O | UNIVERSITY OF OREGON
APPLIED INFORMATION MANAGEMENT

Implementing Enterprise Content Management Using Microsoft SharePoint™

CAPSTONE REPORT

Dana Fowler
Programmer/Database Admin
Key Knife, Inc.

February 2008

Approved By

_____

Dr. Linda F. Ettinger

Academic Director, AIM Program

Implementing Enterprise Content Management

Using Microsoft SharePoint[TM]

Dana Fowler

Key Knife, Inc.

Abstract

for

Implementing Enterprise Content Management Using Microsoft SharePoint[TM]

Enterprise Content Management (ECM) refers to technologies used to capture, manage, store, preserve, and deliver content and documents related to organizational processes (Duhon, 2005a). Microsoft SharePoint[TM] provides the ability to create, publish, and manage content (Microsoft, 2007a). Through analysis of 25 sources published between 2002 and 2007, this literature review provides an introduction to SharePoint and describes its role as a specific selected ECM in order to assist information managers in the implementation of ECM.

Table of Contents

List of Figures

List of Tables

Introduction to the Literature Review

Topic and Research Problem

According to EMC Corporation, "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, 2006a p. 5)." Unstructured content refers to free-form information that exists outside the confines of databases or systems with fixed routines and pathways, such as enterprise resource planning systems and workflow applications (Blair, 2004). According to Blair (2004), this type of information needs to be accessible and usable to a business in order to improve efficiency and contribute strategically.

"Enterprise Content Management (ECM) is a concept that refers to the technologies 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 (Duhon, 2005a)." Microsoft Office SharePoint Server 2007 and Windows SharePoint Services 3.0 (further referred to as "SharePoint") is an example of an ECM technology, designed to integrate Microsoft Office products with the goal to help simplify information management, collaboration, and business process automation (Bates and Smith, 2007).

This inquiry is a review of selected ECM and SharePoint literature, designed to provide information necessary to conduct an ECM implementation using SharePoint. The majority of the selected literature, published between 2002 and 2007, is obtained from EbscoHost (http://ebscohost.com), AIIM (http://www.aiim.org) and the Microsoft Developer Network (http://msdn2.microsoft.com).

Audience and Significance

The intended audience for this literature review is information managers (IT managers, IT support, DBA's, etc.) who work in small to medium, private sector, global manufacturing companies and who are responsible for achieving information related strategic goals, such as improving communication and focusing on profitability through increased operating efficiencies. According to the EMC Corporation (2006a), in order to successfully implement an ECM system it is helpful that information managers understand what ECM is, why ECM is necessary, where to start with ECM, and who benefits from ECM. The purpose of this literature review is to provide information managers with an introduction to these concepts and to provide a rationale for the use of SharePoint, as a selected example of an ECM tool, designed to support achievement of information related strategic goals as these are defined in this document.

Research Limitations

Time frame.

While the precursor to ECM, Enterprise Document Management (EDM), was first released during the late 1980s (Kemp, 2007), the majority of resources collected to support this literature review are published between 2002 and 2007. This time frame is selected in order to focus on literature published after the emergence of Microsoft within the content management arena in 2001, with the introduction of Microsoft SharePoint Portal Server 2001 (Bishop, 2007), and the coining of ECM as a buzzword, around the middle of 2002 (West, Foust, and Klima, 2002).

Databases, sources, and authors.

The research strategies selected for use in this literature review are suitable to the development of a formal literature review, based on the guidelines in *Practical Research Planning and Design* (Leedy and Ormrod, 2005). The initial search for relevant literature, using the online database EbscoHost, returns a significant number of full-text articles on ECM and SharePoint. Additional searches are made on professional sites that specifically address ECM (AIIM) and SharePoint (MSDN). AIIM is "the international authority" on ECM (AIIM, 2006) and includes articles with industry recommended practices (AIIM, 2007) and user guides, which are intended to educate and inform users about document and content systems (Strategy Partners International, 2003a). MSDN is the Microsoft Developer Network (MSDN, 2007) and includes articles such as evaluation guides containing SharePoint information and guidelines.

Textbooks are also selected for additional supporting information. *How Organizations Work: Taking a Holistic Approach to Enterprise Health* (Brache, 2002), contains a section in which the topics of information and knowledge management align with many of the aspects of implementing a content management system. *SharePoint 2007 User's Guide: Learning Microsoft's Collaboration and Productivity Platform* (Bates and Smith, 2007) and *Microsoft Windows SharePoint Services 3.0 Step by Step* (Londer, Bleeker, and Conventry, 2007) are selected to provide an overview of SharePoint.

Criteria used to evaluate the credibility of authors and publications are provided in the Research Parameters section of this document.

Audience.

"In February 2007, with the release of Microsoft Office SharePoint Server 2007 (MOSS), Windows SharePoint Services 3.0 (WSS 3.0) and the Microsoft Office 2007 suite, Microsoft officially entered the Enterprise Content Management (ECM) arena (Bishop, 2007 p. 2)."

It is the intent that this literature review can be used by information managers to support implementation of the latest SharePoint / Microsoft Office integration. The underlying assumption is that implementing SharePoint, as an ECM product will help information managers to achieve information related strategic goals.

Writing Plan Introduction

The writing plan for the review of the literature is based on a thematic approach, in which ideas are organized around a topic or issue, as described by the University of North Carolina (UNC, N.D). The goal in this approach is for the writer to identify common themes in the selected literature and organize the literature into relevant categories. This review is structured around three larger themes, identified initially to meet the goals of the study, and categorized as follows:

- Literature that examines the *purpose of, description and definition of ECM*, including examination of key processes and uses;

- Literature that *provides reasons to implement ECM*, including an analysis of using ECM for an enterprise content strategy; and

- Literature that *explores SharePoint* as one selected ECM product, including information that addresses aspects of SharePoint implementation.

A full description of the Writing Plan is provided in the Research Parameters section of this document.

Definitions

The following definitions show that ECM and SharePoint fit within a selected and well-described category (Lester and Lester, 2005). To reflect the meaning of the definitions pertaining to ECM and SharePoint as they are used in this study, each definition is quoted directly from its listed source. Additional definitions (such as *[Contextual] Translation Rules*) clarify concepts related to conducting a literature review.

Business Process Management (BPM). Automation of business processes, in whole or in part, where documents, information, or tasks are passed from one participant to another for action, according to a set of rules. A business process is a logically related set of workflows, worksteps, and tasks that provide a product or service to customers. BPM is a mix of Process Management/Workflow with Application Integration technology (AIIM, 2004).

Collaboration. Tools (collaborative authoring, video conferencing, shared whiteboards, etc.) that allow multiple users to work on the same content in a common environment (AIIM, 2004).

Content Management System (CMS). The capability to manage and track the location of, and relationships among, content within a repository (AIIM, 2004).

[Contextual] Translation Rules. … to generalize concepts during coding [a researcher] must develop a set of rules by which less general concepts will be translated into more general ones. The researcher must make [a] distinction, i.e. make [an] implicit concept explicit, and then code for the frequency of its occurrence. This decision results in the construction of a translation rule, which instructs the researcher to code for the concept … in a certain way (Busch et al., 2005).

Digital Asset Management (DAM). Designed specifically to manage digital assets, DAM software applications have innovative and specialized methods of storing, organizing, distributing, and tracking digital media across multiple delivery channels. They give businesses the ability to leverage digital content efficiently along the supply chain through production, post-production, and distribution processes (EMC Corporation, 2006b p. 7).

Document Management. Software that controls and organizes documents throughout an enterprise. Incorporates document and content capture, workflow, document repositories, COLD/ERM and output systems, and information retrieval systems (AIIM, 2004).

E-business. E-business is the use of computer technology – hardware, software, and external and internal networks – to facilitate business transactions (Brache, 2002 p. 151).

Electronic [Enterprise] Document Management (EDM). The set of technologies for electronically managing documents - incorporating document and content capture, workflow, document repositories, COLD/ERM and output systems, and information retrieval systems (Strategy Partners International Ltd., 2003b p. 12).

Enterprise Content Management (ECM). … the technologies 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, 2006).

eXtensible Mark-up Language (XML). An established standard, based on the Standard Generalized Mark-up Language designed to facilitate document construction from standard data items. Now being used as a generic data exchange mechanism (Strategy Partners International Ltd., 2003b p. 14).

Implement[ation]. 1: carry out, accomplish; especially: to give practical effect to and ensure of actual fulfillment by concrete measures. 2: to provide instruments or means of expression for (http://www.merriam-webster.com/dictionary/implementation)

Information inventory. … the types of content available across the enterprise as related to the spectrum of business processes and users that require digital information (Cap Ventures, 2003 p. 2).

Information Lifecycle Management (ILM). … the strategy for ensuring information management costs are contained and that the most important information assets – those that contribute to growth and innovation – are identified, cared for and exploited to maximum effect (ECM Corporation, 2005 p. 4).

Knowledge management (KM). Much of KM is getting what is in the heads of a small number of people ("tacit knowledge") available to all who can use it ("explicit knowledge") (Brache, 2002 p. 144).

Library Services. … the collective name for a set of basic, but mandatory, capabilities that ensure integrity and security of … content (ECM Corporation, 2006b p. 24).

Metadata. Data associated with a document that is used to index and/or identify it in the context of a business process or repository application (Strategy Partners International Ltd., 2003b p. 13).

Microsoft Office SharePoint Server 2007. … an integrated suite of server capabilities that can help improve organizational effectiveness by providing comprehensive content management and Enterprise Search, accelerating shared business processes, and facilitating information sharing across boundaries for better business insight (Microsoft, 2007a p. 3).

Microsoft SharePoint. … the central information sharing and collaboration platform for the Microsoft Office system. SharePoint 2007 is made up of two main products: Windows SharePoint Services 3.0 and SharePoint Server 2007 (Bates and Smith, 2007 p. 2).

Records Management. Enables an enterprise to assign a specific life cycle to individual pieces of corporate information from creation, receipt, maintenance, and use to the ultimate disposition of records. A record is not necessarily the same as a document. All documents are potential records, but not vice versa. A record is essential for the business; documents are containers of "working information." (AIIM, 2004).

Unstructured content. 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, such as enterprise resource planning systems and workflow applications (Blair, 2004 p. 65).

Web Content Management (WCM). A technology that addresses the content creation, review, approval, and publishing processes of Web-based content (AIIM, 2004).

Windows SharePoint services 3.0. … provides the solution platform for SharePoint Products and Technologies, delivering a wide range of functional capabilities that are exploited and extended by other SharePoint Products and Technologies (Microsoft, 2007a p. 3).

Workflow. … the automation of a business process, in whole or in part, during which documents, information, or tasks are passed from one participant to another for action, according to a set of procedural rules (Strategy Partners International Ltd, 2003a p. 1).

Research Parameters

The Research Parameters provides an overview of the methods used to develop this literature review, and is divided into four sections: the Search Strategy Report, the Documentation Approach, the Evaluation Criteria, and the Writing Plan. The Search Strategy Report contains sections on Best Searches, Literature Availability, and Key Search Terms and Controlled Vocabularies, which includes detailed tables on search criteria, search information on the term ECM, and search information on the term SharePoint. The Documentation Approach describes the steps taken to review articles. The Evaluation Criteria contains sections on Literature Collection and Literature Selection. The Writing Plan provides a roadmap to the process of conducting a conceptual analysis of the literature as presented in the Review of the Literature section of this document, followed by an outline of the primary themes that are applied.

Search Strategy Report

Best searches.

EbscoHost databases Academic Search Premier; Business Source Premier; Library, Information Science & Technology Abstracts; and Regional Business contain many relevant articles on ECM and SharePoint. EbscoHost publications AIIM E-DOC, Econtent, Information World Review, Portals and KM, and Windows IT Pro also contain many relevant articles on ECM and SharePoint.

AIIM: The ECM Association (http://www.aiim.org) contains many definitions, recommended practice documents, articles, and reports on ECM and SharePoint. AIIM also

includes User Guides, which "are a series of papers on a variety of industry topics, authored by subject matter experts (http://www.aiim.org/user-guides.asp)."

ECM Connection (http://www.ecmconnection.com) contains many articles on ECM and on SharePoint. The more relevant articles are found by sorting the Downloads column. For example, "A 15- Minute Guide to Enterprise Content Management (EMC Corporation, 2006a)" is at the top of the list of downloads using the search term "ECM," as of the writing of this paper.

MSDN (http://msdn2.microsoft.com) contains a vast amount of information on ECM and SharePoint. The "Evaluation Guides (Microsoft, 2007a; Microsoft, 2007b)" and the "Planning and architecture (Microsoft, 2007c)" guide are beneficial in that they contain an overview of the solutions and benefits provided by the software.

Literature availability.

By accessing full text articles from the Internet, information management books, and SharePoint books, there is more than enough literature available on the topics of ECM and SharePoint. The challenge is in finding literature pertinent to the intended audience, goals, and focus of this paper. Selection criteria and limitations are described in the following section.

Key search terms and controlled vocabularies.

The following key search terms and controlled vocabularies are used to collect articles and other research material for use in this literature review:

ECM / SharePoint based on strategic goals:

- Profitability

- Communication

ECM / SharePoint larger area of context:

- Document Management (DM)

- Collaboration

- Records Management (RM)

- Web Content Management (WCM)

- Business Process Management (BPM)

- Email Management

- Digital Asset Management (DAM)

ECM / SharePoint sub-topics:

- The purpose of, description and definition of ECM

- Key processes and uses of ECM

- Reasons to implement ECM

- Using ECM for an enterprise content strategy

- SharePoint as an ECM product

- SharePoint implementation

SharePoint:

- Microsoft Office SharePoint Server 2007

- Windows SharePoint Services 3.0

Detailed search criteria are listed below, in Table 1: Search Criteria, Table 2: Search

Term - ECM, and Table 3: Search Term – SharePoint.

