can turn into benefits after successful implementation and adoption. However, drivers do not inevitably transform into benefits. The framework presented here covers six drivers and benefits which were extracted from academic literature (e.g. Usman, Muzaffar, Rauf, 2009) as well as practitioners' literature (e.g. AIIM case studies, white papers, and vendor brochures). *Cost/efficiency* aims at the reduction of costs and goes hand in hand with higher efficiency and productivity (e.g. streamlined processes). The need to confirm to rules (whether internal or external, e.g. Sarbanes-Oxley Act) and to ensure security of the ECMS (e.g. access rights) is addressed by *compliance/security*. *Continuity* (or business continuity) aims at the availability of important business processes and functions under all circumstances (e.g. disaster recovery). A homogeneous content management architecture and reduction of content silos are addressed by *consolidation/ integration*. *Collaboration* facilitates communicating and cooperation, or working together on tasks and associated content. *Customer service* covers new or better products or services for stakeholders that are not possible without ECM.

Content: While content is something contained in an entity, the *content perspective* includes three views: *information*, *user,* and *system view*. The information view deals with the representation and semantics of the content, which is in particular the clustering, granularity, ontology, taxonomy, and metadata. The relationship between the user and the content is represented by the user view. In contrast to the people view (enterprise perspective), the user view focuses on the interaction between the user and the system, but not on interaction among users. It includes the usage of the content, personalization, and the resulting information needs. The system view deals with the containers in which the content resides. It is closely related to the technology perspective, but is more abstract and less specific in technical aspects. A system implements several base technologies and interacts with its users. The system view specifies functionalities of an ECMS and deals with abstract architectures and business-driven models, rather than with specific ECM solutions or technologies.

Processes: Because the *process perspective* is not specified clearly in ECM research, its meaning is ambiguous. The term processes represents ECM processes that can be defined as activities that build and implement an ECMS. This does not mean describing the ECMS itself, but the process of its development. The ECMS is the outcome of the development and is dealt with in the system view. The *development view* deals with the process of conception, implementation and maintenance of ECMS and is closely related to change management. The *deployment view* includes the implementation of content life-cycle activities, the process of ECMS basic configuration, and the procedure of embedding it into the enterprise.

Technology: Dealing with base technologies, the *technology perspective* includes three views: *hardware*, *software*, and *standards view*. Typical topics for the hardware view include specific servers, clients, networks, and mobile devices used in an ECMS. The software view deals with actual software solutions of software vendors, whether open source or proprietary. This category includes executable and deployable software solutions, but excludes prototypes and pure concepts of software. The standards view deals with established specifications that concern ECM on a technical level. These include for instance the *Extensible Markup Language* (*XML*) and *Content Management Interoperability Services* (*CMIS*), which can be used for a technical perspective on prototypes and software frameworks.

Research: The *research perspective* deals with ECM as an IS *research field* and the underlying *research design*. The research field deals with ECM as a research issue and not with ECM as a topic. Thus, topics are not about the management of content, but rather about ECM literature and research on a meta level (e.g. creating one's own concept or definition and not reusing an existing one). The research design deals with the (main) underlying research method. This paper, for example, deals exclusively with ECM as an emerging IS research field and reviews existing scientific literature. Even though this paper deals with or at least touches on every topic in the extended framework for ECM research, the focus lies on the research perspective.

LITERATURE REVIEW

The reviewed literature is categorized according to the extended framework for ECM research (see Figure 3). In order to classify the articles accurately into the categories, a notation with three different degrees of intensity is used: major (X), minor (●), and marginal (•). Major intensity indicates that a paper mainly deals with a specific topic; minor is used if certain sections or paragraphs are about it; marginal indicates that the paper only slightly mentions a topic. The following tables show the results of the classification:

	ENTERPRISE		PROCESS		CONTENT			TECHNOLOGY			DRIVERS/BENEFITS						RESEARCH	
	People	Business	Development	Deployment	Information	Users	Systems	Hardware	Software	Standards	Collaboration	Costs/Efficiency	Compliance/Security	Customer Service	Continuity	Consolidation/Integration	Field	Design
Nordheim 2006	X	·	X	·	·	●	●		●		●		·			●	●	Case Study Research
Munkvold 2006	X	·	●		X	●	●		●		X		●			●	X	Case Study Research
Munkvold 2003	X	·	●		X	●	·		●		X		●			●	●	Case Study Research
Nguyen 2008b	X	·	●	·		·	●					·	●				·	Literature Review
Bridges 2007	X	·	·	●	●	·	·					·	●			·		Argumentative
Zelko 2007	X	·	●		·						●	·	●		●			Conceptual Research
McNally 2010	X	·			·	●	●		·		·	●	·					Conceptual Research
Vom Brocke 2010a	X	·			·	·					·	●	·				X	Conceptual Research
Vom Brocke 2010b		X		·			●					X	·					Conceptual Research
Arshad 2010		X	●		X		·				●	·	·	·		●	·	Conceptual Research
Wang 2006	·	X	·		●		X			●	●	·	·	·		·		Conceptual Research
Vom Brocke 2008a	●	X	·	X	●		●		·			●	·			·	·	Conceptual Research
Vom Brocke 2011c	●	X	·	X	●	·	●		·		·	●	·	·		·	X	Conceptual Research
Iverson 2007	●	X	·	·	X	●	●				●	●	●			·	·	Conceptual Research
Kunstova 2010b	●	X		·	·		●				●	●						Survey (quantitative)
Grahlmann 2010	●	X		●	·	·	X				·	·	●	·				Case Study Research
Vom Brocke 2011b	●	X		·	X		·				●	●	●	·		·		Case Study Research
O'Callaghan 2005	·	X	·	●	X	·	●	·	·		·	●	·			·		Case Study Research
Usman 2009	·	X			·		●		●		●	●	●	●		·	·	Literature Review
Alalwan 2011	·	X	●		●	●	·					·					·	Argumentative
Allen 2007		X					·					X	·	·				Argumentative
Sprehe 2005	·	·					·					X	X		·	·		Case Study Research
Vom Brocke 2008d	·		●	·	X		·				·	·	·				X	Teaching Cases
Vom Brocke 2008c		●		·	X	●	·				·	·	·			·		Case Study Research
Vom Brocke 2008b		·	●	●	X		●				·	·	·	·				Case Study Research
Aleksy 2006					X	·	·			·			·					Argumentative
Blair 2004	·	●			X		·						·					Argumentative
Andersen 2008	●	·			X	X	●		●	●	●	·	·			·		Conceptual Research
Fowell 2002	●	·			X	●	·									·	●	Argumentative
Korsvik 2010	●	●		●	X	●	●		●			●	X					Case Study Research
Päivärinta 2005	●	●	●	·	X	·	●	·	·		●	●	●	·		X	●	Conceptual Research
Tyrväinen 2006	●	·	●	·	X	●	X	·	·	·							X	Conceptual Research
Smith 2003	●	·	●		X		●		·			●	·	·		·		Focus Group
Zardini 2011	●	·	·		X		·				·	●				●		Action Research
McNay 2002			●	·	X	·	●	·	●	·	·	●			·			Conceptual Research

Table 1. Classification of Reviewed ECM Articles (I/II)

	ENTERPRISE		PROCESS		CONTENT			TECHNOLOGY			DRIVERS/BENEFITS						RESEARCH	
	People	Business	Development	Deployment	Information	Users	Systems	Hardware	Software	Standards	Collaboration	Costs/Efficiency	Compliance/Security	Customer Service	Continuity	Consolidation/Integration	Field	Design
Kuechler 2007				•	X		●	•	•	•			●			●		Conceptual Research
Zykov 2007			●	•	X		•			•		•						Conceptual Research
Erickson 2008	●				X		•										●	Conceptual Research
Scott 2011	●				•	X	•				•	●	•	•				Survey (quantitative)
Wiltzius 2011	●	•	●		●	X	●		•		•	•	•	•		•	•	Survey (qualitative)
Scheepers 2006	●		X	•	•	X	●	•			•	●	•			•		Case Study Research
Grahlmann 2011	•		•		•	•	X				•						X	Case Study Research
Nordheim 2004	●	●	•	X	•	●	X		●		•	•				●		Case Study Research
Scott 2004	●	•	X	•	●		X	•	•	•	●	X			•	•		Case Study Research
Podean 2011	●		●		●	●	X		•	●	X	•						Conceptual Research
Dilnutt 2006b		•			●		X		•		●	•	●	•		•		Conceptual Research
Gromoff 2011	●	●	●		•		X					•	•					Survey (exploratory)
Kunstova 2010a					•	•	X		•	●	•	●	●	•	•	●	•	Survey (quantitative)
Nunn 2008			•		•		X					•	●					Argumentative
Reimer 2002		●			●		X			●	•	●	•		•	●	•	Argumentative
Dilnutt 2006a	•	•			•		X		●	•	●	•	●	•		●		Conceptual Research
De Carvalho 2007			•	•	●	•	X	•	●	●		●						Conceptual Research
Wagner 2008		•	•				X	•	•	•			X					Conceptual Research
Nguyen 2007		•					X		•			•	X		•	•		Argumentative
Nguyen 2008a			•				X		●				X					Survey (exploratory)
Jichen 2009		•					X		●	X						•		Prototyping
Wu 2007					●	●	X			X	•							Conceptual Research
Kwok 2004		•	•		●	●	X		•	X		●	●			●		Conceptual Research
Chieu 2008b		•	●		●	•	X	•	●	X			•			•		Prototyping
Chieu 2008a		•	●		●	•	X	•	●	X			•			•		Prototyping
Chiu 2005	•				●	●	X	•	•	X			X					Case Study Research
Pong 2011	•	•	●	•		•	●		X	•	•	●	●			•		Case Study Research
Banks 2009	•		•		•	•	●	•	X	•	X							Prototyping
Chieu 2007			●		●	•	●		•	X			●					Prototyping
Tyrväinen 2003																	X	Introduction
Salminen 2005																	X	Introduction
Päivärinta 2004																	X	Introduction
Vom Brocke 2011a																	X	Research Agenda
Total (≠0)	41	46	37	26	56	36	62	13	34	23	35	46	48	15	7	31	27	Notation: Major X 3 / Minor ● 2 / Marginal • 1
Total (Weighted)	78	79	63	37	119	59	131	13	53	44	56	76	78	16	8	44	52	

