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Enterprise content management research: a comprehensive review

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Abstract

Purpose – The purpose of this paper is to provide a comprehensive literature review of enterprise content management (ECM) research, a conceptual framework of areas of concern regarding ECM, and an agenda for future ECM research, based on the review and conceptual framework.

Design/methodology/approach – To gain an understanding of the ECM literature, a structured research approach is adopted, consisting of two phases. The first phase consists of identifying the relevant ECM research papers. In the second phase, the analysis phase, the current ECM research is categorized based on three structural pillars: system component dimensions, system lifecycle, and strategic managerial aspects.

Findings – After a review and classification of 91 ECM publications, it is found that ECM involves several sophisticated and interacting technical, social, organizational, and business aspects. The current ECM literature can be grouped around three main pillars: the first pillar consists of the four ECM component dimensions (tools, strategy, process, and people). The second pillar is the enterprise system lifecycle (adoption, acquisition, evolution, and evaluation). The final pillar is the strategic managerial aspect (change management, and management commitment). Based on the review and a proposed conceptual framework, an agenda for future research around the aforementioned three pillars is suggested.

Originality/value – There is a lack of ECM meta-analysis research that explains the current state of the field. This paper contributes to information systems research by describing and classifying the published literature in ECM and by pointing out the gaps where further research is most needed. Furthermore, the paper provides a framework that may provide a conceptual structure for future studies.

Keywords Organizations, Information management, Enterprise content management, Research work, Review, Meta-analysis, Framework

Paper type Literature review

1. Introduction

All organizations create, classify, and archive information for it to be accessible when needed. The number of physical and virtual information artifacts created and stored in today's business world is increasing exponentially, including rapidly escalating unstructured content in organizations. Some studies show the rate of increase in the unstructured content to be in the order of 800 MB per person per year (Gingell, 2006). As estimated by the Gartner Group, 75-80 percent of an organization's data are unstructured and not in a standard format that can easily be retrieved when needed (O'Callaghan and Smits, 2005). "It is estimated that unstructured content is growing at anywhere between 65 percent and 200 percent per annum depending on the industry sector" (EMC Corporation, 2006, p. 5). This escalation in unstructured content has caused the emergence of different content management platforms that support various applications (Tramullas, 2005). To deal with the increasing information overload and with the structured and unstructured data complexity, many organizations have implemented enterprise content management (ECM) systems. ECM is a term that

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was coined by AIIM International and is now widely used by vendors and users (Blair, 2004).

There is some confusion as to the precise definition of the term ECM. Smith and McKeen (2003) define it as "the strategies, tools, processes and skills an organization needs to manage all its information assets regardless of type over their lifecycle." The ECM Association (AIIM International) defines ECM as "the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists[1]." According to Gartner, ECM includes the following core components: document management, web content management, records management, document imaging, document centric collaboration, and workflow (Woolley and Fletcher, 2007). ECM is also defined as "the technology that provides the means to create/capture, manage/secure, store/retain/destroy, publish/distribute, search, personalize and present/view/print any digital content" (Munkvold *et al.*, 2006, p. 71). Despite these definitional differences, there seems to be consensus on ECM processes (i.e. activities involved with ECM). Many researchers view ECM as the evolution of document management, records management, workflow (business process) management, and web content management systems (CMS) that started in the 1980s.

ECM can be viewed as an evolution of information management that involves the management of structured and unstructured content through the complete content lifecycle (Boiko, 2002). ECM allows organizations to simplify heterogeneous data and process structured, and unstructured information (O'Callaghan and Smits, 2005). There is a fairly consistent perception among researchers that ECM is not only a practical set of technologies but also includes organizational concepts that involve various business perspectives (Blair, 2004; Munkvold *et al.*, 2006; Tyrväinen *et al.*, 2006; vom Brocke *et al.*, 2009). Rockley (2006) reported that one of the main goals of ECM implementation is to have transparent content sharing by making different and disparate applications (e.g. web content management, records management) interoperable. By having shared transparent content that facilitates cross department collaboration, the capturing of knowledge and content can be made easier (Jenkins, 2004). In this regard, many researchers believe that ECM overlaps with knowledge management (KM); Duffy (2001), Lee and Hong (2002), and Carvalho and Ferreira (2001) suggest ECM as one type of KM. Some researchers consider ECM a subfield of KM (Nordheim and Paivarinta, 2006), or consider ECM as one tool among KM tools. Tyndale (2002) defines KM tools as the tools that "promote and enable the knowledge process in order to improve decision-making"; he mentions the following as some examples of KM tools: intranet, content management, document management, and web portals.