Search Engines & Databases	Criteria	Search Terms	Hits	Quality
EbscoHost Text Only combined databases: Academic Search Premier Business Source Premier Regional Business News Computer Source ERIC MasterFile Premier Library, Information Science & Technology Abstracts (LISTA)	Full Text and Pages > 3 where applicable	"Enterprise Content Management"	261	See table 2
		SharePoint	61	See table 3
AIIM US	Articles and Research	None	1666	Varies
	User Guides	None	7	Good
AIIM UK	White Papers	None	21	Good
ECM Connection	Downloads	ECM	1349	Varies
		SharePoint	97	Varies
MSDN	None	"enterprise content management"	1.25 m	Difficult to navigate
		SharePoint	2.44 m	
Microsoft Technet	Technology = Windows SharePoint Services Resources = Library		14	Good
Google Scholar	English	"enterprise content management"	656 total 279 pdf's	Difficult to find full text articles
		SharePoint	1300 total 388 pdf's	

Table 1 - Search Criteria

Database hits	Source hits	Author hits	Subject Terms
LISTA (177)	AIIM E-DOC (142)	John F Mancini (18)	INFORMATION resources management (115)
Business Source Premier (48)	Information World Review (30)	Bryant Duhon (17)	INFORMATION technology (62)
Regional Business News (20)	EContent (25)	Mike Alsup (7)	RECORDS – Management (48)
Academic Search Premier (16)	others (less than 10).	others (5 or less).	BUSINESS enterprises (42)
			Others (40 or less)

Table 2 - EbscoHost Combined Databases statistics on search term "Enterprise Content Management"

Database hits	Source hits	Author hits	Subject Terms
Regional Business News (21)	Windows IT Pro (10)	Dan Holme (5)	MICROSOFT Corp. (26)
Academic Search Premier (13)	AIIM E-DOC (9)	Russell Stalters (4)	COMPUTER software (20)
LISTA (11)	Portals and KM (4)	Bill Ives (4)	NAICS/Industry Codes443120 Computer and Software Stores (15)
Computer Source (10)	others (3 or less)	Others (2 or less)	INFORMATION resources management (8)
Business Source Premier (6)			Others (5 or less)

Table 3 - EbscoHost Combined Databases statistics on search term "SharePoint"

Documentation Approach

The section, "Organizing the Information You Have Collected (Leedy and Ormrod, 2005, p. 75)" is used as the basis for the documentation approach for this literature review. The documentation approach during the review of literature is as follows:

1) Save a copy of each potentially useful electronic article and abstract when available.

2) Review each abstract.

3) Divide the articles into useful and not useful electronic "piles" based on the relevancy of the abstract.

4) Review the index, introduction, and conclusion of books from previous AIIM courses and from employers "library."

5) Record the bibliography and abstract for each useful article and book in a Microsoft Word document.

6) Note the type (article, interview, publication, website, white paper, or book), content (key words and phrases), abstract (about, introduction, preface, or preview), and author for each article and book.

Evaluation Criteria

Literature collection.

Articles, interviews, publications, white papers, and books used in the literature collection are identified in the Review of the Literature Bibliography section of this document.

The electronic sources are obtained from EbscoHost databases Academic Search Premier and Computer Source, AIIM (http://www.aiim.org), ECM Connection (http://www.ecmconnection.com), and MSDN (http://MSDN.microsoft.com). The books are obtained from Amazon.com (http://www.amazon.com).

The search engines and databases, criteria for search, and search terms are detailed in the Search Strategy Report section of this document. The search strategy, for the retrieval of relevant literature, is as follows:

1) Review the term "Enterprise Content management" on Wikipedia (http://en.wikipedia.org/wiki/Main_Page) to get an idea of the purpose, history, characteristics, and components of ECM. This review leads to the discovery of key terms and concepts related to ECM and an external link to AIIM (http://www.aiim.org).

2) Search on the terms "Enterprise Content Management" and "SharePoint" on EbscoHost

databases Academic Search Premier and Computer Source.

3) Review the "Articles and Research" and "User Guide" sections on AIIM US

(http://www.aiim.org).

4) Review the "White Papers" section on AIIM UK (http://www.aiim.org.uk).

5) Review Microsoft Technet (http://msdn2.microsoft.com) for SharePoint Services in the

Windows Library.

In order to review only current and relevant material the following terms are not used:

- Consolidation, mergers, and alliances pre 2007

- Events pre 2007

- Trends and market development pre 2007

- Outsourcing and contracting

Literature selection.

The research results leads to an idea of the information available on ECM and SharePoint

and to the identification to the larger area of context for these topics. Each of the resources is

reviewed for relevance to the literature review. The following criteria are used to include or

exclude material:

- The resources directly relate to the topic and sub-topics of the inquiry and key terms

and phrases.

- The resources are published between 2002 and 2007.

- The resources are relevant for the intended audience.

Each article is then previewed using the methods suggested by Hewitt (2002 p. 22): Scan

the abstract, the introduction, headings and subheadings, tables and figures, discussion and

conclusions, and the reference list. Look for any obvious omissions, lack of detail, errors in presentation and figures. Review the reference list for literature research. This preview of the articles leads to additional criteria, which is used in discarding resources based on the following:

- Instant messaging

- SharePoint 2.0

- SharePoint Beta, security

The article *Critical Evaluation of Information Sources* (Bell, 2007), is used as a guideline to determine credibility of sources. Articles and books are reviewed for authority, objectivity, quality, coverage, currency, and relevance. While every article and book is reviewed for publisher authority, all but the user guides and white papers are reviewed for author authority. In addition, each article follows Hewitt's (2002) guidelines for critical appraisal:

- The purpose of the article is clear and well defined.

- Methods are clearly described and appropriate.

- Results, where applicable, are presented in a clear and understandable format.

- Interpretation of results is consistent with the presented results.

Writing Plan

Conceptual analysis, also known as thematic analysis, is a category of content analysis in which a concept is chosen and analyzed by quantifying and tallying its presence (Busch et al., 2005). The writing plan for this literature review is based on a conceptual analysis model in which ideas are organized around topics identified by coding text into manageable content categories using selective reduction. In order to limit subjectivity, increase reliability, and increase validity, the terms are based on "contextual translation rules (Busch et al., 2005)."

The preliminary conceptual analysis of the selected texts results in the formulation of three primary themes for this literature review: Literature that examines the *purpose of, description and definition of ECM*, including examination of key processes and uses; Literature that *provides reasons to implement ECM*, including an analysis of using ECM for an enterprise content strategy; and Literature that *explores SharePoint* as one selected ECM product, including information that addresses aspects of SharePoint implementation.

   Conceptual analysis.

The steps for conducting the conceptual analysis as the process for developing the themes of this literature review are part of the Colorado State University Writing Studio guides (Busch et al., 2005) and are outlined as follows:

1) Decide the level of analysis: Code for sets of words or phrases rather than single words.

   a) Identify documents with a significant amount of ECM functionality phrases, *Enterprise Content Management (ECM) Definitions* (AIIM, 2004) and *A Guide to Evaluating Enterprise Content Management Software* (EMC Corporation, 2006b). Use these

documents to outline ECM functionality into categories based on headings and phrases based on sub-headings.

b) Identify documents with a visual representation of ECM functionality, *ECM At Work – Wall Poster* (Duhon, 2005a) and *Enterprise Content Management (ECM) 101* (AIIM, 2003). Use these documents to outline ECM functionality concepts based on a visual representation.

2) Decide how many concepts to code: Develop an interactive set of categories and phrases during the coding process rather than using pre-defined concepts. The first review of the documents used to identify coding concepts includes 16 ECM functionality categories and 145 ECM functionality phrases.

3) Decide whether to code for existence or frequency of a concept: Code for the existence of a concept, and how the concept appears in the text, rather than for the frequency of a concept.

4) Decide on how to distinguish among concepts: Group concepts if they appear in some altered or collapsed form (for example RM versus ERM) rather than exactly as they appear. Grouping similar terms narrows the coding concepts to 56 distinct ECM functionality phrases.

5) Develop rules for coding the text: Create contextual translation rules to translate in order to code consistently throughout the text and make distinctions between similar concepts. Results of the coding process are presented in five Appendices. Appendix A lists ECM functionality concepts, arranged by categories and phrases. Appendix B provides a visual representation of the lists of information in Appendix A. Appendix C provides descriptions of each of the ECM phrases in Appendix A and B. Appendix D provides a list of modified

ECM phrases. Appendix E lists the concepts and the corresponding documents in which the concepts are found.

Examples of coding rules are as follows:

a) *Enterprise Content Management (ECM) Definitions* (AIIM, 2004) includes preferred phrases. For example, "Check In/Out" is used in the place of "Check in / check out," and "Check-in and check-out."

b) All storage type concepts (i.e. "CD-ROM") are grouped under the phrase "Storage Technologies."

c) All recognition type concepts (i.e. HCR, ICR, etc.) are grouped under the concept "Recognition."

6) Decide what to do with irrelevant information: Ignore irrelevant information rather than re-examining and altering the coding scheme.

7) Code the texts:

a) Prepare electronic files.

    i) Scan ECM Documentum files to PDF.

    ii) Use Adobe Acrobat Professional "OCR Text Recognition" on the ECM Documentum files to "Recognize Text."

    iii) Save PDF files and HTML files as text.

b) Search for the existence of concepts in the texts files. A list of phrases and the corresponding documents is included in Appendix E of this document.

8) Analyze the results: Examine the data and draw conclusions and generalizations in order to see trends (in this case described as 'themes') that are indicative of larger ideas.

Writing plan outline.

Upon completion of the conceptual analysis, the next step in the writing plan is to formulate and organize the concepts within the three primary themes as outlined below. The numbers following each concept correlate with the prefacing numbers of each reference listed in the Review of the Literature section of this document.

1) Literature that Examines the Phenomenon of ECM (the What)

   a) Examine the purpose of ECM [1, 4, 5, 7]

   b) Describe and define ECM [1, 2, 4, 5, 7, 10]

   c) List key processes and uses of ECM [1]

2) Literature that Presents Reasons to Implement ECM (the Why)

   a) Describe reasons to implement ECM

      i) Increased competitive advantage [2, 6]

      ii) Productivity savings [2, 4, 6, 11]

      iii) Reduced customer service costs [2, 6, 11]

      iv) Improved content quality [2, 5, 11]

      v) Increased social networking [2, 5, 6]

      vi) Reduced cost of compliance [2, 5, 6]

   b) List steps to implement ECM as an enterprise content strategy

      i) Cost/Benefit Analysis [8, 13, 14, 15, 16]

      ii) Planning an ECM Strategy [2, 4, 5, 6, 7, 9, 11, 16]

      iii) Reviewing recommended practices [4, 7, 11]

      iv) Preparing a requirements guideline [12]

3) Literature that Examines the Role of SharePoint as a Specific Selected ECM Implementation

   Product (the How)

   a) Describe and define SharePoint [17, 21]

   b) List SharePoint processes and uses [17, 21]

      i) Document Management [19, 22, 25]

      ii) Collaboration [22, 25]

      iii) Records Management and Information Management Policies [17, 21, 22]

      iv) Web Content Management [21]

      v) Workflow and Business Process Management [17, 18, 20, 21, 22]

      vi) Enterprise Search and Retrieval [17, 21]

      vii) Business Forms [21, 25]

      viii)   Business Intelligence [21]

      ix) Security [17, 21, 22]

      x) Administration [21]

      xi) Microsoft Integration [17, 20, 22]

   c) Conclusion: How to plan for SharePoint implementation [25]

      i) Determine User needs [25]

      ii) Determine Number of users and user types [25]

      iii) Plan for Web site structure and publishing [23, 25]

      iv) Plan for content [23, 25]

      v) Plan for integration with Microsoft Office [24, 25]

Review of the Literature Bibliography

The following annotated bibliography of the 25 references selected for use in the Review of the Literature, is categorized by topic and sub-topics. As explained in the Writing Plan section of this document, the numbers prefacing each reference correlate with the numbers used in the Writing Plan Outline section of this document. In addition, the prefacing numbers are used in the list of categories and concepts of Enterprise Concept Management (Appendix A of this document) and the Conceptual Analysis Concept table (Appendix E of this document). Annotations consist of the abstract published with each selected reference.

Category 1: Literature that Examines the Phenomenon of ECM (the What)

The purpose, description and definition of ECM.

1) Blair, B. (2004). An Enterprise Content Management Primer. Information Management Journal, Vol. 38 Issue 5, p. 64-66. Retrieved October 24, 2007, from EbscoHost: Academic Search Premier

Abstract: This article focuses on the significance of enterprise content management (ECM) in helping organizations manage and control content according to their business goals and legal needs. ECM, a term introduced in 2001 by AIIM International, has been widely adopted by vendors, analysts, and end users in the marketplace. ECM is the technologies, tools, and methods used to capture, manage, store, preserve, and deliver content across an enterprise. Clearly, this is a broad definition that covers a wide range of technology categories such as electronic document management and business process management. At its core, ECM acknowledges that not all information is created equal. Some of it has business, operational, legal, regulatory value and, as a result, must be identified and treated in a different way. ECM is

also concerned with information that would not normally be classified, retained, and managed as a record. 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, such as enterprise resource planning systems and workflow applications. Unstructured information, including e-mail, word processing documents, digital images and Portable Document Format files.

2) Kemp, J. (2007). A Critical Analysis into the Use of Enterprise Content Management Systems in the IT Industry. Retrieved November 3, 2007, from

http://www.aiimhost.com/whitepapers/JamesKemp_ECMReport.pdf

Abstract: This report analyses the use of Enterprise Content Management Systems (ECMSs) in the Information Technology (IT) industry. An Enterprise Content Management System (ECMS) uses technologies, tools and methods to capture, manage, store, preserve and deliver content to support organisational processes. Recent studies estimate the ECMS market to be worth over $3 billion, with large vendors such as Open Text, EMC, Interwoven, Vignette and more recently Microsoft, IBM and Oracle entering the market.

This report details primary and secondary research into this topic conducted over a six month period. First it describes how the effective capturing, managing, storing, preserving and delivering of information, content and documents can help IT organisations innovate, adapt and maintain competitive advantage. Second it presents a number of unique models, including a categorisation of current ECMSs and a depiction of the likely evolution of this technology. Third it explores and critically analyses the key advantages and barriers that arise when using ECMSs in the IT industry. A prediction of how ECMSs and related technologies will be used in future is presented prior to the reports conclusion.

Examination of key ECM processes and uses.

ECM is generally considered an amalgamation of a number of distinct but interrelated applications (EMC Corporation, 2006a). The larger areas in the field of information management that provide context for the topic are ILM, Document & Content Management, and BPM & Workflow.

3) AIIM. (2004). Enterprise Content Management (ECM) Definitions. Retrieved November 4,

2007, from http://www.aiim.org/article-aiim.asp?ID=27664

Abstract: AIIM represents the Information Management community as the global association for both users and suppliers of Enterprise Content Management (ECM) solutions – the strategies, services and technologies which enable organizations to capture, manage, store, preserve and deliver information to support business processes (AIIM, 2006).