Table 2. Classification of Reviewed ECM Articles (II/II)

As shown above, the papers are not ordered by the name of the first author or the year of publication, but in a concept-centric way (Webster and Watson, 2002). The papers are grouped with respect to the ECM research perspectives and views they cover. By using a manual cluster analysis, similar papers are arranged close together. Thus, relationships and coherencies between the papers can be recognized and main concepts can be derived from the clusters. Papers with enterprise-centric issues are arranged at the top, followed by papers that address the content perspective, technical approaches, and finally papers about the ECM research field. The seven concept-centric clusters are: people-centric (8 papers), business-centric (14), information modeling (16), user-centric (3), ECMS (20), technical approaches (3), and research field (4).

With regard to the traditional ECM research perspectives (see Tyrväinen et al., 2006), an order of significance can be identified from the tables above. In particular, each paper (64), except of the four (4) papers about the research field, deals with the content perspective in some way, either with regard to information, user, or system views. Numerous (54) of the reviewed papers deal with the enterprise perspective. The technology perspective is addressed by 40 papers and the process perspective of ECM by 45 papers. These figures indicate whether a paper somehow deals with a perspective, but do not reveal how intensively the paper treats the topic. Taking into account the degree of intensity by calculating the weighted sum (major/minor/marginal) instead of the quantity, few papers mainly deal with the ECM process perspective. Due to space limitations, the intensity is not considered further here. Almost all papers (62) mention or deal with at least one ECM driver or benefit. The ECM research field itself is addressed by 27 papers.

The content perspective is considered most frequently: Almost every paper deals with the system (62) and with the information view (56). The user view is considered less often. Approximately every second paper (36) takes the user of ECMS into account. Within the enterprise perspective, the business view is considered slightly more often (46) than the people view (41). Two of three papers deal with the business view and more than every second one deals with the people view. With regard to the technology perspective, the software (34) and the standards view (23) are the focal point, while the hardware view (13) is considered less often. Every second paper somehow deals with the software view, however, the topic usually plays a minor role within the papers. Concerning the process perspective, the development view received more attention from scholars than the deployment view. With 37 papers, approximately every second paper deals with the development view and 26 papers deal with the deployment view.

The two most important drivers found in the reviewed literature are cost/efficiency and compliance/security. More than two-thirds of the papers name those drivers. In every second paper, collaboration is mentioned as an ECM driver. Consolidation/integration is an important driver, while customer service and continuity have less relevance.

The most often identified research method is conceptual research (23), followed by case study research (16). Further methods applied include argumentative approaches (9), surveys (6), prototyping (5), and others (9). A connection between the research method and the classification can be recognized. While conceptual and case study research is applied for papers dealing with the enterprise perspective, prototypes are used for more technical approaches.

DISCUSSION

A variety of academic sources were searched for ECM literature to gain a comprehensive, in-depth insight into the current state of the research field. To ensure a multifaceted spectrum of authors and opinions, the screening of the literature was mild. In total, 68 articles were identified as relevant and reviewed. As a broad range of different scientific articles was chosen, the reviewed literature is diverse: in length, focus, and in its research contribution. Although some papers lack scientific background, several made an important contribution to IS research. However, ECM as a research topic has not yet reached the highest academic outlets and conferences are the main source of ECM literature. This review supports prior findings that indicate that ECM research is still in an immature state (vom Brocke, Derungs, Herbst, Novotny, Simons, 2011b, p. 10) and includes a small body of literature (Grahlmann et al., 2011, p. 2).