Though the increased use of ECM makes it an important topic for information systems (IS) research (Päivärinta and Munkvold, 2005), the ECM field lacks meta-analysis research that explains the current state of the field. Though there have been a few ECM reviews (Tyrväinen *et al.*, 2006; Usman *et al.*, 2009), these reviews were not comprehensive. Comprehensive literature reviews are valuable (Saunderlin, 1994), as they help researchers determine where there is particular need for further investigation, and such reviews may point to specific problems in earlier studies. Literature reviews also help researchers in developing theoretical frameworks that can help structure future studies. Thus this paper has three objectives: first, to provide a comprehensive literature review of ECM research, second, to develop a conceptual

framework of areas of concern regarding ECM, and finally, to suggest an agenda for future research based on the review and the conceptual framework.

The rest of this paper is arranged as follows. The identification and selection of relevant ECM publications is described in Section 2. In Section 3 the selected publications are analyzed in conjunction with the development of a conceptual framework. Next, in Section 4, a future research agenda for ECM investigations is proposed. The paper concludes with final remarks in Section 5.

2. Identification of relevant ECM publications

To gain a good understanding of the ECM literature, a structured approach consisting of two phases is adopted. The first phase consists of searching for and selecting relevant ECM research papers. In the second phase, the current ECM research is analyzed and categorized based on three structural pillars: system component dimensions, system lifecycle, and strategic managerial aspects.

To make the review as comprehensive as possible, journal papers, conference papers, book chapters, as well as books are included in the review. We used the library web site of a large research institution and Google Scholar. The review is restricted to published research in ECM only, i.e. research that was identified by the researchers as ECM, thus keywords used include enterprise content management and ECM. The search was conducted in March 2011. Initially 3,360 publications (excluding patents) were identified. After refining the search to include only English language publications and to exclude citations, the number of publications was reduced to 1,740. After scanning through these, many additional papers were excluded because ECM was not the main topic of the paper; the paper was written by an ECM vendor and discussed the documentation and specification of a specific ECM system; they were practitioner directed papers; or the acronym "ECM" referred to something other than ECM. In all, 91 publications finally remained for this review.

Table I lists the 91 reviewed publications, their authors, publication type, the methodology used, and the ECM dimension (as defined in this paper). Publication types are journal papers, conference proceedings (including workshops and symposia), books, book chapters, and academic theses or dissertations. Methodology applied in the papers is classified as case study research, theoretical or conceptual (i.e. the study is based mainly on literature and has no empirical testing), archival (i.e. study is based on ECM documentations), survey (Piccolo and Ives, 2005), descriptive (i.e. the study describes the ECM system or its impact), design science (i.e. the study reports on the design and evaluation of an artifact), and mixed methods (i.e. any combination of the previously listed methods). ECM dimensions used for classification are tools (i.e. technology related to ECM), strategy (e.g. investment justification, implementation planning, stakeholders identification), process (e.g. ECM deployment), and people (e.g. training, stakeholder involvement) (Vom Brock, 2010a,b; Tyrväinen *et al.*, 2006; Smith and McKeen, 2003; Salminen *et al.*, 2005; O'Callaghan and Smits, 2005).

Microsoft Excel was used to tabulate and analyze the results. Table II shows the number of publications by publication type.

The dates for the ECM publications in this literature review range from 2001 to 2011. The graph in Figure 1 shows the distribution of the papers by year. Except in 2006, 2009, and 2011, the trend for ECM publications is increasing. The perceived decrease of ECM publications for 2011 is misleading, as only the first quarter of the year (January through March) was included.