4) EMC Corporation. (2006b). A Guide to Evaluating Enterprise Content Management

Software. Retrieved October 24, 2007, from

http://www.aiim.org.uk/publications/ecm_at_work/pdfs/ecm_evaluation_guide.pdf

Abstract: ECM facilitates the creation, management, distribution, and exchange of large volumes of rich, primarily unstructured content, within and beyond the enterprise - to customers, employees, partners, and suppliers. Certain basic features and functionality, identified in this guide, are necessary for an ECM solution to deliver tangible benefits to the organization.

These capabilities are required whether you are considering content management for digital assets, a portal, a customer website, or a document management initiative. They are also immediately or an enterprise-wide initiative. Not all ECM Solutions are created equal. It's important when evaluating solutions to compare them in the context of your individual requirements, but also against an industry benchmark of capabilities.

Category 2: Literature that Presents Reasons to Implement ECM (the Why)

    Reasons to implement ECM.

5) EMC Corporation. (2006a). A 15 Minute Guide to Enterprise Content Management.

    Retrieved October 24, 2007, from

    http://www.aiim.org.uk/publications/ecm_at_work/pdfs/Ecm_15min_guide.pdf

Abstract: As a professional knowledge worker, you know how valuable your time is. You need to distill concepts, evaluate options and execute complex transactions on a daily basis. So you need as much information as you can process as quickly as possible to be proficient. We understand that need and aim to communicate concepts and ideas as clearly as possible to aid your understanding of a particular subject. This 15-minute guide is the second in a series that began with the "15-Minute Guide to Enterprise Content Management." The series is aptly named. In no more than 15 minutes we hope to provide a starting point for learning about a particular subject, and to make it an easy and entertaining read. This particular guide focuses on the importance of Information Lifecycle Management (ILM) for enterprise content management users. We aim to identify the key drivers for ILM, why organizations need to adopt an ILM strategy and the benefits of ILM for enterprise content management users.

6) EMC Corporation. (2006c). When Content Matters: Building the business case for enterprise

content management. Retrieved October 21, 2007, from

http://www.aiim.org.uk/publications/ecm_at_work/pdfs/15_min_guide_when_content_matte

rs.pdf

Abstract: This 15-minute guide is part of a series of guides that, in no more than 15

minutes, aims to provide a starting point for learning about a particular subject, in an easy and

entertaining read. This particular guide describes the business benefits of using an enterprise

content management system and how a variety of organizations are already using such a system

today. It will explain how enterprise content management systems organize content and make it

available to users. It will also discuss how organizations can gain user acceptance and build

enthusiasm for such a system. Finally, this guide offers ideas for getting started with enterprise

content management in your own organization.

Using ECM for an enterprise content strategy.

7) AIIM. (2007). Recommended Practice. Analysis, Selection, and Implementation of Electronic

Document Management Systems (EDMS). Retrieved November 9, 2007, from

http://www.aiim.org/documents/standards/arp1-2007.pdf

Abstract: This industry recommended practice presents a set of procedures and activities

that should be considered and/or performed during all aspects of analyzing, selecting, and

implementing electronic document management systems. This document provides a

categorization of relevant national and international standards and reports, enabling users and

organizations to quickly identify and locate required information for all aspects of the EDMS

project.

8) *Allen, D. (2007).* Cost/Benefit Analysis for Implementing ECM, BPM Systems. Information

Management Journal. Vol. 41 Issue 3, p. 34-41. Retrieved October 24, 2007, from

EbscoHost: Academic Source Premier

Abstract: The article provides a cost-benefit analysis on adopting either the enterprise

(ECM) or the business process (BPM) systems. The ECM system focuses more on managing

receptacles of data while the BPM system focuses first on the business process involved then

makes use of the tools in those business processes. In evaluating their cost benefits, some factors

to be considered include the company's key statistical information, projected employee

productivity savings and hourly costs, and also, the time required to process any transaction that

involves processing time that will be relevant in determining how the ECM or BPM system can

help increase the company's capacity to manage more transactions without adding manpower.

9) *CAP Ventures, Inc. (2003).* Developing an Enterprise Content Strategy: The Blueprint for

Universal Content Management. Retrieved October 24, 2007, from

http://www.ecmconnection.com/Downloads/Detail.aspx?docid=e5ca836a-d5ee-4d5b-9569-

a299651069d5.

Abstract: This document explains why the development of an enterprise content strategy

should be a precursor to the implementation or integration of content systems. This endeavor

requires organizations to identify the types of content available across the enterprise as related to

the spectrum of business processes and users that require digital information.

Taking this kind of "information inventory" provides a roadmap for applying the right

mix of fundamental, asset-specific, and process-specific content capabilities to a broad range of

content-driven business processes. Evaluating the ECM and content solutions market with this

kind of exercise completed will be invaluable to pinpointing products that can address line of business (LOB), enterprise, Federal, and industry-specific business requirements.

10) **EMC Corporation. (2005).** A 15 Minute Guide to Information Lifecycle Management for Enterprise Content Management Users. Retrieved November 9, 2007 from http://www.aiim.org.uk/publications/ecm_at_work/pdfs/ecm_ilm_15min_guide.pdf

Abstract: As a professional knowledge worker, you know how valuable your time is. You need to distill concepts, evaluate options and execute complex transactions on a daily basis. So you need as much information as you can process as quickly as possible to be proficient. We understand that need and aim to communicate concepts and ideas as clearly as possible to aid your understanding of a particular subject. This 15-minute guide is the second in a series that began with the "15-Minute Guide to Enterprise Content Management." The series is aptly named. In no more than 15 minutes we hope to provide a starting point for learning about a particular subject, and to make it an easy and entertaining read. This particular guide focuses on the importance of Information Lifecycle Management (ILM) for enterprise content management users. We aim to identify the key drivers for ILM, why organizations need to adopt an ILM strategy and the benefits of ILM for enterprise content management users.

11) **Hodgson, C. (2004).** Planning for an Enterprise Content Management System: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28314

Abstract: This paper explores the need for an Enterprise Content Management (ECM) strategy and the issues to address in developing such a strategy. Before jumping into technology solutions, non-technology issues around cultural behaviors, regionalization of content, metadata, retention requirements, and intellectual property have to be considered.

12) Porter-Roth, B. (2004). RFP Guidelines for an Enterprise Content Management System:

AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-

docrep.asp?ID=28312

Abstract: This is a guide to writing a request for proposal (RFP) for an enterprise content

management (ECM) system. An RFP is a document that expresses your project's goals,

requirements, and other information that a supplier needs to write a proposal. Sent to many

potential suppliers, the RFP seeks to establish a competitive environment that allows the buyer to

select the best solution at the best price. The winning proposal becomes the foundation for the

contract, which defines project tasks and performance goals. This guide provides you with the

basic format, guidelines, examples, and suggestions for writing a successful ECM RFP. The

advantages of using an RFP far outweigh the potential problems of dealing directly with

suppliers and not have a formal set of requirements. An RFP promotes competitive thinking

among suppliers and encourages them to provide unique solutions based on their products,

services, and knowledge of an industry.

13) Strategy Partners International Ltd. (2003a). Business Process Management and Workflow:

AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-

docrep.asp?ID=28316

Abstract: Business Process Management [BPM] is a new term that covers a portfolio of

functions and approaches that includes techniques to integrate the processes within multiple

applications, across companies, and between companies.

Workflow, as defined by the Workflow Management Coalition (WfMC), is the

automation of a business process, in whole or in part, during which document, information, or

tasks are passed from one participant to another for action, according to a set of procedural rules.

This Guide sets out to explain in straightforward terms how Business Process Management and Workflow works, where and how it delivers real benefit to organizations, and the key current and emerging applications and technologies that make it an investment for the future as well as for the present.

14) *Strategy Partners International Ltd. (2003b).* Document and Content Capture: AIIM User

Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28318

Abstract: Document and content capture systems are fundamental to Information Technology. They provide a cost-effective, accurate, and operationally simple mechanism to feed content (e.g., news articles, pictures, and files) into Document and Content Management systems, as well as into key business applications such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), eBusiness, and eGovernment.

This Guide sets out to explain in straightforward terms how document and content capture works, where and how it delivers real benefit to organizations, and the key current and emerging applications and technologies that make it an investment for the future as well as for the present.

15) *Strategy Partners International Ltd. (2003c).* Document and Content Output and

Presentation: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28315

Abstract: Document and Content Output and Presentation systems are fundamental to Information Technology. They provide a cost-effective, accurate, and operationally simple mechanism to deliver structured and unstructured documents from data processing and document and content repositories to people in the most appropriate format. They offer the capability to

improve the presentation of the content, format it for the particular viewing device, and present the brand image of the sender.

This User Guide sets out to explain in straightforward terms how Document and Content Output and Presentation works, where and how it delivers real benefit to organizations, and the key current and emerging applications and technologies that make it an investment for the future as well as for the present.

16) Strategy Partners International Ltd. (2003d). Document and Web Content Management:

AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-

docrep.asp?ID=28317

Abstract: Document and Web Content Management (D&WCM) is a set of generic IT functionality that is used to create, manage, and exploit unstructured information. It is sold as a set of software and services for a broad spectrum of applications from archiving to personalized multi-channel electronic commerce. This guide sets out to explain in straightforward terms how Document and Web Content Management (D&WCM) works, where and how it delivers real benefit to organizations, and the key current and emerging applications and technologies that make it an investment for the future as well as for the present.

Category 3: Literature that Examines the Role of SharePoint as a Specific Selected ECM Implementation Product (the How)

What is SharePoint as an ECM product.

17) Bishop, D. (2007). Enterprise Content Management with Microsoft SharePoint. Retrieved

November 9, 2007, from

http://www.ecmconnection.com/Downloads/Detail.aspx?docid=0f4b7d88-db08-45cf-9bb7-

8fe7f7fd6c0e

Abstract: In February 2007, with the release of Microsoft Office SharePoint Server 2007

(MOSS, Windows SharePoint Services 3.0 (WSS 3.0) and Microsoft Office 2007 suite,

Microsoft officially entered the Enterprise Content Management (ECM) arena. Microsoft

provides a robust, scalable ECM platform that rivals those of traditional ECM vendors. With the

addition of mature SharePoint technology partners, Microsoft is a viable ECM contender today.

This paper reviews the capabilities of MOSS 2007 and WSS 3.0 for Enterprise Content

Management, evaluating their ability to serve as an Enterprise Content Management solution

today. The ability of Microsoft to meet the content management needs of customers relies on the

solution requirements of each organization. Microsoft will continue to rely on its partners to

enhance its ECM platform.

18) Gerhardt, D. (2007). SharePoint and InfoPath: A Powerful Duo. Windows IT Pro. Vol 13,

Issue 4, p. 55-59. Retrieved October 24, 2007, from EbscoHost: Computer Source

Abstract: The article focuses on the use of the Microsoft Office InfoPath 2003 Service

Pack 2 in creating the form library files to activate the document-sharing and collaboration

capabilities of Microsoft Windows SharePoint Services 2.0. The InfoPath can be used in

designing and filling out electronic forms, which are stored as XML. It can also be used in

validating data that users enter, as well as enable or disable controls in the form view.

19) **Holme, D. (2007).** The File Share Is Dead: Long Live SharePoint Document Libraries.

Windows IT Pro, Vol. 13 Issue 5, p. 69-73. Retrieved October 24, 2007, from EbscoHost:

Computer Source

Abstract: The article discusses the things that can be done using the new Windows

SharePoint document libraries. (Holme) explains that one can create a document library in

Windows SharePoint Services 3.0. One can also set permissions on a document library and

secure it automatically. He adds that after creating and securing the library, the user can add files

to it. The system also allows the user to view and edit documents and monitor the changes and

activities in a document library, among others.

20) **McKenna, E. (2007).** SharePoint & Office Pro: How SharePoint Matches Up to Public

Folders. Windows IT Pro. Vol. 13 Issue 7, p. 61-65. Retrieved October 24, 2007, from

EbscoHost: Computer Source

Abstract: The article reviews the computer software SharePoint from Microsoft.

21) **Microsoft. (2007a).** Microsoft Office SharePoint Server 2007 Evaluation Guide. Retrieved

November 2, 2007, from http://go.microsoft.com/fwlink/?linkid=83060&cicid=0x409

Abstract: This evaluation guide is designed to give you a solid understanding of the

design goals and feature set for Microsoft® Office SharePoint® Server 2007 and a familiarity

with the product implementation. It provides an overview of the solutions and benefits provided

by Office SharePoint Server 2007, along with descriptions of new and improved features in the

areas of portal, search, content management, business forms and integration, and business

intelligence. It also provides a hands-on tour of the product's main feature areas and concludes with useful information for administrators and developers.

The ultimate goal of this guide is to aid the reader in performing a thorough and effective evaluation of Office SharePoint Server 2007. This guide is intended for anyone who is interested in learning more about Office SharePoint Server 2007 and wants hands-on experience.

22) Microsoft. (2007b). Microsoft Windows SharePoint Services 3.0 Evaluation Guide.

Retrieved November 2, 2007, from http://technet.microsoft.com/en-us/windowsserver/SharePoint/bb400753.aspx

Abstract: This Evaluation Guide is designed to give you a solid understanding of the design goals and feature set for Microsoft Windows SharePoint Services 3.0 and a familiarity with the implementation of this technology in Windows Server 2003. It provides an overview of the solutions and benefits enabled by Windows SharePoint Services as well as descriptions of new and improved features in the areas of collaboration, storage and security, deployment and management, user interface, and platform extensibility. It also provides a hands-on tour of the main feature areas of Windows SharePoint Services and includes useful information for administrators and developers.

The ultimate goal of this guide is to aid the reader in performing a thorough and effective evaluation of Windows SharePoint Services. This guide is intended for anyone who is interested in learning more about Windows SharePoint Services and wants hands-on experience.

Implementing SharePoint 2007™.

23) Bates, S. and Smith, T. (2007). SharePoint 2007 User's Guide: Learning Microsoft's

Collaboration and Productivity Platform. New York: Springer-Verlag, Inc.

Abstract: Microsoft Office SharePoint Server 2007 and Windows SharePoint Services 3.0

provide a collection of tools and services you can use to improve user and team productivity,

make information sharing more effective, and facilitate business decision-making processes. In

order to get the most out of SharePoint 2007, you need to understand how to best use the

capabilities to support your information management, collaboration, and business process

management needs.