Two limitations have been identified for this research: Since ECM research is still relatively young, it lacks consistent and well-accepted definitions (vom Brocke et al., 2011c, p. 493). ECM as a concept and research field is still evolving, therefore definitions are not final. Accordingly, the definitions in this paper are labeled as working definitions and do not claim to be final. Further, there is no guarantee that some relevant articles were not found or considered, even though the search process was exhaustive. There were no boundaries with regard to the time period. However, there is a thematic restriction to the ECM domain. Due to this restriction, EDM articles that did not explicitly address ECM were excluded. Important contributions to the EDM domain were made by Sprague, Päivärinta, Tyrväinen, Karjalainen/Honkaranta, and Salminen to name a few. Because EDM is one of the closest ancestors of ECM (Päivärinta and Munkvold, 2005), researchers who are conducting ECM research should be aware of it.

This review supports previous findings that ECM literature mainly deals with constructive studies, conceptual ideas and frameworks, and technological functionalities (Nordheim and Päivärinta, 2006; Usman et al., 2009). In other words, it addresses technological issues and functionalities or investigates the application of ECM in an organizational context, often by conducting a case study (Grahlmann et al., 2011, p. 4). Due to the youth of the ECM research field, the diversity of the research methods applied is rather limited; explorative results were produced and little quantitative work has been carried out. Moreover, many reviewed articles do not explicitly mention the research method employed.

A classification was conducted according to the extended ECM research framework. To motivate ECM research with regard to people-centric and business-centric issues, the enterprise perspective now consists of two views. In addition to that, drivers and objectives were added. The review pointed out that the content perspective is dealt with the most, followed by the enterprise perspective. The process and the technology perspective received less attention, which supports previous findings from Tyrväinen et al. (2006) and Grahlmann et al. (2011). Concerning the main topics of the papers, several core themes were disaggregated and seven clusters were formed. Some papers have a rather practical focus and technological view, while others take content aspects and the organizational context into account and put more emphasis on theoretical IS research.

IMPLICATIONS FOR FURTHER RESEARCH

In order to form an integrated body of literature, further research must be conducted. The extended framework for ECM research can be used to guide future research. Based on the framework, the review of ECM literature and its classification, research gaps and research directions were identified.

With regard to the process perspective, a comprehensive reference model for the implementation of ECM is needed. It can include the integration of multi-product ECM solutions as proposed by Grahlmann et al. (2011). In the course of the implementation, content needs to be structured and modeled. Numerous authors emphasize the importance of corporate taxonomy and metadata. Therefore, detailed guidelines that are generally applicable to the ECM domain seem to be useful. Further, the operation of ECMS must be investigated. Validated research about the operation of already implemented systems that goes beyond vendor reports, lessons learned and case studies is necessary.

Even though hardware barely received attention from scholars, there is little need for further research since technology appears not to be a critical success factor to ECM adoption (see also Tyrväinen et al. (2006, p. 630)). In cloud-based ECM and multi-tenancy contexts, however, hardware and performance are relevant factors. Nevertheless, there is need for research concerning social and organizational issues. ECM goes beyond content management as a plain technical concept. In particular, ECM research has to pay more attention to the user of ECMS, user acceptance and critically examine the impact of ECM on employees.

Because little quantitative research has been conducted, there is a need to validate ECM benefits empirically and quantitatively. While bottom-up approaches often focus on immediate benefits (e.g. cost reductions), other less tangible benefits (e.g. better decision making) are part of a top-down vision (Smith and McKeen, 2003, p. 650). A framework for monetary evaluation of ECM success and impact beyond simple ROI calculations that includes long-term benefits is necessary.

In addition to the drivers mentioned above, other drivers should be considered in the future. These include: consistency, content quality, and content intelligence. For this review, rather broad categories were used (e.g. compliance/security). For a quantitative measurement of benefits, a fine-grained categorization is useful. Due to limited scalability of manual clustering approaches, the use of automated or semi-automated clustering seems promising for further investigations. Moreover, a different sorting and clustering of the reviewed literature (see Table 1 and 2) can provide additional insights. For example, the reviewed literature arranged in a chronological order can describe the evolution of ECM research. Further, a sorting according to the employed research design is another useful option.