No.	Authors	Publication type	Methodology	ECM dimension
1	Alalwan and Weistroffer (2011)	Conference	Theoretical	Strategy
2	Allen (2008)	Book	Descriptive	Strategy
3	Arshad *et al.* (2010)	Conference	Theoretical	Strategy
4	Asprey and Middleton (2003)	Book	Descriptive	All
5	Aziz *et al.* (2010)	Conference	Design science	Tools
6	Banks *et al.* (2009)	Conference	Descriptive	Tools
7	Bawazir and BenSeddeek (2007)	Conference	Descriptive	Tools
8	Befa *et al.* (2010)	Book chapter	Descriptive	Tools
9	Benevolo and Negri (2007)	Journal	Survey	Tools
10	Bianco and Michelino (2010)	Journal	Case study	Tools strategy people
11	Broadbent (2009)	Master's thesis	Archival study	Tools
12	Burlaca (2003)	Journal	Descriptive	Tools
13	Carvalho (2008)	Book chapter	Descriptive	Tools
14	Chao and Luo (2009)	Journal	Design science	Tools
15	Chieu and Zeng (2008)	Journal	Design science	Tools
16	Chieu *et al.* (2007)	Conference	Design science	Tools
17	Chieu *et al.* (2008)	Conference	Design science	Tools
18	Chiu and Hung (2005)	Conference	Case study	Tools processes
19	Chiu *et al.* (2010)	Journal	Case study	Tools
20	Dilnutt (2006a, b)	Journal	Descriptive	Tools
21	Eden (2008)	Book	Case study	All
22	Fennell (2007)	Journal	Case study	Process
23	Fisher and Sheth (2004)	Book chapter	Design science	Tools
24	Fowell (2002)	Book chapter	Theoretical	Strategy
25	Fowler (2008)	Master's thesis	Archival	Tools
26	Goings *et al.* (2007)	Journal	Case study	Strategy
27	Hopkins (2009)	Conference	Case study	Process
28	Iverson and Burkart (2007)	Journal	Theoretical	Strategy
29	Jenkins (2004)	Book	Descriptive	All
30	Jinwen and Jianguo (2003)	Journal	Descriptive	Tools
31	Joha and Janssen (2010)	Journal	Case study	Strategy
32	Junco and Bailie (2004)	Conference	Case study	Process
33	Kelley (2002)	Book	Descriptive	All
34	Koidl *et al.* (2009)	Conference	Descriptive	Tools
35	Koo (2008)	Book chapter	Descriptive	Tools
36	Korb and Strodl (2010)	Conference	Descriptive	Strategy
37	Krechel *et al.* (2006)	Symposium	Descriptive	Tools
38	Kun *et al.* (2009)	Journal	Descriptive	Tools
39	Kunstova (2010)	Journal	Survey	Strategy
40	Kwok and Chiu (2004)	Conference	Combined (descriptive and theoretical)	Tools processes
41	Laleci *et al.* (2010)	Journal	Design science	Tools
42	Liu *et al.* (2007)	Journal	Descriptive	Tools
43	Malik (2010)	Book chapter	Descriptive	Tools
44	Math (2005)	Conference	Descriptive	Strategy
45	Mauthe and Thomas (2004)	Book	Descriptive	All

Table I.
List of ECM publications

(*continued*)

No.	Authors	Publication type	Methodology	ECM dimension
46	McNay (2002)	Conference	Descriptive	Tools
47	Mega *et al.* (2005)	Conference	Descriptive	Tools
48	Meike *et al.* (2009)	Journal	Descriptive	Tools
49	Munkvold *et al.* (2006)	Journal	Case study	Tools strategy people
50	Naak *et al.* (2008)	Conference	Descriptive	Tools
51	Naak *et al.* (2009)	Book chapter	Descriptive	Tools
52	Naik and Shivalingaiah (2009)	Conference	Archival	Tools
53	Nath and Arora (2010)	Conference	Case study	Tools
54	Nguyen *et al.* (2007)	Conference	Archival study	Tools
55	Nordheim and Paivarinta (2004)	Conference	Case study	Tools processes
56	Nordheim and Paivarinta (2006)	Journal	Case study	Processes
57	Norrfors (2007)	Master's thesis	Survey	Tools strategy
58	Obermier (2006)	Journal	Descriptive	Strategy
59	O'Callaghan and Smits (2005)	Conference	Design science	Strategy processes
60	Pachet (2003)	Journal	Case study	Tools strategy
61	Päivärinta and Munkvold (2005)	Conference	Case study	Tools strategy people
62	Pérez-Montoro (2011)	Book chapter	Theoretical	Tools
63	Pullman and Baotong (2008)	Journal	Theoretical	strategy
64	Reimer (2002)	Journal	Descriptive	Tools
65	Rockley *et al.* (2002)	Book	Descriptive	All
66	Saslaw (2009)	Master's thesis	Combined	Tools
67	Scheepers (2006)	Journal	Case study	Strategy processes
68	Scott (2011)	Conference	Survey	People
69	Smith and McKeen (2003)	Journal	Combined	Strategies tools
70	Souer *et al.* (2008)	Journal	Design science	Tools strategy
71	Sprehe (2005)	Journal	Case study	Tools strategy
72	Talloju (2007)	Master's thesis	Survey	Tools
73	Taylor (2004)	Journal	Descriptive	Strategy
74	Tyrväinen *et al.* (2006)	Journal	Theoretical	All
75	Usman *et al.* (2009)	Conference	Theoretical	Tools strategy
76	Vitari *et al.* (2006)	Journal	Combined	Tools strategy
77	vom Brocke and Simons (2008)	Conference	Design science	Tools strategy
78	vom Brocke *et al.* (2008b)	Conference	Design science	Tools strategy
79	vom Brocke *et al.* (2008c)	Conference	Design science	Tools
80	vom Brocke *et al.* (2008a)	Conference	Design science	Process
81	vom Brocke *et al.* (2009)	Journal	Design science	Process
82	vom Brocke *et al.* (2010b)	Conference	Theoretical	Strategy
83	vom Brocke *et al.* (2010a)	Book chapter	Design science	Strategy
84	Wagner *et al.* (2008)	Conference	Descriptive	Tools
85	Xin-qiang (2010)	Journal	Descriptive	Tools
86	Yan and Wu (2008)	Book chapter	Descriptive	Tools
87	Yu (2005)	Book	Case study	All
88	Zardini *et al.* (2010)	Conference	Case study	Strategy
89	Zhang *et al.* (2010)	Conference	Descriptive	Tools
90	Zhang and Zhongfan (2001)	Journal	Combined (descriptive and theoretical)	Tools
91	Zykov (2006)	Workshop	Combined (theoretical/ design science)	Tools process

Table I.