In this book, we walk you through the components and capabilities that make up a

SharePoint 2007 environment. We provide step-by-step instructions for using and managing

these elements, as well as recommendations for how to best leverage them. We then take two

common SharePoint uses, document management and project information management, and

walk you through creating samples of these solutions. We describe the challenges these solutions

are designed to address and the benefits you will receive.

24) Londer, O., English, B., Bleeker, T., and Coventry, P. (2007). Microsoft Windows

SharePoint Services 3.0 Step by Step. Washington: Microsoft Press

Abstract: The smart way to learn Microsoft Windows SharePoint Services 3.0 – one step

at a time! Experience learning made easy – and quickly teach yourself how to use Windows

SharePoint Services to enable effective team collaboration. With Step by Step, you set the pace –

building and practicing the skills you need, just when you need them!

25) Microsoft. (2007c). Planning and architecture for Windows SharePoint Services 3.0

technology. Retrieved November 2, 2007, from

http://technet2.microsoft.com/windowsserver/WSS/en/library/ab2bedd4-d12b-4825-9c10-

1c5e4079e1c61033.mspx?mfr=true

Abstract: This book provides information and guidelines to lead a team through the steps

of planning the deployment of a solution based on Microsoft Windows SharePoint Services 3.0.

The audiences for this book are business application specialists, line-of-business specialists,

information architects, IT generalists, program managers, and infrastructure specialists who are

planning a solution based on Windows SharePoint Services 3.0. This book also includes links to

planning worksheets for recording information related to your planning and deployment

activities.

Review of the Literature

The review of the literature examines the phenomenon of enterprise content management (ECM), reasons to implement ECM, and the role of SharePoint™ as a specific selected ECM product. The purpose of this literature review is to provide information managers with an introduction to ECM concepts, to provide a rationale for the use of SharePoint, as a selected example of an ECM tool designed to support achievement of information related strategic goals, and to provide information necessary to prepare for an ECM implementation using SharePoint. The review of the literature is structured around three larger themes: (1) literature that explains describes and defines ECM, including the purpose; (2) literature that presents reasons to implement ECM, including a list of implementation steps; and (3) literature that describes and defines SharePoint, which concludes with how to plan for a SharePoint implementation.

Theme 1 - The Phenomenon of ECM

Literature summarized in this component examines the purpose of, description and definition of ECM and includes examination of key processes and uses of ECM, in order to provide information managers with an introduction to ECM.

Purpose of ECM.

Organizations need to make information accessible and usable in order to improve efficiency (Blair, 2004) and "to leverage enterprise knowledge assets for competitive advantage (EMC Corporation, 2006a p. 4)." ECM "… provide[s] users with greater access to digital information from a common user interface through the utilization of industry standard Internet browser technology (AIIM, 2007 p. 3)."

According to Blair (2004), ECM captures, manages, and controls content according to business and legal needs. ECM helps create new content with common desktop applications, such as Microsoft Word. ECM manages content within the ECM and content from other applications such as Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and Web applications. And ECM adds intelligence to content through categorization, metadata, and tags, making it easier to search and faster to retrieve content (EMC Corporation, 2006b).

Blair (2004) also notes that organizations need to comply with laws, regulations, and other directives regarding the care and handling of information. ECM controls information through the review, revision, and approval process according to user defined business rules. In addition, ECM enables relationships between content, allows content to have multiple identities for various contexts and renditions, and allows users to reuse and repurpose information for distribution (EMC Corporation, 2006b).

Description and definition of ECM.

Enterprise Content Management Systems (ECMs) are fairly new compared to the introduction of networks in 1969 (Kemp, 2007). Kemp (2007) states …"it is widely believed that ECMs are an advancement of Electronic Document Management Systems (EDMSs) which were first released during the late 1980's (p. 5)" and had the ability to store scanned images. Since then, the term Document Management has been changed to Content Management (AIIM, 2007).

Stand alone ECM applications increased in popularity in the 1990's with the introduction of software that enabled users to access documents from any desktop and offered intelligent storage. In 2000 and 2001 software companies began the production of ECMs, a culmination of development in the areas of Document Management (DM), Collaboration/Groupware, Records

Management (RM), Web Content Management (WCM), and Workflow/Business Process Management (BPM) (Kemp, 2007).

The term ECM was introduced in 2001 by AIIM International and is defined as the "technologies, tools, and methods used to capture, manage, store, preserve, and deliver content across an enterprise (Blair, 2004 p. 65)." ECM manages traditional content types as well as electronic objects throughout what is known as a contents lifecycle, including creation, management, deployment, and archiving or destruction of content (EMC Corporation, 2005).

Content can be unstructured or structured and it can be digital or physical information. Unstructured information is the "free-form content that exists outside the confines of databases or systems with fixed routines and pathways (Blair, 2004 p. 65)." Structured information comes from other applications such as ERP, CRM, and portals (EMC Corporation, 2006a). Digital information includes text documents, spreadsheets, still images, audio and video files, and e-mail (EMC Corporation, 2006b). Physical information resides on paper.

Key processes and uses of managing ECM.

ECM covers a wide range of technology categories described in the paragraph by Blair (2004), including capture, manage, store, preserve, and deliver. Capture is the process of "collecting, identifying, and classifying business content into the systems that will house and manage it (p. 65)." "Manage focuses on handling content with specific goals (p. 65)." Store and preserve include "the technologies and techniques that enable the efficient, accurate retention and storage of content that supports business and legal goals (p. 65)." Deliver provides "timely, secure access to business content to the systems and people who need it (p. 65)." The components of the technologies and tools used to capture, manage, store, preserve, and deliver

ECM are shown in Appendix A, outlined in Appendix B, and described in Appendix C in this

document.

Theme 2 - Reasons and Steps to Implement ECM as an Enterprise Content Strategy

Literature summarized in this component provides reasons to implement ECM and includes an analysis of implementing ECM as an enterprise content strategy in order to achieve information related strategic goals.

Reasons to implement ECM.

EMC Corporation (2006a, 2006b, and 2006c), Hodgson (2004), and Kemp (2007) suggest six reasons to implement an ECM as follows:

Increased competitive advantage.

Kemp (2007) notes that the effective capturing, storing, preserving, and delivering of information, content, and documents can deliver benefits by increasing competitive advantage. In addition, the ability to find existing content can help leverage organizational knowledge for competitive advantage via cost leadership or differentiation leading to above average performance (Kemp, 2007). The EMC Corporation (2006c) highlights obtaining increased competitive advantage through accelerating new product innovations and introductions, leading to faster product development by getting products to market faster than competitors. Additionally, the EMC Corporation (2006c) cites the opportunity to improve operational efficiencies leading to a number of outcomes described below, including productivity savings, reduced customer service costs, improved content quality, increased social networking, and reduced cost of compliance.

Productivity savings.

"According to industry studies, knowledge workers spend as much as 40 percent of a typical business day just sorting through [locations inside and outside the company] to find specific content (EMC Corporation, 2006b p. 31)," often without success, resulting in inefficiencies and poor decision making. "ECM allows an organization to gain control of information, provide knowledge workers with access to all of the information they need and are allowed to see, and differentiate content based on its relevance (EMC Corporation, 2006c p. 4)." The ability to index content and use search capabilities allows users to find content, increase business productivity, and reduce the costs associated with finding content (Kemp, 2007). An ECMs can lower staffing costs by streamlining content creation, reducing time spent searching for or waiting for information, and reducing website administration (Hodgson, 2004). In addition, ECM can speed up business processes and automate repetitive processes through workflow and BPM to increase operational effectiveness and productivity (Kemp, 2007, EMC Corporation, 2006c).

Reduced customer service costs.

An ECMs can provide better customer service by giving workers all of the information they need and delivering that information while interacting with the customer (EMC Corporation, 2006c). Real-time access to information can reduce duration of calls, eliminate callbacks, and increase call volume per person (Hodgson, 2004). Automating business processes through workflow and BPM can increase customer response time (Kemp, 2007). Improved client relationships and better customer retention rates lead to higher profits (EMC Corporation, 2006c).

Improved content quality.

According to EMC Corporation, "… unstructured content is growing at anywhere between 65 percent and 200 percent per annum (2006a p. 5)." An ECMs can decrease the amount of outdated, inaccurate information, ensure consistency of content, and break content into components for reusability (Hodgson, 2004). In addition, metadata helps users to find content that can be modified or referenced rather than duplicated (Kemp, 2007).

Increased social networking.

An ECMs can improve business efficiency, new product development, and supply chain responsiveness by using collaborative workspaces and integrating with external systems (EMC Corporation, 2006a). ECM streamlines collaborative decision making processes (EMC Corporation, 2006c) and increases social networking by allowing more than one person to work on content at the same time to share information. In addition an ECMs allows virtual teams to bring together disparate users, utilize colleague's knowledge, form relationships, provide growth of new ideas and innovation, and provide current information across the company (Kemp, 2007).

Reduced cost of compliance.

An ECMs can reduce content duplication with metadata. Metadata can also help with company policies that enforce removal of unnecessary original documents, enable content retention for compliance of regulations and laws, and use workflow for automated document retention, archiving, and deletion to reduce the cost of compliance (Kemp, 2007). ECM can simplify compliance with regulatory requirements (EMC Corporation, 2006c) and reduce the chance of litigation for not complying with regulations (EMC Corporation, 2006a).

Steps to implement ECM as an enterprise content strategy.

Allen (2007), AIIM (2007), EMC Corporation (2006b), and Porter-Roth (2004) suggest steps to consider when implementing ECM as an enterprise content strategy. Collectively, these four steps include creating a cost/benefit analysis, planning an ECM strategy, reviewing recommended practices, and preparing a requirements guideline. A discussion of each step follows.

Step 1: Cost/Benefit analysis

Gaining competitive advantage and increasing revenues are key factors of any ECM implementation. The highest returns of an ECM are derived from improving customer service and increasing the number of customer transactions (Allen, 2007).

A consolidated cost summary and Return on Investment (ROI) calculation can be used to analyze the costs and benefits of implementing an ECMs. An ROI can include a comparison of costs per transaction and time required to complete transactions, key corporate data, employee costs, process time statistics, and other costs such as those associated with lost or misplaced files, reconstruction of files, or compliance (Allen, 2007).

An ROI should trace cost factors to the organizational budget (Allen, 2007). Project costs can include new hardware, new software, media conversion, integration services, electronic forms development, training, development and IT support, annual maintenance, predictable upgrades, and supplies (Allen, 2007). Project costs can be compared to cost savings through the use of BPM and workflow, document and content capture, document and content output and presentation, and WCM. Examples of potential cost savings through implementing an ECM are shown in Table 4.

Business Process	Quantifiable Savings	Indirect Savings
BPM and Workflow	Reduced cost of physical resources (Strategy Partners International Ltd., 2003a).	Increased speed of the business cycle (Strategy Partners International Ltd., 2003a).
	Increased operating efficiency and effectiveness (Strategy Partners International Ltd., 2003a).	Increased information availability (Strategy Partners International Ltd., 2003a).
Document and Content Capture	Reduced office relocation costs (Allen, 2007).	Increased speed of the business cycle (Strategy Partners International Ltd., 2003b).
	Reduced office and file space (Allen, 2007).	Increased information availability (Strategy Partners International Ltd., 2003b).
Document and content output and presentation	Reduced equipment costs (Allen, 2007).	Increased speed of the business cycle (Strategy Partners International Ltd., 2003c).
	Reduced paper and consumables (ink) usage (Allen, 2007).	Increased brand image (Strategy Partners International Ltd., 2003c).
	Reduced postage costs (Allen, 2007).	Increased customer fulfillment (Strategy Partners International Ltd., 2003c).
	Reduced routing distribution (Allen, 2007).	Extended brand image (Strategy Partners International Ltd., 2003c).
Web content management	Reduced cost of production (Strategy Partners International Ltd., 2003d).	Increased efficiencies (Strategy Partners International Ltd., 2003d).
	Reduced cost of delivery (Strategy Partners International Ltd., 2003d).	Increased customer satisfaction and retention (Strategy Partners International Ltd., 2003d).
	Reduced maintenance of Web site content (Strategy Partners International Ltd., 2003d).	Reduced cost of customer service (Strategy Partners International Ltd., 2003d).

Table 4 – Potential ECM Cost Savings

Step 2: Planning an ECM strategy

In planning an ECM strategy an organization should consider stakeholders and users, scope, functionality, classification, and information inventory and content capabilities.

Stakeholders and users. Involve all stakeholders in requirements planning (Kemp, 2007). Define the target audience (employees, partners, and suppliers) and consider localization because 80 percent of non native English speakers prefer to transact business in their native language (EMC Corporation, 2006b). Motivate users by focusing on functions that are business critical and process centric such as information search and retrieval, access to information, and collaboration. Use tools and techniques that are familiar to users such as a Web interface, integration with Microsoft Office, Microsoft Outlook, and Windows Explorer (EMC Corporation, 2006c).

Scope. Decide on centralized or distributed content management and whether global content will be consistent across regions while retaining localization. Review the content lifecycle including content approval, audit trails, retention requirements, and migration strategy (Hodgson, 2004). Review the potential for integration with ERP and CRM, which are consumers as well as contributors of content (EMC Corporation, 2006b).

Functionality. Consider implementing necessary foundational components and then adding other functionality required by business units (AIIM, 2007). Take an incremental approach by identifying high-value scenarios and building progressively to focus on specific requirements, get budgetary approval, and achieve a quick ROI (EMC Corporation, 2006a). Identify the most "business critical content-centric processes (EMC Corporation, 2006a p. 7)" such as industry regulations, managing relationships with suppliers, or improving customer relationships. Examples include paper intensive processes (expensive to handle, difficult with

compliance, and time intensive), content collaboration (speed decision making and work with latest versions), time critical processes (bring product to market faster), consolidating operations (mergers and acquisitions that combine multiple systems and information silos), and compliance (automate document archival and security) (EMC Corporation, 2006c).

Classification. Full text search examines all words in a document and lacks precision. Taxonomy gives a user the additional ability to browse content hierarchically increasing the chance of finding relevant content (Kemp, 2007). Gather metadata from those most familiar with the content. Determine a classification and taxonomy system so that content can be described and controlled before it is re-used (Strategy Partners International Ltd., 2003d). Automate metadata on access, revision, or update of content. Use a controlled vocabulary and document templates to establish document hierarchies and indexing (Hodgson, 2004).