Studies that discuss ECM as a research field and not the management of enterprise content are needed. A homogenization and establishment of widely acknowledged definitions is necessary and can help to distinguish ECM from related research areas. In future research, the terms business processes and (ECM) processes have to be distinguished more clearly and consistent terminology has to be established.

IMPLICATIONS FOR PRACTICE AND TRENDS

More and more companies are in the process of adopting or already have adopted ECM. Commercial solutions are maturing and becoming more advanced. A number of trends will influence the ECM market in the future: As cloud solutions are popular nowadays, some content and ECM services will be moved into the cloud, whether a public, hybrid or private one. Cloud content management is supposed to be scalable and cost-efficient and enables another trend: mobile devices in the ECM context. Due to more sophisticated mobile devices and faster cellular networks, enterprise content can be available

from everywhere at anytime. A trend that is already present to a certain extent is enterprise social networking. It has the potential to connect content, knowledge and expertise to people. Further, rather content-centric trends in ECM are: the management of big data and big content (e.g. videos), the combination of structured and unstructured data, and content intelligence. In addition to the practical application of ECM trends, IS research needs to be aware of the trends and conduct targeted research.

CONCLUSION AND OUTLOOK

This review of ECM research literature synthesizes and summarizes prior research and integrates the findings in a concept-centric way. A total of 68 articles were reviewed and classified from a neutral perspective. The ECM domain was characterized; main topics and concepts were derived. An established framework for ECM research was adopted, refined and explained together with working definitions. Further, implications for research and practice were drawn.

The current state of ECM research is still premature. The body of literature of this emerging research field is small, but steadily growing. Further targeted research needs to be conducted: There is little need for technical approaches, but rather for more research focusing a detailed reference model, ECM processes, the enterprise perspective and users of ECMS. In general, more quantitative work is required. Based on this paper, more extended discussions can follow and a more detailed research agenda can be created.

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APPENDIX

#	Journal Name	Database	Hits (in Field)			Relevant
			Title	Abstract	All	
1.	MIS Quarterly	Journal Homepage	0	1	/	0
2.	Information Systems Research	Informs	0	0	0	0
3.	Communications of the ACM	ACM Digital Library	/	/	1	1
4.	Management Science	Informs	0	0	0	0
5.	Journal of Management Information Systems	MetaPress	0	0	0	0
6.	Artificial Intelligence	ScienceDirect	0	0	0	0
7.	Decision Science	Wiley Online Library	0	0	0	0
8.	Harvard Business Review	Journal Homepage	0	0	2	0
9.	AI Magazine	AAAI	0	0	1	0
10.	European Journal on Information Systems	Palgrave Journals	3	/	17	4
11.	Decision Support Systems	ScienceDirect	0	0	1	0
12.	Information & Management	ScienceDirect	0	0	2	0
13.	ACM Transactions on Database Systems	ACM Digital Library	0	0	0	0
14.	Journal of Computer and System Science	ScienceDirect	0	0	0	0
15.	Sloan Management Review	Journal Homepage	/	/	0	0
16.	Communication of the AIS	AISeL	1	1	5	2
			4	**2**	**29**	**7**

Table 3. Relevant ECM Literature in IS Journals

Acronym	Conference Name	Since Year	Hits (in Field)			Relevant
			Title	Abstract	All	
ICIS	International Conference on Information Systems	1994	0	0	3	0
ECIS	European Conference on Information Systems	2000	5	3	9	5
AMCIS	Americas Conference on Information Systems	1997	0	1	8	2
HICSS	Hawaii International Conference on System Science	1995	9	/	15	9
PACIS	Pacific Asia Conference on Information Systems	1993	0	0	4	0
SAIS	Southern Association for Information Systems	2004	1	1	2	1
MCIS	Mediterranean Conference on Information Systems	2006	0	0	0	0
BLED	Bled eConference	2001	0	1	4	2
ACIS	Australasian Conference on Information Systems	2001	0	1	6	4
WI	International Conference on Wirtschaftsinformatik	1999	0	1	5	1
			15	**8**	**56**	**24**

Table 4. Relevant ECM Literature in Proceedings of IS Conferences

Database/Search Engine	Hits			Relevant
	Title	Abstract	All	
IEEE Xplore Digital Library	13	22	164	18
AISeL	11	13	62	16
ACM Digital Library	20	49	163	13
ScienceDirect	2	3	87	1
Springerlink	11	16	227	7
EBSCOhost/Business Source Premier	1	2	2	1
JSTOR	0	1	6	0
InterScience/Wiley Online Library	0	36	42	1
Web of Knowledge/Science	26	/	55	17
	84	**142**	**808**	**74**

Table 5. Relevant ECM Literature Found in IS Databases

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