Of the 33 journal papers as shown in Table III, three appeared in *Communications of the Association for Information Systems*, two appeared in the *European Journal of Information Systems*, and one appeared in *Communications of the ACM*. Many of the journals are not IS journals, which leads to the conclusion that IS researchers have only started to show interest in the ECM field. The 35 conference papers included two workshop paper and one symposium paper. Six of the others were presented at the Hawaii International Conference on Systems Sciences (HICSS), three at the Australian Conference on Information Systems (ACIS), and two at the European Conference on Information Systems (ECIS). With regard to research methodology, one-third of the publications are descriptive, which is classified as belonging to the tools dimension. Case study methodology was used in 22 percent of the publications; design science in 17 percent; survey papers made up 6 percent; and archival papers 5 percent.

3. Conceptual framework and analysis of ECM publications

ECM development is an ongoing process that involves enterprise content resources, infrastructure, and managerial practices within the context of dynamic change in technology, organizations, and markets (Päivärinta and Munkvold, 2005). ECM technology represents only a small part of the ECM complexity. ECM systems involve various sophisticated and interacting aspects, including technical, social, organizational, and business aspects. In an attempt to comprise this complexity, the ECM literature is structured around three pillars. The first pillar consists of four ECM component dimensions: tools, strategy, process, and people. The second pillar is the enterprise system lifecycle. Esteves and Pastor (1999) suggested the following lifecycle phases for enterprise system: adoption, acquisition, implementation, use and maintenance, evaluation, and retirement. This lifecycle (excluding retirement, which seems not to be applicable here, and implementation, because it overlaps with the

Publication type	Number of publications
Journals	33
Conference proceedings	35
Books	8
Book chapters	10
Master's theses	5
Total	91

Table II.
Number of ECM publications by type

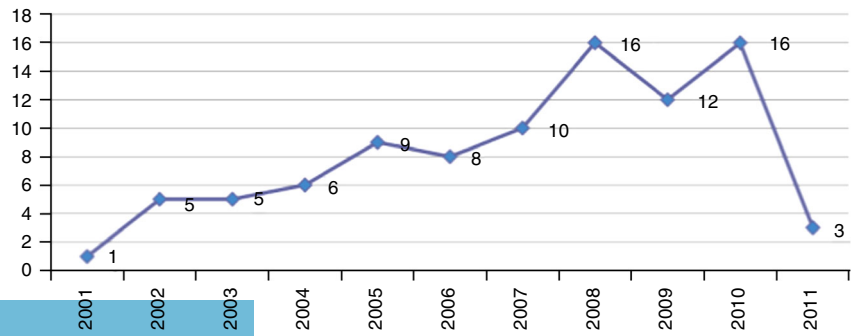

Figure 1.
Distribution of ECM publications by year

Journal name	Number of publications
Communications of the Association for Information Systems	2
European Journal of Information Systems	3
Communications of The ACM	1
Communications of The IIMA	1
Datenbank-Spektrum	1
Computer Applications and Software	1
Computer of Engineering	1
Computer of Engineering and Applications	1
Computer Science Journal of Moldova	1
Government Information Quarterly	1
IEEE Congress on Services Part II	1
IFIP Advances in Information	1
Information Systems and E-Business Management	1
International Journal of Automation and Computing	1
International Journal of Information Management	1
International Journal of Knowledge, Culture and Change Management	1
International Journal of Systems and Service-Oriented Engineering	1
International Water Power & Dam Construction	1
Journal of Digital Information Management	1
Journal of Industrial Technology	1
Knowledge-Based Systems	1
Medical Reference Services Quarterly	1
Microcomputer Information	1
Modern Electronics Technique	1
Nonprofit Management & Leadership	1
Organizacija	1
Scandinavian Journal of Information Systems	1
Security & Privacy, IEEE	1
Technical Communication Quarterly	1
The Electronic Journal Information Systems Evaluation	1

Table III.
Journals with ECM publications

process dimension) is adopted as the second pillar. The final pillar is the strategic managerial aspect, including change management and management commitment. Previous ECM research discusses the managerial aspects such as change management under the people dimension. However, these managerial aspects should have a separate classification, as they may also be included in the system lifecycle (e.g. adoption). In the next subsections, the ECM publications as they relate to each of the aforementioned three pillars are discussed.