Information inventory and content capabilities. "Enterprise content is a collection of related information objects required to complete a business process. An enterprise content strategy defines all digital information integral to the successful completion of a business process … (CAP Ventures, Inc, 2003 p. 3)." Asset-specific content capabilities enable the application of lifecycle management to content according to the type of digital information required for business processes. These capabilities include DM, RM, WCM, BPM, and DAM (CAP Ventures, Inc, 2003). Develop an enterprise content strategy by taking an information inventory of digital assets and applying lifecycle management (from content creation through archival) to those assets, which leads to establishing the value of those assets. Map asset-specific content capabilities to the content to eliminate inefficiencies and redundancies (CAP Ventures, Inc, 2003).

Process-specific content capabilities. Section 404 of the Sarbanes-Oxley Act (2002), requires internal financial systems in place (RM) and management of websites (WCM). Asset-specific and process-specific capabilities, such as contract management and RM, include business documents, e-mails, and contracts and are managed through DM, Collaboration, RM, BPM, and Email Management (CAP Ventures, Inc, 2003). Be sure to map process-specific content capabilities to the content for compliance.

Content audit/inventory. A content audit/inventory helps to determine the content that is most complex to manage such as content from many different components of information, multimedia content, large volumes of information, frequency of creation or acquisition, frequency of update or revision, re-use, localization, and security. Determine the customer for the content and which content has the most value – usually that which will contribute to increased revenue or reduced costs (Hodgson, 2004).

Content map. Prior to implementation, an organization should map business processes to understand the flow of content in the business, where it starts (specific department, enterprise application, or outside the organization), how and where it crosses boundaries, and how it interacts with other systems. Conduct an impact analysis of development work and customizations and match the results to available resources (EMC Corporation, 2006a).

Step 3: Reviewing recommended practices

The following section details three recommended practices in selecting and implementing an ECM, based on selection, project phases/activities, and implementation.

Selection. "Industry guidelines provide specific information to users that will enable them to gain detailed information necessary to successfully prepare for, select, and implement the desired technology (AIIM, 2007 p. 8)." Stick to industry standards, promoted by organizations

such as the Workflow Management Coalition and XML.org, to protect enterprise investment (EMC Corporation, 2006b).

   Project phases/activities. Clearly define existing processes and procedures and identify issues and problems through the following activities (AIIM, 2007):

1) Develop a high-level overview of business processes. Identify all general work activities, policies, and business procedures and how they flow throughout the organization.

2) Obtain detailed processing information for the high-level business processes.

   a) Identify how information is received, processed and moved between functions.

   b) Identify processing rules and conditions as the document moves through each process.

3) Develop a "Processing Metrics Report" that includes time spent on all manual activities. Identify processes that can be replaced with technology or through change management.

4) Develop solution requirements by establishing a company-wide document classification and indexing methodology.

5) Clearly define business objectives, functional requirements, and expectations.

   a) Define business related critical success factors such as improved service, ability to track and monitor work activities, centralized historical information, increased resource efficiency, compliance with government regulations, or decreased storage costs.

   b) Define technical related critical success factors such as scalability, migration path, modularity, accessibility, or industry standardization.

   Implementation factors. System administration, security requirements, capacity planning, system performance, system scalability, and training requirements should be considered during implementation. Implementation factors are outlined in Table 5 (AIIM, 2007 Hodgson, 2004).

Implementation Factor	Function
System administration	Functions required to administer and control applications, security, hardware, and data backup/migration.
Security requirements	User authentication, document authentication, and secure network transactions.
Capacity planning	The categorization of documents by type, retention period, and frequency of access.
System performance	Determining the anticipated response times for document, viewing, printing, and scanning/indexing.
System scalability	The ability to increase the number of processors, servers, and storage capabilities.
Training requirements	Content creators, content managers, content users, and system administrators.

Table 5 - Implementation Factors

Step 4: Preparing a Requirements Guideline

A requirements guideline report should outline project responsibility, initial need

identification, team formalization, product education, and business process analysis.

Project responsibility. Define content creators, support departments, and key stakeholders

(Porter-Roth, 2004).

Initial need identification. Do a preliminary analysis to determine the project needs. List

basic issues, risks of not taking further action, benefits gained, and resources required (Porter-

Roth, 2004).

Team formalization. Include subject matter experts and technical resources such as

business operations (determine what work steps the new system should provide, how the

information will be presented, and how the new system would improve business), information

technology (responsible for technical analysis), and purchasing/procurement (provide financial

data) (Porter-Roth, 2004).

Product education. Understand the problem and how technology can resolve it. Identify potential products. Attend conferences, participate in user groups, and visit other companies (Porter-Roth, 2004).

Business process analysis. Identify business processes through the following activities (Porter-Roth, 2004):

1) Perform an analysis of the business process focused on the content and how it is used to perform business operations.

2) Document who uses the content, how it is received and distributed, conversion requirements, and categorization.

3) Create a baseline to identify the functional requirements. "… completely document the current process(es) before … begin[ing] to reengineer them using new technology and processes (p. 3)."

4) Create a written report that includes processes, document types and volumes, workflow diagrams, and examples of physical documents.

5) Review what changes can be made to automate manual processes.

Theme 3 - SharePoint™ as a Specific Selected ECM Implementation Product

Literature summarized in this component explores SharePoint as one selected ECM product and includes information that addresses aspects of SharePoint implementation, in order to present SharePoint as a viable ECM tool.

Describe and define SharePoint.

With the introduction of SharePoint Portal Server 2001, Microsoft provided basic content services such as basic document management (DM). Windows SharePoint Services 2.0, SharePoint Portal Server 2003, and Content Manager Server were released in 2003 providing DM, WCM, and collaboration. "In February 2007, with the release of Microsoft Office SharePoint Server 2007 (MOSS), Windows SharePoint Services 3.0 (WSS 3.0), and the Microsoft Office 2007 suite, Microsoft officially entered the Enterprise Content Management (ECM) arena (Bishop, 2007 p. 2)."

WSS 3.0 offers content services such as basic DM, collaboration, limited workflow, and basic search. MOSS is built on top of WSS 3.0, utilizes WSS 3.0 features, and includes RM, WCM, extended workflow, extended search, and forms processing (Bishop, 2007). As noted in the product materials, "Microsoft Office SharePoint Server 2007 builds on top of Windows SharePoint Services 3.0 to provide a comprehensive solution with enterprise-scale capabilities to meet critical needs (Microsoft, 2007a p. 5)" and "helps organizations gain better control and insight over their content, streamline their business processes, and access and share information (Microsoft, 2007a p. 1)."

List SharePoint key features, processes and uses.

SharePoint provides the ability to create, publish, and manage content (Microsoft, 2007a). The primary components of the ECM "manage" aspect of SharePoint are DM, Collaboration, RM, WCM, Workflow, and BPM (AIIM, 2004). The following text describes eleven key features and processes, based on WSS 3.0 and MOSS (Bishop, 2007).

Document Management

With SharePoint, a company can "easily manage documents and help ensure integrity of content (Microsoft, 2007b p. 10)." SharePoint DM features include the ability to check documents in or out, track changes to documents, keep multiple versions of documents, route documents for approval before publishing, and tag documents with metadata for sorting and content management (Microsoft, 2007c).

SharePoint stores documents in document library lists. Document libraries provide views and security levels and allow a user to create documents through Microsoft Office or upload documents directly to the library. The fundamental aspects of document library management include creating, configuring, and securing libraries and viewing, editing, and monitoring documents in those libraries. Document libraries enable collaboration, check in/out, version control, content approval, workflow, and remote and offline access (Holme, 2007).

Collaboration

The Collaboration feature in SharePoint is primarily concerned with distributing information, data, and documents to other people (Microsoft, 2007c). Collaboration provides forums for brainstorming ideas, building knowledge bases, or gathering information through wikis and blogs. Collaboration can help to "Improve team productivity with easy-to-use collaborative tools... (Microsoft, 2007b p. 9)," such as sites and lists.

Through use of the collaboration feature, a company can broadcast information to a group of people and collect information or feedback. Collaboration includes sections for describing, publicizing, or announcing an event or other information, viewing calendar or event information, reading documents or editorial articles, or posting or uploading information and documents (Microsoft, 2007c).

Records Management

The SharePoint Records center is designed to collect, organize, and control records. Information Management Policies are actions to be performed on a record that limit user interaction and achieve a high level of compliance through automation. Policies include auditing and reporting of policy-based actions, retention (expiration), and collaboration (user communication statements) (Bishop, 2007).

Through site templates, records repositories support customizable policies, hold capabilities, retention, expiration schedules, Integrated Windows Rights Management Services, access control and security, information rights management, tracking and auditing, and storage sites, records and vaults (Microsoft, 2007a; Microsoft, 2007b).

Other functionality of RM includes "hold orders," which interrupt the expiration process, document routing, document conversion (InfoPath, Word Documents or XML to web pages), and email retention (Bishop, 2007). Additionally, RM offers label and bar code support and the ability to treat E-mail content as records with managed mail folders and mail management policies (Microsoft, 2007a).

Web Content Management

SharePoint WCM "includes many features that are useful for designing, deploying, and managing intranet portals [and] corporate Internet presence Web sites (Microsoft, 2007a p. 42)."

Site templates ensure a consistent interface, are easy to select and implement, and can be customized. Template-based Web pages include page layouts and a master page that controls the look, feel, and content of a page. SharePoint includes enterprise templates for general use and publishing templates that display both internal and public content. Site templates support specific content and include a news site, publishing site with workflow, collaboration portal, and publishing portal. Office SharePoint Designer 2007 can be used to create Master Pages and Page Layouts (Microsoft, 2007a).

Workflow and Business Process Management

Workflow allows a user to automate and gain visibility of common business activities. Examples of workflow include document review and approval, issue tracking, and signature collection (Microsoft, 2007a). Communication features let users know when actions are required or changes are made to content (Microsoft, 2007b). Workflows can be associated with a document library, list, or content type (McKenna, 2007). Default workflows include approval, feedback collection, signatures collection, and disposition approval. Additional workflows can be created in VisualStudio.Net 2005 and Microsoft SharePoint Designer 2007. SharePoint workflow is an implementation of Windows Workflow Foundation (Bishop, 2007).

The SharePoint form library allows for the management of XML based form files, which are structured and allow for consistent data entry (Gerhardt, 2007). BPM provides forms-based business processes and the ability to connect with databases and line-of-business applications (Microsoft, 2007a). Forms can be built from scratch or from built-in templates such as status reporting, issue tracking, and purchasing.

SharePoint is integrated with Microsoft Office InfoPath, an application for designing and using electronic forms (Gerhardt, 2007). Microsoft Office InfoPath Forms Services enables the

design and deployment of forms and delivers centralized forms management and control. The Form Import Wizard can import Microsoft Office Excel or Word forms into Office InfoPath 2007 forms (Microsoft, 2007a).

In addition to the "manage" components of ECM, SharePoint offers Enterprise Search and Retrieval, Business Forms, Business Intelligence, Security, Administration, and Integration with Microsoft Office.

Enterprise Search and Retrieval

Search provides the ability to locate relevant content distributed across a wide range of sites and other sources. Search can be used to perform advanced queries or property-based searching, includes duplicate result handling, and is a shared service that provides content gathering, indexing, and querying (Microsoft, 2007a). MOSS search includes full-text searching, basic property-based searching, term hit-highlighting, relevance ranking, and suggested terms (Bishop, 2007). Relevance uses attributes to maximize relevance of results and search document content, line-of-business application data, and Web content. With people search, personal information can be indexed and used in queries. Business data search can include data from ERP, CRM, or custom applications, which is accessed through the Business Data Catalog (Microsoft, 2007a).

Business Forms

The Business Data Catalog provides access to external data, such as line-of-business applications and databases. Data connection libraries store Office Data Connection files that describe connections to external data (Microsoft, 2007a). Data connections pull in data from other applications and Web Parts display content from other systems (Microsoft, 2007c).

Business Intelligence

Integrated business intelligence dashboards assemble and display business information from disparate sources. Business intelligence provides the ability to deliver business critical information through server-based spreadsheets or key performance indicators (KPIs). Spreadsheets can be created as part of a portal, dashboard, or business scorecard. Key Performance Indicators (KPIs) communicate goals and status. Web-based business intelligence uses Excel services. Report Center can be used for report access and management and includes a report library, data connection library, and a dashboard template (Microsoft, 2007a).

Security

Security employs a range of authentication providers, policy management, group management, and permission levels (Microsoft, 2007a). Security can be applied to any securable object in SharePoint including a site-collection, top-level site, sub-site, library or list, folder, document, or item.

By default, permissions are inherited, however they can be reconfigured (Holme, 2007, Microsoft, 2007b). A securable object can inherit security permissions from a parent object or have its own security. In addition, pluggable authentication allows administrators to use Windows Authentication (Bishop, 2007). With the rights-trimmed user interface users can only see the features that they have permissions to use (Microsoft, 2007b).

Administration

SharePoint offers a single integrated platform to manage intranet, extranet, and Internet applications and integrate with programming API's and XML Web services. Extensibility provides an application programming interface (API) that allows custom applications, XML, and SOAP integration. Site Model provides a template-based infrastructure for automated navigation

and a consistent user interface. Management tools are centralized and include delegated

administrative facilities. Storage allows content to reside in Microsoft SQL Server™ with data

management capabilities, version control, metadata, and site-level search (Microsoft, 2007a).

Microsoft Office integration

Content creation and editing is tightly integrated with the Microsoft Office 2007 Suite.

The integration gives users access to versioning, metadata, and workflow (Bishop, 2007). Users

can create workspaces, post and edit documents, and view and update calendars on SharePoint

sites from Microsoft Office system files and programs. SharePoint is integrated with Office

2007, Office Outlook 2007, and Office SharePoint Designer 2007 (Microsoft, 2007b).

Other applications can be integrated with SharePoint using various application

programming interfaces and web services (Bishop, 2007). SharePoint task lists, discussion

boards, and document libraries can be integrated with Microsoft Outlook 2007. Outlook 2007

provides two-way offline synchronization of all but the document library. Exchange public

folders can be used to archive group discussions and are accessible through SharePoint Search.

Microsoft Office Groove 2007 provides two-way synchronization between document libraries. In

addition, Microsoft Access 2007 provides two-way synchronization between custom lists

(McKenna, 2007).

Conclusions

Enterprise Content Management (ECM) in general refers to "the technologies, tools, and methods used to capture, manage, store, preserve, and deliver content across an enterprise" (Blair, 2004). ECM gives information managers the ability to "simplify information management, collaboration, and business process automation" (Bates and Smith, 2007). ECM helps organizations that need to comply with laws and regulations, regarding the care and handling of information, take control of their information. In addition, ECM helps to make information accessible and usable in order to contribute strategically and improve efficiencies (Blair, 2004).

The specific steps to implement an ECM vary from author to author but most often include the following common elements: a cost/benefit analysis, requirements planning, review of recommended practices, and creation of a requirements guideline. A cost/benefit analysis can be used to analyze the ROI of implementation (Allen, 2007). Stakeholders, scope, functionality, and content should be considered during requirements planning (Kemp, 2007; EMC Corporation 2006b; Cap Ventures, Inc., 2003; Hodgson, 2004). Recommended practices should be considered while defining existing processes (AIIM, 2007). And, a requirements guideline can be used to outline the project (Porter-Roth, 2004).

SharePoint™ is a Microsoft product that provides ECM functionality designed to help organizations streamline business processes (through workflow and BPM) and share information (through collaboration) (Microsoft, 2007a). Information managers working in small to medium, private sector, global manufacturing companies may be able to achieve information related strategic goals, such as improving communication and focusing on profitability through increased operating efficiencies, more easily and quickly by using SharePoint to manage

documents, collaborate, manage Web content, and manage business processes through workflow. The reasons for this are numerous (see full description in the Review of Literature, Theme 2 – Reasons to Implement ECM. In summary, SharePoint integrates with Microsoft Office 2007 to provide Document Management capabilities that can create, store, retrieve, edit, and secure content (Bishop, 2007). SharePoint Collaboration can help with information, data, and document distribution (Microsoft, 2007c). SharePoint provides features and services to support Records Management and enable compliance through policies, retention (Bishop, 2007), access control, and security of corporate information (Microsoft, 2007a). SharePoint provides Web Content Management that helps to design, deploy, and manage websites (Microsoft, 2007). Additionally, SharePoint Workflow and Business Process Management can provide automated routing and processing to help automate business processes (Bishop, 2007).

There are five important steps in preparing for an ECM implementation using SharePoint. These are: determine user needs, determine the number of users and user types, plan for web site structure and publishing, plan for content, and plan for integration with Microsoft Office (Microsoft, 2007c). Each step is outlined below, with focus on the role of SharePoint.

Step 1: Determine user needs

a) Identify user needs and map those needs to features in the sites. Special considerations include client, server, and line-of-business integration, add-on solutions, features, and applications (Microsoft, 2007c).

b) Map needs to particular features and review the planning considerations to determine requirements or considerations to use a particular feature. Features include document storage and workflow, communication, collaboration features, information management

features, and special sites such as blogs, wikis, document workspaces, and meeting

workspaces (Microsoft, 2007c).

Step 2: Determine number of users and user types

a) Determine server capacity and special features and settings to incorporate in sites

(Microsoft, 2007c).

b) Estimate how many users will use the SharePoint site, how users will interact with sites

and the percent of users that will work with specific features such as communication,

collaboration, document storage, and search (Microsoft, 2007c).

c) Determine special access requirements such as remote access, Internet access, mobile

access, offline capabilities, or anonymous users (Microsoft, 2007c).

Step 3: Plan for Web site structure and publishing

Key among the effectiveness of a site is the ability to predictably locate the site and the

content needed within the site (Microsoft, 2007c).

a) Sites and sub sites. "SharePoint sites work best when they are focused on a single effort

or are used by a single team (Microsoft, 2007c p. 32)." Consider the following factors for

the number of sites and collections: how many users will use the sites, how the users are

related or interact with each other, how the users will use the site, what type of content

will be stored in the site, and the complexity of information that will be stored in the site

(Microsoft, 2007c).

b) Site navigation. A site collection can use the same navigation bars, content types,

workflows, security groups, lookup fields across lists, search scope, and feature set

(Microsoft, 2007c). Create a site navigation diagram with all top-level Web sites and sub

sites that maps to the way people would use the information (Bates and Smith, 2007).

c) Templates. Templates provide a consistent structure throughout a site. Create templates that include all of the key components needed to support business processes (Bates and Smith, 2007).

d) Individual site content needs and structure. To help decide what content to put in the site and how to organize the content survey stakeholders and users to determine what they want in the site or begin with a rough organization plan for the site (Microsoft, 2007c).

Step 4: Plan for content

Structuring the content of the site makes it easier for users to find, contribute to, and work with that content (Microsoft, 2007c).

a) Lists. A list is a collection of information. Lists include announcements, calendar, contacts, custom lists, discussion boards, issue tracking, links, project tasks, and surveys (Microsoft, 2007c). Decide whether to use built in lists, create custom lists, or both.

b) Libraries. Libraries are collections of files that can be shared with other sites. Libraries are supported by templates, workflow, check in/out, and versioning (Microsoft, 2007c). Determine the libraries that fit business needs.

c) Content types. A content type defines attributes of a list item, document, or folder and can specify properties, workflows, templates, document conversions, and custom features for that content type. Document libraries and lists can contain one or multiple content types. After identifying existing content types identify custom content types by determining the parent content type, columns, template, and workflow to associate with the custom type (Microsoft, 2007c).

d) Workflows. Workflows can be associated with libraries, lists, or content types and can run on documents or list items (Microsoft, 2007c). Using workflow allows information to

be incorporated directly into business processes (Bates and Smith, 2007). Decide on how to create and integrate workflows into familiar tools and applications so that SharePoint becomes part of the daily routine (Microsoft, 2007c).

Step 5: Plan for integration with Microsoft Office

a) SharePoint integrates with Microsoft Office Outlook 2007 to enable collaboration between Calendars, Tasks, Contact lists, and libraries (Londer et al., 2007). Decide on what collaborative functionality to implement between SharePoint and Microsoft Outlook.

b) SharePoint integrates with Microsoft Office Excel 2007 to enable one-way synchronization of lists (Londer et al., 2007). Decide on what lists to share between SharePoint and Microsoft Office Excel.

c) SharePoint integrates with Microsoft Access 2007 to enable client-server databases with Windows SharePoint Services (Londer et al., 2007). Decide on what database accessibility to implement between SharePoint and Microsoft Access.

References

AIIM. (2003). Enterprise Content Management (ECM) 101. Retrieved November 30, 2007, from

    http://www.aiim.org/article-aiim.asp?ID=29086.

AIIM. (2004). Enterprise Content Management (ECM) Definitions. Retrieved November 4,

    2007, from http://www.aiim.org/article-aiim.asp?ID=27664.

AIIM. (2006). About AIIM - The Enterprise Content Management Association? Retrieved

    October 28, 2007, from http://www.aiim.org/article-aiim.asp?ID=18274.

AIIM. (2007). Recommended Practice. Analysis, Selection, and Implementation of Electronic

    Document Management Systems (EDMS). Retrieved November 9, 2007, from

    http://www.aiim.org/documents/standards/arp1-2007.pdf.

Allen, D. (2007). Cost/Benefit Analysis for Implementing ECM, BPM Systems. Information

    Management Journal. Vol. 41 Issue 3, p. 34-41. Retrieved October 24, 2007, from

    EbscoHost: Academic Source Premier.

Bates, S. and Smith, T. (2007). SharePoint 2007 User's Guide: Learning Microsoft's

    Collaboration and Productivity Platform. New York: Springer-Verlag, Inc.

Bell, C. (2007). Critical Evaluation of Information Sources Or, But Is It Credible? Retrieved

    November 17, 2007, from http://libweb.uoregon.edu/guides/findarticles/credibility.html.

Bishop, D. (2007). Enterprise Content Management with Microsoft SharePoint. Retrieved

    November 9, 2007, from

    http://www.ecmconnection.com/Downloads/Detail.aspx?docid=0f4b7d88-db08-45cf-9bb7-

    8fe7f7fd6c0e.

Blair, B. (2004). An Enterprise Content Management Primer. Information Management Journal,

Vol. 38 Issue 5, p. 64-66. Retrieved October 24, 2007, from EbscoHost: Academic Search

Premier.

Brache, A. (2002). How organizations Work: Taking a Holistic Approach to Enterprise Health.

New York, John Wiley & Sons, Inc.

Busch, C., De Maret, P., Flynn, T., Kellum, R., Le, S., Meyers, B., Saunders, M., White, R., and

Palmquist, M. (2005). Content Analysis. Writing@CSU. Colorado State University

Department of English. Retrieved November 26, 2007, from

http://writing.colostate.edu/guides/research/content/printformat.cfm?printformat=yes.

CAP Ventures, Inc. (2003). Developing an Enterprise Content Strategy: The Blueprint for

Universal Content Management. Retrieved October 24, 2007, from

http://www.ecmconnection.com/Downloads/Detail.aspx?docid=e5ca836a-d5ee-4d5b-9569-

a299651069d5.

Duhon, B. (2005a). ECM At Work – Wall Poster. Retrieved November 30, 2007, from

http://www.aiim.org/article-aiim.asp?ID=29914.

Duhon, B. (2005b).What is ECM? Retrieved October 28, 2007, from http://www.aiim.org/about-

ecm.asp.

EMC Corporation. (2005). A 15 Minute Guide to Information Lifecycle Management for

Enterprise Content Management Users. Retrieved November 9, 2007 from

http://www.aiim.org.uk/publications/ecm_at_work/pdfs/ecm_ilm_15min_guide.pdf.

EMC Corporation. (2006a). A 15 Minute Guide to Enterprise Content Management. Retrieved

October 24, 2007, from

http://www.aiim.org.uk/publications/ecm_at_work/pdfs/Ecm_15min_guide.pdf.

EMC Corporation. (2006b). A Guide to Evaluating Enterprise Content Management Software.

  Retrieved October 24, 2007, from

  http://www.aiim.org.uk/publications/ecm_at_work/pdfs/ecm_evaluation_guide.pdf.

EMC Corporation. (2006c). When Content Matters: Building the business case for enterprise

  content management. Retrieved October 21, 2007, from

  http://www.aiim.org.uk/publications/ecm_at_work/pdfs/15_min_guide_when_content_matte

  rs.pdf.

Gerhardt, D. (2007). SharePoint and InfoPath: A Powerful Duo. Windows IT Pro. Vol 13, Issue

  4, p. 55-59. Retrieved October 24, 2007, from EbscoHost: Computer Source.

Hewitt, M. (2002). Trent Focus for Research and Development in Primary Health Care: Carrying

  Out a Literature Review. Retrieved October 22, 2007, from UO, Terminal Project Web site:

  http://128.223.179.107/aim/Capstone07/HewittLitReview.pdf.

Hodgson, C. (2004). Planning for an Enterprise Content Management System: AIIM User Guide.

  Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28314.

Holme, D. (2007). The File Share Is Dead: Long Live SharePoint Document Libraries. Windows

  IT Pro, Vol. 13 Issue 5, p. 69-73. Retrieved October 24, 2007, from EbscoHost: Computer

  Source.

Kemp, J. (2007). A Critical Analysis into the Use of Enterprise Content Management Systems in

  the IT Industry. Retrieved November 3, 2007, from

  www.aiimhost.com/whitepapers/JamesKemp_ECMReport.pdf.

Leedy, P. and Ormrod, J. (2005). Practical Research Planning and Design. New Jersey: Pearson

  Merrill Prentice Hall.

Lester, J. and Lester, J. Jr. (2005). Writing research papers: A complete guide. New York: Pearson Education, Inc.

Londer, O., English, B., Bleeker, T., and Coventry, P. (2007). Microsoft Windows SharePoint Services 3.0 Step by Step. Washington: Microsoft Press.

McKenna, E. (2007). SharePoint & Office Pro: How SharePoint Matches Up to Public Folders. Windows IT Pro. Vol. 13 Issue 7, p. 61-65. Retrieved October 24, 2007, from EbscoHost: Computer Source.

Microsoft. (2007a). Microsoft Office SharePoint Server 2007 Evaluation Guide. Retrieved November 2, 2007, from http://go.microsoft.com/fwlink/?linkid=83060&cicid=0x409.

Microsoft. (2007b). Microsoft Windows SharePoint Services 3.0 Evaluation Guide. Retrieved November 2, 2007, from http://technet.microsoft.com/en-us/windowsserver/SharePoint/bb400753.aspx.

Microsoft. (2007c). Planning and architecture for Windows SharePoint Services 3.0 technology. Retrieved November 2, 2007, from http://technet2.microsoft.com/windowsserver/WSS/en/library/ab2bedd4-d12b-4825-9c10-1c5e4079e1c61033.mspx?mfr=true.

MSDN. (2007). About MSDN. Retrieved November 11, 2007, from http://msdn2.microsoft.com/en-us/aboutmsdn/default.aspx.

Porter-Roth, B. (2004). RFP Guidelines for an Enterprise Content Management System: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28312.

Strategy Partners International Ltd. (2003a). Business Process Management and Workflow: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28316.

Strategy Partners International Ltd. (2003b). Document and Content Capture: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28318.

Strategy Partners International Ltd. (2003c). Document and Content Output and Presentation: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28315.

Strategy Partners International Ltd. (2003d). Document and Web Content Management: AIIM User Guide. Retrieved November 2, 2007, from http://aiim.org/article-docrep.asp?ID=28317.

UNC. (N.D.). How to Write a Literature Review. The Writing Center University of North Carolina at Chapel Hill. Retrieved October 22, 2007, from UO Terminal Project Web site: http://www.unc.edu/depts/wcweb/handouts/literature_review.html.

West, K., Foust, B., and Klima, C. (2002). Understanding the ECM Market. AIIM E-Doc Magazine. Retrieved November 10, 2007, from http://www.edocmagazine.com/vault_articles.asp?ID=25375.

Appendix A

Appendix A includes a list of categories and concepts of Enterprise Content Management (ECM) functionality used to code text during the conceptual analysis. The numbers following each category or concept correlate with the sources [3] AIIM, 2004; [4] EMC Corporation, 2006b; and [26] Duhon, 2005a. Note: sources [3] and [4] are found in the Review of the Literature Bibliography section of this document whereas source [26] is not.