3.1 The four ECM component dimensions

The first dimension to be discussed is the tools dimension. The majority of the papers (46 percent) focusses on the technical dimension and ignore other dimensions. For instance, Chiu *et al.* (2010) propose a financial ECM framework that allows intra-enterprise and inter-enterprise interactions. Privacy and access control policies are demonstrated for internal content management, and for external access control. The authors demonstrate the achievement of integration and control in a case study from the banking industry. In another example, Befa *et al.* (2010) utilize the benefits of semantic web technologies that include semantic interoperability and dramatic cost reduction, to extend the ECM system to automatically import and export ontologies. In her Master's thesis, Saslaw (2009) used Microsoft SharePoint (one type of ECM) and

inquiry-based design to construct a prototype for a resource portal for the University of North Carolina Healthcare System. She found that the method is useful in identifying the types of information in the ECM. By using design science methodology, Aziz *et al.* (2010) propose a grid-based CMS for multimedia data in the publishing industry; the authors argue that the system leads to better controlling of storage resources, and helps in matching the users' previous behavior to resource policies.

However, 22 percent of the papers discuss other dimensions in addition to the tools dimension. Pérez-Montoro (2011) presents different types of CMS including document management, record management, and learning content management; the features of each system are defined to show the applications of these systems in e-learning and KM. McNabb (2005) claims that compliance, governance, and process efficiency are the main drivers of ECM adoption. Large IT infrastructure vendors (e.g. IBM, EMC, Oracle) view ECM as a growth opportunity while smaller vendors (e.g. Laserfiche) that provide specific parts of ECM such as web content management, may find themselves obsolete unless they are able to distinguish themselves. Also, the author makes two important suggestions: organizations should adopt the ECM suite that aligns with the corporate objectives, and ECM vendors should be evaluated based on their long-term strategy.

Totally, 18 percent of the papers discuss mainly the strategy dimension. For instance, Allen (2008) discusses in his book the common strategies to solve the "legacy problem domains" that are traditionally addressed in different ECM modules. The book also discusses the converting strategies from traditional content to digital content. The benefits and barriers of ECM adoption are discussed by Kunstova (2010). This author found that the most important barrier is the lack of technological, human, and financial resources, and the most important benefit is productivity increase. Alalwan and Weistroffer (2011) propose a framework to link ECM to decision-making activities, and present five propositions based on published literature to identify the potential effects of ECM technology on decision support activities.

Another 24 percent of the papers discuss the strategy dimension in addition to one or more other dimensions. As a case in point, Smith and McKeen (2003) investigate how organizations implement and develop ECM in order to manage information by having a focus group of knowledge managers. They discuss the reasons that lead to ECM adoption. Although the authors conclude that ECM systems enhance the organizational processes by providing essential services such as capturing, creating, indexing, searching, accessing, organizing, and maintaining content, they also find that the short-term benefits (i.e. cost reduction and work process simplification) are the primary drivers for ECM adoption. They argue that organizational performance may be affected significantly by the right practices of content stewardship and the right information technology and behavior. They claim that managers have more value to gain from ECM systems if they follow a more strategic approach. In another publication, Munkvold *et al.* (2006) aim to build an understanding of ECM based on a major ECM project in the oil industry. They claim that in order to gain effective and efficient electronic collaboration, three types of management are crucial: management of content, management of infrastructure, and change management. They include change management as one of the major categories of ECM; according to their case study, user-related issues require change management such as motivating users for administrative and technological changes, and improving user skills to deal with ECM technology. To solve this problem, training programs and active user support are crucial. Finally, the authors conclude that research is needed in the

following areas: ECM personalization and customization, utilizing content metadata and corporate taxonomy, and justifying the investment of ECM and evaluating the impact of ECM systems.

Only 7 percent of the papers discuss process as the main dimension. For instance, vom Brocke and Simons (2008) and vom Brocke *et al.* (2009) claim that business process management and ECM are two strongly related fields of research; they propose the ECM-blueprinting framework that systemizes ECM adoption. Their framework consists of five phases: business process analysis, content analysis, ECM analysis, ECM-blueprint adaptation, and business process redesign. The proposed framework is evaluated in the context of a research project accomplished in a large-scale international cooperation. Based on the evaluation results, the framework provided valuable insights that can deal with the challenges of ECM. Fennell (2007) discusses the deployment of an open source CMS, named Drupal, in the libraries of the University of Minnesota.