1) Capture [3, 4]

- Aggregation [3, 4]
- Categorization [3, 4, 26]
- Content Creation [4]
- COLD [3, 4]
- Document Imaging [3, 4, 26]
- Forms Processing [3, 4, 26]
- Indexing [3, 4, 26]
- Recognition [26]
- Scanning [26]

2) Manage [3]

a) Document Management [3, 4, 26]

- Access Control [4]
- Annotation [4]
- Check In/Out [4]
- Lifecycle Management [4]
- Search [4]

- Version Control [4]

- Workflow [4]

b) Collaboration [3, 4, 26]

- Access Control [4]

- Content Sharing [4]

- Information Exchange [4]

- Workflow [4]

c) Records Management [3, 4, 26]

- Access Control [4]

- Auditing [4]

- Retention [4]

d) Web Content Management [3, 4, 26]

- Lifecycle Management [4]

- Search [4]

- Version Control [4]

- Workflow [4]

e) Business Process Management [3, 4, 26]

- Integration [4]

- Process Monitoring [4]

- Workflow [3, 5, 26]

f) Digital Asset Management [4, 26]

- Access Control [4]

- Integration [4]

- Mark-up [4]

- Version Control [4]

- Workflow [4]

g) Email Management [26]

- Search [4]

- Verification [4]

3) Library Services [4]

- Auditing [3]

- Check In/Out [3, 4]

- Retrieval [3, 26]

- Search [4, 26]

- Version Control [3, 4]

4) Store [3, 26]

- Archival [26]

- Repository [4, 26]

- Storage Technologies [4]

5) Preserve [3]

- Migration [26]

- Backup / Recovery [26]

6) Deliver [3]

a) Transformation [3, 4]

- Compression [3]

- Rendition [4]

- Syndication [3, 26]

b) Security [26]

- Access Control [4]

- Digital Rights Management [3]

- Digital Signature [3]

- Public Key Infrastructure [3]

c) Distribution [26]

- Content Assembly [4, 26]

- Enterprise Report Management [3, 4]

- Localization [4, 26]

- Personalization [3, 4, 26]

Appendix B

Appendix B includes a visual representation of the categories and concepts of Enterprise

Content Management (ECM) functionality included in Appendix A of this document.
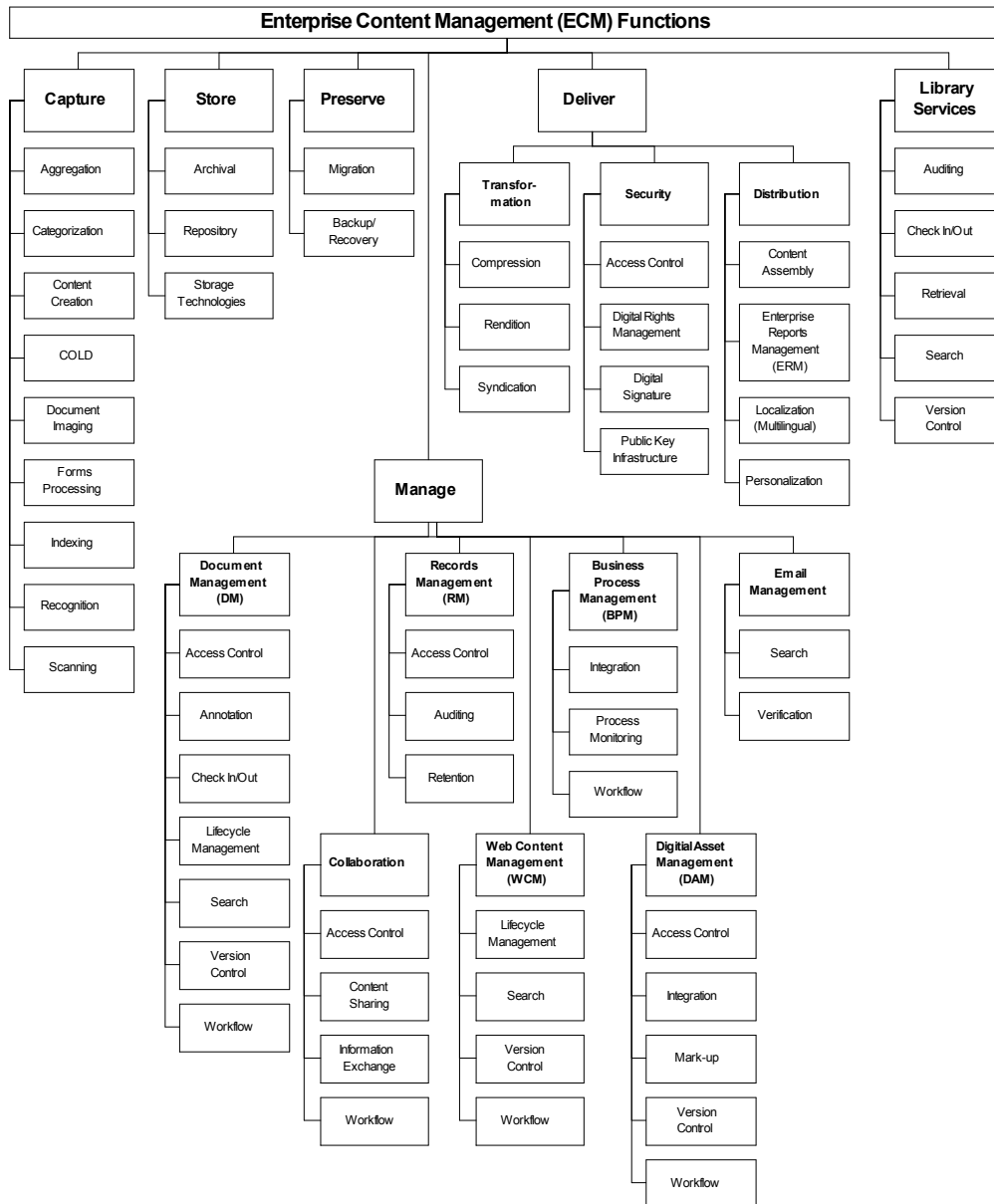

Figure 1 – Enterprise Content Management Functions

Appendix C

Appendix C includes a detailed list of categories and concepts of Enterprise Content Management (ECM) functionality outlined in Appendix A of this document.

1) *Capture.* The set of technologies and services required to capture documents and information from documents … in order to process the content of the documents in a form that meets the need of the repository or business application being served (Strategy Partners International Ltd., 2003b p. 1)." Capture includes, "all types of physical and electronic information, including paper, faxed information, reports, document batches, XML transactions and forms (EMC Corporation, 2006b p. 11)." Capture uses inputting technologies such as scanning, indexing, OCR, forms, and digital creation (AIIM, 2007) to convert paper-based forms into electronic images that can be analyzed, indexed, attributed, and stored securely (EMC Corporation, 2006b). An ECMs can automatically analyze content using classification engines and ground rules, which the engines use to classify content. Capture automatically tags and categorizes content and improves ability to search, retrieve, deliver, and repurpose content (EMC Corporation, 2006c). Key components of capture are aggregation, categorization, content creation, COLD, document imaging, forms processing, indexing, recognition, and scanning.

- *Aggregation.* "The process of combining data inputs from different creation and authoring tools and other systems (AIIM, 2004 p. 2)." Aggregation "easily captures, imports, or moves large numbers of files into a repository (EMC Corporation, 2006b p. 8)."

- *Categorization*. Organizes "… documents, Web pages, and other content into logical groupings, based on their contents (AIIM, 2004 p. 2)." Categorization also

"determines what a content item is about, thus enabling automatic metadata tagging [based on industry-specific and company-specific taxonomies], faster search and retrieval, and enforcement of retention policies (EMC Corporation, 2006b p. 11)."

- *Categorization*. Integration "with industry standard authoring tools such as Microsoft Word, Microsoft Excel … (EMC Corporation, 2006b p. 5)" simplifies content creation.

- *Computer Output to Laser Disc (COLD).* "Stores and indexes computer output [reports primarily] on magnetic disks, optical discs, and magnetic tape. Once stored, the reports can be retrieved, viewed, printed, faxed, or distributed to the Internet (AIIM, 2004 p. 2)." COLD also "transforms enterprise reports into ISO-standard PDF/A (PDF format for long term preservation) digital archives, ensuring archive integrity and long-term accessibility (EMC Corporation, 2006b p. 13)."

- *Document imaging*. Document imaging "…transforms paper documents into digital images and metadata that can be leveraged in key business processes. It provides capture, processing, records management, and archival capabilities (EMC Corporation, 2006b p. 11)."

- *Forms processing*. "The ability for software to accept scanned forms and extract data from the boxes and lines to populate databases (AIIM, 2004 p. 2)." Forms processing "reduces dependence on paper-based procedures by automating and managing electronic forms-driven business processes (EMC Corporation, 2006b p. 11)."

- *Indexing*. The "identification of specific attributes of a document or database record to facilitate retrieval (AIIM, 2004 p. 2)."

- *Recognition*. "…allow paper information to be translated to electronic data without manual data input. Recognition technologies have progressive capabilities from optical character recognition (OCR) to intelligent character recognitions (ICR) and are important for converting large amounts of forms or unstructured data to usable information in a content management system (Duhon, 2005a p. 1)."

- *Scanning*. "Paper generally enters the organization through a scanner, or sometimes, a multifunction device. In centralized scan operations, large volumes of paper are put into the system by dedicated workers. In distributed operations, smaller volumes of documents are captured with lower volume scanners or multifunction devices closer to their point of creation (Duhon, 2005a p. 1)."

2) *Manage*. The key components to manage function of ECM include DM, Collaboration, RM, WCM, BPM, DAM, and Email Management.

a) *Document Management (DM)*. DM is the "software that controls and organizes documents throughout an enterprise. [DM] incorporates document and content capture, workflow, document repositories, COLD/ERM and output systems, and information retrieval systems (AIIM, 2004 p. 3)." DM handles content with specific goals such as improving customer service (Blair, 2004), determines who has accessibility to and use of documents, and determines who will require access to the content and how it will be used (Kemp, 2007). In highly regulated industries, DM gives users the ability to control documents to meet regulatory compliance and quality standards (EMC Corporation, 2006b). Key components of DM are access control, annotation, check in/out, lifecycle management, search, version control, and workflow.

- *Access control*. "Controls how documents are reviewed, modified, approved, and published (EMC Corporation, 2006b p. 11)."

- *Annotation.* "Enables users to review, mark up, and approve content as part of familiar business processes (EMC Corporation, 2006b p. 6)."

- *Check in/out.* For information on check in/out, see the Library Services section in this Appendix.

- *Lifecycle Management*. "Identifies and enforces document stages, such as reviewed, approved, published, archived, and retired (EMC Corporation, 2006b p. 5)."

- *Search*. For information on search, see the Library Services section in this Appendix.

- *Version Control*. "Enables tracking of major and minor document versions and renditions (EMC Corporation, 2006b p. 5)."

- *Workflow*. "Defines and automates business processes associated with creating and distributing documents (EMC Corporation, 2006b p. 5)."

b) *Collaboration*. Includes "tools (collaborative authoring, video conferencing, and shared whiteboards) that allow multiple users to work on the same content in a common environment (AIIM, 2004 p. 3)." Collaboration brings people together to communicate, coordinate, and collaborate, enables teams to work dynamically toward a common goal while capturing, storing, and archiving content, allows users to effectively plan, strategize, make decisions, and build consensus, eliminate redundancy by giving entire enterprise access to search for, reference, reuse, or publish information, and increases productivity, cost savings, and faster time to market (EMC Corporation, 2006b). The key components to collaboration are access control, content sharing, information exchange, and workflow.

- *Access Control*. For information on access control, see the Document Management section in this Appendix.

- *Content Sharing*. "Allows users to access shared documents, illustrations, photographs, presentations, animation, video, and other content from a variety of sources (EMC Corporation, 2006b p. 10)."

- *Information Exchange*. "Supports chat rooms, discussion threads, virtual meetings, application and desktop sharing, and white boarding (EMC Corporation, 2006b p. 10)." In addition, provide forums for brainstorming ideas, building knowledge bases, or gathering information "weblogs (also known as blogs) and wikis (Web sites that team members can quickly edit without any technical expertise) (Microsoft, 2007b)."

- *Workflow*. "Enables contributors from any organization anywhere in the world to participate seamlessly in collaborative projects (EMC Corporation, 2006b p. 10)."

c) *Records Management (RM)*. Provides the structure to define policies to "store specific content that is either valuable, admissible, or both, in secure, immutable storage environments for a defined period of time (EMC Corporation, 2006a p. 5)." Key components of RM include access control, auditing, and retention.

- *Access Control*. For information on access control, see the Document Management section in this Appendix.

- *Auditing*. Allows an organization to "produce records on-demand, recover deleted content and prove missing records and content were destroyed appropriately, reducing the risks of associated litigation and fines (EMC Corporation, 2006b p. 35)."

- *Retention.* "Applies and enforces automatic, uniform content retention and disposition guidelines such as holds and expiration notifications to electronic content (EMC Corporation, 2006b p. 12)."

d) *Web Content Management (WCM).* "WCM solutions automate the complex process of creating, managing, and publishing content to websites, portals, and web applications in multiple languages and locales and for diverse audiences (EMC Corporation, 2006b p. 6)." Key components of WCM include lifecycle management, search, version control, and workflow.

- *Lifecycle Management.* For information on lifecycle manage, see the Document Management section in this Appendix.

- *Search.* For information on search, see the Library Services section in this Appendix.

- *Version Control.* For information on version control, see the Library Services section in this Appendix.

- *Workflow.* For information on workflow, see the Document Management section in this Appendix.

e) *Business Process Management (BPM).* "A business process is a logically related set of workflows, work steps, and tasks that provide a product or service to customers. BPM is a mix of Process Management/Workflow with Application Integration technology (AIIM, 2004 p. 3)." BPM enables an organization to increase productivity, minimize errors, reduce costs, shorten operation cycles, adapt processes, and automatically enforce business rules and policies (EMC Corporation, 2006b). Key components of BPM include integration, processing monitoring, and workflow.

- *Integration*. "Supports the execution of complex business rules as automated steps in a business process that may be externally defined (EMC Corporation, 2006b p. 25)."

- *Process Monitoring.* "Supports continual process optimization by analyzing alternative process flows and resource loadings, identifying trouble spots and iteratively improving and deploying business processes (EMC Corporation, 2006b p. 25)."

- *Workflow*. "executes, monitors, and manages business processes; automatically evaluates business rules; and assigns process tasks to the correct system, group, or individual at the appropriate time; uses configurable policies and queue management to efficiently handle high volumes of incoming work; [and] provides audit data that can prove indispensable for process tuning, monitoring business activity, and meeting compliance initiatives (EMC Corporation, 2006b p. 25)."

f) *Digital Asset Management (DAM).* "Designed specifically to manage digital assets, digital asset management (DAM) software applications have innovative and specialized methods of storing, organizing, distributing, and tracking digital media across multiple delivery channels (EMC Corporation, 2006b p. 7)." Key components of DAM include access control, integration, mark-up, version control, and workflow.