Process is a common dimension along with other dimensions in 15 percent of the papers. Nordheim and Paivarinta (2004, 2006) concentrate on ECM implementation issues and present a framework for ECM customization based on an ERP literature review, and a case study from the oil industry. The authors try to determine the issues that emerge during the process of developing an ECM system. They summarize four motors of development and change: teleological, evolutionary, life cycle, and dialectical motors. The authors also discuss the challenges of ECM and found that content management challenges include lack of management attention and commitment. Scheepers (2006) proposes a conceptual framework to help in the implementation of enterprise information portals, which is considered as a key component of ECM infrastructure. The suggested framework is based on marketing fundamentals. In that framework, the users of the portals should be viewed as segments and for each segment the following certain factors should be considered: content, distribution, promotion, and price. O'Callaghan and Smits (2005) propose a framework to implement ECM that helps in selecting the content brought under ECM; the authors claim that the proposed framework can guide IT investment and create business value. By using a portal-based IS design, Zykov (2006) discusses the implementation and maintenance of ECM systems. The author argues that his new method can help information resource management by providing consistent and adequate metadata manipulation.

Only one paper was centered solely on the people dimension. Scott (2011) discusses the user perceptions of ECM systems as one of the determinants of technology acceptance. The research evaluates the elements that lead to ECM system acceptance. The results reveal that cognitive engagement is an essential construct of technology acceptance. Also the research emphasizes the importance of metadata and taxonomy in structuring the content.

In addition, around 12 percent of the papers were in the people dimension along with other dimensions. Nordheim and Paivarinta (2004, 2006) suggest that ECM capabilities should satisfy the user needs and on references through personalization and customization. They argue that ECM should facilitate increasing the quality of the content, providing easy-to-use systems, and meeting the security requirements through authentication and encryption. Smith and McKeen (2003) emphasize the importance of hiring and training people with analytic skills (namely, technology skills, statistical modeling and analytic skills, knowledge of the data, knowledge of the business, communication and partnering). Through a study of ten Italian cases, Bianco and Michelino (2010) explore the interaction between organizational and technological

factors by studying the impact of CMSs on publishing firms; the authors identify the organizational factors that are affected by the technology use. The socio-technical context that favors the adoption of technology is also specified.

3.2 ECM system lifecycle

In the adoption phase, the initial requirements for an ECM system are investigated, the impact of the system on the organization is analyzed, and the goals and benefits of the system are determined. In this literature review no papers were found that focus on ECM adoption. However, looking at the literature, there are complicated and interrelated adoption problems that involve management (i.e. strategy planning, organizational culture), technology (i.e. tools and practices), and stakeholders (i.e. training and resistance). Kemp (2007) noted that many barriers such as organizational culture and user resistance often face the adoption of ECM. Dilnutt (2006a, b) explores the emergence of the ECM discipline. Also, he discusses the reasons for the increasing demand of document-based information management and the reasons behind ECM adoption. He claims that "moving toward smarter knowledge platforms, and the adoption of common standards and protocols" are the main reasons behind ECM convergence. The benefits of ECM can be summarized as: compliance, efficiency, consistency, customer service, consolidation, and risk alleviation.

In the acquisition phase, ECM systems are selected by comparing system features to business requirements. Benevolo and Negri (2007) discuss the mismatch between organizations' needs and the functions of information management products including document and records management systems, web CMS, and ECM systems. The authors compare the characteristics of 22 international products to the following organizational needs: information collection, management, and publication. Their results show that the content management products generally can deal with all three areas (collection, management, publication), but are usually focussed on only one of those areas. The authors conclude "[…] there is no standard and commonly accepted definition for Content Management." The vendors of CMS often offer various systems and organizations should evaluate the CMS functionalities according to their specified requirements. After classifying CMS into digital asset management, web content management, source configuration management, document management, ECM, and KM, Votsch (2001) highlights the problem that organizational needs usually do not match the solutions offered by vendors. The author gives important advice for executives who plan to purchase and implement CMS. Vitari *et al.* (2006) purport that choosing the most suitable CMS for organizational needs is a complicated task. The authors claim that there are difficulties in pre-purchasing evaluations of CMS because there is no analysis framework. They proposed two tools based on the analysis of 23 CMS, one for analyzing CMS and a second one for understanding the strategy of CMS vendors. The application of their tools to analyzing CMS and identifying strategies are also discussed in the paper.

The evolution phase, which overlaps with the tools dimension, includes integrating ECM systems with existing information sources and IT systems. Reimer (2002) especially focusses on the structure and functions of ECM systems. He suggests that business process efficiency may be enhanced greatly by applying integrated ECM. He also suggests that the legacy systems in the organization need to be considered when implementing ECM. Reimer (2002) argues that consolidation of existing disparate data into a single enterprise depository may not be possible, so he suggests a federation or warehouses for these data, which can lead to a single logical view. Also, he argues that

ECM functions, after ECM implementation, should be superior to any individual solution such as documents management, reports management, or records management. Kunkelmann and Brunelli (2002) describe the integration of advanced retrieval and indexing modules into a media archive system, which is one type of ECM. The authors claim that the system supports customizable structure and also supports the content during the whole content lifecycle.

In the evaluation phase, performance, benefits, and features of the system are assessed based on the requirements objectives that are determined in the adoption phase. In this phase, the question to ask is, "does the system satisfy the needs of the organization?" Päivärinta and Munkvold (2005) found that there often is a mismatch between observation and actual performance; they conclude that ECM evaluation practices bear shortcomings. Norrfors (2007) evaluated the usability of Platina, which is one of the ECM systems in Sweden; the author provides suggestions to redesign the user interface based on Microsoft Windows standards.

3.3 Strategic managerial aspects

Two predominant strategic aspects that are discussed widely in ECM literature are change management and management commitment.

With regard to change management, vom Brocke and Simons (2008) and vom Brocke *et al.* (2009) propose an ECM-blueprinting framework, which manages process change in the organization. Päivärinta and Munkvold (2005) present a content model for ECM providing an integrated perspective on information management; they conclude that change management is necessary to optimize fit among the types of content, enterprise, infrastructure, and administration. They found that change management is crucial to gain management support by justifying ECM investment, and to deal with users' resistance. Munkvold *et al.* (2006) include change management as one of the major categories of ECM. According to their case study, user-related issues require change management, such as motivating users for administrative and technological changes and improving user skills to deal with ECM technology. To solve this problem, they suggest that training programs and active user support are crucial. Based on Joha and Janssen (2010) make several suggestions to manage change while implementing content management, such as continuous user involvement in the system design, providing post-implementation training, and pursuing funding and leadership engagement.

Management commitment is also considered an important factor in the ECM literature. For example, Nordheim and Paivarinta (2006) found that content management challenges include lack of management attention and commitment. Top management (and other employees') commitment is required to ensure that the new business processes and the new types of content are integrated into the system to benefit the whole organization (Kemp, 2007). Vidgen *et al.* (2001) found that lack of senior management commitment was a problem in adopting SiteScape as web content management.

A conceptual ECM framework is developed based on the above discussion. This framework categorizes the ECM literature within the discussed three pillars: the four-ECM dimensions, the ECM systems lifecycle, and the strategic management aspects as shown in Figure 2.

4. Agenda for future research

Based on the literature review and the conceptual framework shown in Figure 2, several gaps and opportunities for further research are highlighted, are discussed. The following list summarizes the proposed ECM research agenda.

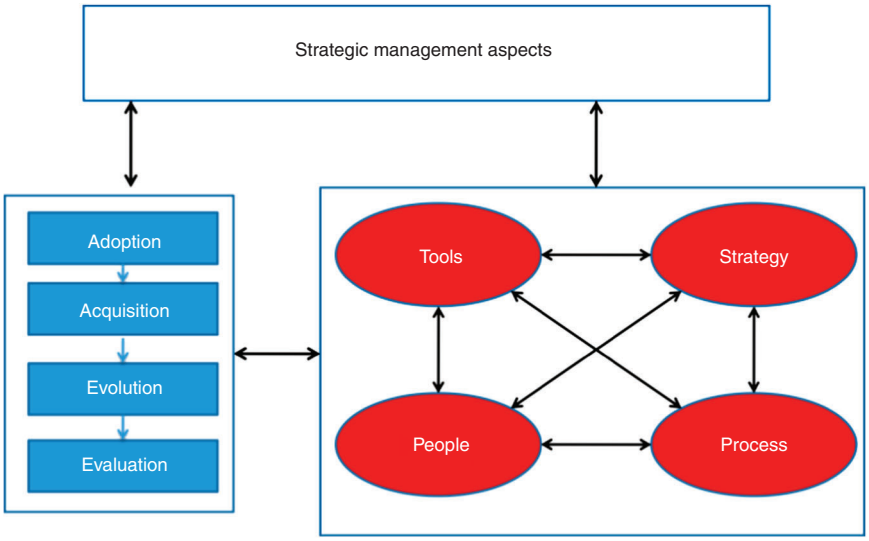

Figure 2.
Conceptual ECM framework

The four ECM dimensions are as follows.

(1) Tools:
- To what extend are ECM systems suitable for cloud computing?
- What are the architectural requirements for cloud computing ECM?
- How can existing IT infrastructure be integrated into enterprise mobile solutions?

(2) Strategy:
- What are the strategic capabilities of ECM?
- How can investment in ECM be justified?
- How can organizations best achieve strategic capabilities of ECM?

(3) Process:
- How can ECM be effectively implemented?
- What are potential tools, practices, and guidelines to help in ECM implementation?