- *Access Control.* For information on access control, see the Document Management section in this Appendix.

- *Integration*. "Gives users the ability to access, check in, and check out content directly within desktop applications, including multimedia and design tools, thus streamlining the whole creation process (EMC Corporation, 2006b p. 8)."

- *Mark-up*. "Incorporates lightweight asset markup and collaboration capabilities through the content production process (EMC Corporation, 2006b p. 8)."

- *Version Control*. "Enables tracking of major and minor versions of digital asset files (EMC Corporation, 2006b p. 5)."

- *Workflow*. "Defines and automates business processes associated with creating and distributing rich media assets (EMC Corporation, 2006b p. 8)."

g) *Email Management*. "As the de facto standard for business communication, removing emails from the server and saving them to a repository isn't enough. Email must be classified, stored, and destroyed consistent with business standards—just as any other document or record (Duhon, 2005a p. 1)." Key components of email management include search and verification.

- *Search*. "Finds and ingests PST and NSF files in central repository for easy search during legal discovery (EMC Corporation, 2006b p. 14)."

- *Verification*. "Captures messages automatically and monitors each step of the process to ensure that a message is committed to the archive before deleting the message from the e-mail server (EMC Corporation, 2006b p. 14)."

3) *Store*. "Content needs to "live" somewhere. Storage technology (optical disks, magnetic, tape, microfilm, RAID, paper) provide options for storing content online for rapid access or near- or off-line for content that isn't needed often (Duhon, 2005a p. 1)." Key components of store include archival, repository, and storage technologies.

- *Archival*. "Content that must be preserved over decades must be saved [archived] to media, such as paper and film-based imaging, with longevity to match (Duhon, 2005a p. 1)."

- *Repository*. "Leverages compliant storage systems (such as content-addressed storage) that can further assure the immutability and authenticity of content (EMC Corporation, 2006b p. 9)."

- *Storage technologies*. "Compliant storage systems (such as content-addressed storage) that can further assure the immutability and authenticity of content (EMC Corporation, 2006b p. 9)."

4) *Preserve*. The key components of preserve include migration and backup/recovery.

- *Migration*. "As storage media ages, content must be moved [migrated] to new media for continued accessibility (Duhon, 2005a p. 1)."

- *Backup/recovery*. "Backing up content in various formats and/or locations helps to ensure business viability in the face of a disaster (Duhon, 2005a p. 1)."

5) *Deliver*. The deliver component of an ECMs provides timely, secure access to business content (Blair, 2004). Key components of deliver include transformation, security, and distribution.

a) *Transformation*. "Provides standard, server-side media transformations such as format conversions, resizing, and cropping, in both an on-demand and automated fashion (EMC Corporation, 2006b p. 8)." The key components of transformation include compression, rendition, and syndication.

- *Compression*. "Technique used to reduce the number of bits in a digital image file; JPEG and TIFF are two examples (AIIM, 2004 p. 4)."

- *Rendition*. "Renditions are different forms of the same content. For example, a Microsoft Word document could have an HTML rendition and a PDF rendition (EMC Corporation, 2006b p. 24)."

- *Syndication*. "Supply of content for reuse and integration with other material, often through a paid subscription (AIIM, 2004 p. 4)."

b) *Security*. "Restricts access to content, both during its creation and management as well as when delivered (Duhon, 2005a p. 1)." The key components to security include access control, digital rights management, digital signature, and public key infrastructure.

- *Access control*. For information on access control, see the Document Management section in this Appendix.

- *Digital rights management*. "Enables secure distribution, and disables illegal distribution, of paid content over the Web (AIIM, 2004 p. 4)."

- *Digital signature*. "Electronic signature that can be used to authenticate the sender of a message (AIIM, 2004 p. 4)."

- *Public key infrastructure*. "Enables the secure exchange of content through the use of a public and a private cryptographic key pair that is obtained through a trusted authority (AIIM, 2004 p. 4)."

c) *Distribution*. "Content gets where and to whom it needs to go through a number of tools. Content can be delivered via print, email, websites, portals, text messages, [and] RSS feeds (Duhon, 2005a p. 1)." The key components to distribution include content assembly, enterprise reports management, localization, and personalization.

- *Content assembly*. "Enables multiple content objects to be organized, assembled, and published as a single structure (EMC Corporation, 2006b p. 6)."

- *Enterprise Reports Management* (*ERM*). "Integrating ECM with report management allows customers to transform … information streams into documents and data that can be rapidly accessed to drive greater efficiency and improve responsiveness to

customer requests. In addition, reports are stored efficiently, maintained in a secure environment, and archived in compliance with industry regulations (EMC Corporation, 2006b p. 13)."

- *Localization*. "Provides support for users to work in localized clients and enables management of translations and delivery of content to multiple, global sites (EMC Corporation, 2006b p. 6)."

- *Personalization*. "Provides tools for developers to tailor the portal experience to a specific customer's needs (EMC Corporation, 2006b p. 7)."

6) *Library Services*. Controls the authoring, check-in/out, and/or version control of documents being developed, managed, or stored. In addition, library services enable collaborative development and the ability to store and manage digitally born documents (AIIM, 2007). Key components of library services include auditing, check in/out, retrieval, search, and version control.

- *Auditing*. "Allows organization to track which files were accessed by whom, how the files were used, whether they were printed or e-mailed, and more (EMC Corporation, 2006b p. 9)."

- *Check In/Out*. "Check in/check out maintains read-only and edit states, locks content while in use to prevent accidental deletion and overwriting, and ensures that locks on content are visible and understood (EMC Corporation, 2006b p. 24)."

- *Retrieval*. "Procedure for searching for and extracting database records or content (AIIM, 2004 p. 4)."

- *Search*. "Lets users navigate large sets of information without knowing how that information is organized or stored (EMC Corporation, 2006b p. 5)."

- *Version Control*. "As content is created, reviewed and modified, versions proliferate. An ECM system must keep track of them, maintaining an audit history that includes all versions and renditions. Version control supports the pruning of unwanted versions and the ability to roll back to earlier versions (EMC Corporation, 2006b p. 24)."

Appendix D

Appendix D includes modified phrases and corresponding document phrases used to code

text during the conceptual analysis process.

Modified Phrase	Document Phrase
Access Control	Access control lists
Access Control	Asset security
Access Control	Flexible and secure access control
Access Control	Robust security features
Access Control	Strong security
Access Control	User authentication
Access Control	User-based and role-based access control
Access Control	Widespread yet secure access
Aggregation	Aggregation
Aggregation	Batch-mode capture
Annotation	Annotations
Archival	Long-term Archival
Auditing	Audit trails
Auditing	Logging and auditing
Backup/Recovery	Backup/Restore
Business Process Management	(BPM)
Business Process Management	Business Process Management
Capture	Capture
Categorization	Advanced classification
Categorization	Automated tagging, categorization and classification of content
Categorization	Categorization
Categorization	Classification and retention
Categorization	Document classification
Categorization	Taxonomy
Check In/Out	Check in/check out
Check In/Out	Check In/Out
Check In/Out	Library services
COLD	(COLD/ERM)
COLD	Capture and conversion
COLD	Computer Output to Laser Disc/Electronic Report Management
COLD	Migration
Collaboration	Collaboration
Compression	Compression
Content Assembly	Content integration
Content Assembly	Dynamic page creation and assembly
Content Assembly	Virtual document management
Content Assembly	Virtual documents
Content Creation	Content creation
Content Sharing	Content sharing

Deliver	Deliver
Digital Asset Management	(DAM)
Digital Asset Management	Digital Asset Management
Digital Rights Management	Digital Rights Management
Digital Signature	Digital Signature
Distribution	Publish
Document Imaging	Document Imaging
Document Management	(DM)
Document Management	Document Management
Email Management	Email Archiving and Management
Enterprise Reports Management	(COLD/ERM)
Enterprise Reports Management	(ERM)
Enterprise Reports Management	Computer Output to Laser Disc/Electronic Report Management
Enterprise Reports Management	Content management services
Enterprise Reports Management	Enterprise Report Management
Enterprise Reports Management	Enterprise scalability
Forms Processing	E-Forms/Web Forms
Forms Processing	Electronic forms
Forms Processing	Forms Processing
Forms Processing	Input Designs
Forms Processing	Native XML authoring and management
Indexing	Asset analysis
Indexing	Index
Indexing	Indexing
Information Exchange	Real-time information exchange
Integration	Business rules integration
Integration	Integration with popular creative tools
Integration	Process integration
Integration	Streaming audio/video
Library Services	Library Services
Lifecycle Management	Built-in workflow and lifecycle management
Lifecycle Management	Lifecycle management
Localization	Advanced globalization and multilingual management
Localization	Global platform
Localization	Localization
Manage	Manage
Mark-up	Mark-up capability
Migration	Migration
Personalization	Personalization
Personalization	Portlet creation
Preserve	Preserve
Process Monitoring	Process monitoring and optimization
Public Key Infrastructure	(PKI)
Public Key Infrastructure	Public Key Infrastructure
Recognition	(HCR)
Recognition	(ICR)
Recognition	(OCR)

Recognition	(OMR)
Recognition	Handprint Character Recognition
Recognition	Intelligent Character Recognition
Recognition	Optical Character Recognition
Recognition	Optical Mark Recognition
Recognition	Recognition
Records Management	(RM)
Records Management	Records Management
Rendition	Content transformation
Rendition	Rendition management
Rendition	Storyboarding
Rendition	Thumbnails
Repository	Repositories
Retention	Retention management
Retention	Secure, tamper-proof archive
Retrieval	Retrieval
Retrieval	Search & Retrieval
Scanning	Scanning
Search	Asset identification
Search	Personal folder archiving
Search	Powerful, integrated search capabilities
Search	Search & Retrieval
Search	Search and export
Security	Security
Storage Technologies	(CD-ROM)
Storage Technologies	(DVD)
Storage Technologies	(MO)
Storage Technologies	(NAS)
Storage Technologies	(RAID)
Storage Technologies	(SAN)
Storage Technologies	Compact Disc Read Only Memory
Storage Technologies	Data Warehouse
Storage Technologies	Database
Storage Technologies	Digital Versatile Disc
Storage Technologies	File System
Storage Technologies	Magnetic Storage
Storage Technologies	Magneto Optical
Storage Technologies	Microfilm
Storage Technologies	Network Attached Storage
Storage Technologies	Optical Disc
Storage Technologies	Paper
Storage Technologies	Redundant Array of Independent Disks
Storage Technologies	Storage Area Network
Storage Technologies	Tape
Store	Storage
Syndication	Syndication
Transformation	Transformation

Verification	Message capture and verification
Version Control	Site editions and rollback
Version Control	Version Control
Web Content Management	(WCM)
Web Content Management	Web Content Management
Workflow	Built-in workflow and lifecycle management
Workflow	Compound document support
Workflow	Inter-enterprise workflow
Workflow	Process execution
Workflow	Structured and unstructured activities
Workflow	Workflow
Workflow	Workflow/Business Process Management
Modified Phrase	Document Phrase

Table 6 – Code Phrases

Appendix E

Appendix E includes a list of Conceptual Analysis Concepts and the corresponding documents in which the concepts are found. The numbers in the "Documents" column correlate with the prefacing numbers of each reference listed in the Review of the Literature Bibliography section of this document.

Modified Phrase	Documents
Access Control	[1, 11, 16, 17, 18]
Aggregation	[3, 6, 11, 13, 16, 17, 18, 21]
Annotation	[1, 16]
Archival	[1]
Auditing	[3, 6, 15, 16]
Backup/Recovery	[17]
Business Process Management	[2, 3, 4, 9, 15, 16, 20]
Capture	[1, 2, 3, 4, 6, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21]
Categorization	[1, 3, 6, 9, 11, 13, 16, 19, 21]
Check In/Out	[1, 3, 13, 16]
COLD	[1, 3, 5, 6, 7, 9, 16, 17, 20, 21]
Collaboration	[1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19, 21]
Compression	[1, 3, 16, 19, 21]
Content Assembly	[16]
Content Creation	[3, 6, 10, 13, 15, 16, 21]
Content Sharing	[9, 16]
Deliver	[1, 3, 4, 6, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21]
Digital Asset Management	[2, 3, 8, 10, 13, 16]
Digital Rights Management	[3]
Digital Signature	[1, 3, 6, 16]
Distribution	[1, 3, 5, 6, 8, 9, 10, 11, 13, 16, 17, 18, 19, 20, 21]
Document Imaging	[1, 2, 3, 10, 16, 19, 20, 21]
Document Management	[1, 3, 4, 5, 6, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21]
Email Management	[10]
Enterprise Reports Management	[1, 3, 9, 10, 16]
Forms Processing	[1, 2, 3, 4, 6, 10, 11, 16, 20]
Indexing	[1, 3, 5, 6, 7, 9, 10, 11, 13, 16, 17, 18, 19, 21]
Information Exchange	[16]
Integration	[16]

Library Services	[1, 13, 16]
Lifecycle Management	[8, 14, 16]
Localization	[6, 8, 13, 16, 21]
Manage	[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21]
Mark-up	[16]
Migration	[1, 5, 6, 7, 16, 17, 20, 21]
Personalization	[3, 6, 11, 13, 16, 17, 21]
Preserve	[3, 4, 6, 9, 10, 16, 18, 19, 21]
Process Monitoring	[16]
Public Key Infrastructure	[3, 16]
Recognition	[1, 3, 6, 16, 21]
Records Management	[1, 3, 4, 9, 10, 11, 13, 14, 15, 16, 17, 19]
Rendition	[7, 16]
Repository	[1, 2, 3, 6, 9, 11, 15, 16, 17, 20, 21]
Retention	[16]
Retrieval	[1, 2, 3, 6, 8, 9, 10, 13, 14, 16, 17, 18, 19, 20, 21]
Scanning	[1, 3, 16, 20, 21]
Search	[6, 16]
Security	[1, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21]
Storage Technologies	[1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21]
Store	[1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 21]
Syndication	[3, 9, 13, 17, 21]
Transformation	[3, 13, 16]
Verification	[16]
Version Control	[1, 3, 5, 6, 11, 13, 16, 17, 21]
Web Content Management	[3, 6, 8, 9, 10, 11, 13, 15, 16, 20, 21]
Workflow	[1, 2, 3, 5, 6, 7, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 21]

Table 7 - Conceptual Analysis Concepts