(4) People:
- How can different stakeholders be involved in ECM implementation?
- What are the best training strategies that ensure higher workers' efficiency?

ECM system lifecycle are as follows.

(1) Adoption:
- What is the impact of ECM adoption on organizational performance?
- What are the factors that affect ECM adoption?

(2) Acquisition:
- How can organizations best select the ECM system that matches their needs?
- What are good acquisition-planning methodologies that organizations can follow?

(3) Evolution:
- What are the challenges of ECM integration and how can they be resolved?
- What are the critical success factors for integrating ECM systems with existing information sources?

(4) Evaluation:
- How can the performance of ECM system be effectively evaluated?
- What are the different performance measures that match with different ECM perspectives?

Strategic managerial aspects are as follows.

(1) Change management:
- What are the change management strategies that can handle different perspectives of ECM?
- How can these strategies be utilized?

(2) Management commitment:
- How can the commitment of management to adopt ECM system be assured for the whole system lifecycle?

Although the tools dimension is the most discussed area in the ECM literature, there is still a need to look at emerging technologies such as cloud computing and enterprise mobile computing.

In the strategy dimension, the literature lacks empirical testing of the strategic effectiveness of ECM. Empirical research is needed to show that the adoption of ECM has short-term and long-term benefits. Beyond confirming the strategic effectiveness of ECM, researchers need to also investigate how that effectiveness can best be achieved.

In the process dimension, the ECM field lacks academic guidelines for successful implementation; empirical research that discusses ECM implementation is scarce. Gottlieb (2005) concludes that "Full and successful ECM implementations are rare, if any exist at all." He suggests several strategies for successful ECM implementation, such as utilizing the corporate metadata and taxonomy to have a holistic view of content and integrating content throughout the enterprise by establishing a federated content architecture. Usman *et al.* (2009) conclude, "[…] ECM domain is currently lacking the set of tools, techniques, practices and guideline for successful ECM implementations."

In the people dimension, although stakeholders have been discussed as a critical component in change management, further research is needed into the effects of involving different stakeholders in ECM implementation, how different stakeholders can be involved in ECM implementation, and what the best training strategies are that ensure higher workers' efficiency.

In the adoption phase, although understanding the organizations' adoption of an idea, product, or technology is important to the success of the implementation of that idea or technology (Thompson, 1969; Pierce and Delbecq, 1977; Rogers, 1983), research focusing on the adoption phase is still very scarce. Research that leads to better understanding of the impact of ECM adoption on organizational performance and the factors that affect that adoption is needed.

In the acquisition phase, there is scarce academic research that investigates acquiring the right ECM system to match the specific needs of the organization, although there are major practitioners' tools (i.e. Magic Quadrant from Gartner, and Forrester Wave report) that provide useful information for ECM acquisition. Research on the methods of acquiring ECM systems as well as research that discusses acquisition-planning methodology for organizations to follow is needed.

In the evolution phase, research on challenges and solutions of ECM integration is needed. Determining the critical success factors for ECM integration would be most useful.

For the evaluation phase, as in the many of the other areas, little research has been published, as also pointed out by Tyrväinen *et al.* (2006). Research is needed to address how ECM performance can be evaluated, and what the different performance measures should be that correspond to different ECM perspectives.

In change management, a broader view is required to consider the strategies that can handle various perspectives (human and organizational) of ECM, and how to best utilize these strategies. Management commitment is a critical success factor for ECM systems as for other enterprise systems. Management commitment is required before, during, and after system implementation. Thus, research is needed to determine the best ways to get management commitment for the whole system lifecycle.

5. Conclusion

This paper provides a comprehensive literature review of published ECM research, a conceptual framework for analyzing and classifying ECM research publications, and a possible agenda for future research in ECM. Although ECM can be viewed as an evolution of information management, and its importance is becoming rapidly more evident, the ECM field lacks sufficient meta-analysis research that explains the current state of the field. The comprehensive literature review of ECM research provided in this paper is a step toward closing this gap. Previous ECM reviews (Tyrväinen *et al.*, 2006; Usman *et al.*, 2009) do not adequately cover the diverse interacting aspects of the ECM field. The conceptual framework presented in this paper allows other researchers in the ECM field to put their own research in a better context, and thus help in understanding the relevant ECM issues that need further investigation. The suggested research agenda is based on the literature review and the identified gaps in the published ECM research.

Thus the contribution of the paper is threefold. First, the literature review provides an overview of what has been done, and by extension, what has not yet been done in ECM research. Second, the conceptual framework provides a structure for future studies related to ECM, thereby giving context and supporting the understanding of such work and its potential impact on other scholarship and on practice. Third, the suggested research agenda provides a guideline for scholars wanting to do research in ECM and helps direct their attention to those areas most in need of further investigation.

Note

1. www.aiim.org

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