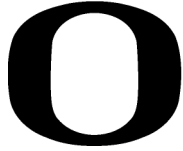


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# Improving Information Findability within an ECM System to Increase Knowledge Worker Efficiency and Effectiveness

CAPSTONE 1 Bibliography

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## Introduction to the Annotated Bibliography

### Problem

EMC Corporation is described in Wikipedia as an American multinational corporation that offers data storage, information security, virtualization, and cloud computing products and services which enable businesses to store, manage, protect, and analyze massive volumes of data (Wikipedia, n.d., para. 1). EMC notes that:

The world's information is doubling every two years. In 2011 the world created a staggering 1.8 zettabytes. By 2020 the world will generate 50 times the amount of information and 75 times the number of 'information containers' while IT staff to manage it will grow less than 1.5 times. ("Digital Universe," 2013)

May (2012) asserts that the problem, as identified by Gartner, along with IDC, is that this explosive growth in information has resulted in a situation in which 80% to 90% of information that resides within the enterprise is so far submerged within corporate IT systems that it becomes virtually inaccessible by *knowledge workers*.

The Association for Information and Image Management (AIIM) (2013) defines an *enterprise content management* (ECM) system as one which provides "the strategies, methods and tools used to capture, manage, store, preserve, and deliver content and documents related to organizational processes" (para. 1). Many claims are made in support of the value of enterprise content management. For example, Saxena (2013) states that *enterprise content management* (ECM) systems "provide benefits such as a single repository for content storage, easy retrieval of content and sharing of information" (p. 4). According to the Association for Information and Image Management (AIIM), "ECM tools and strategies allow the management of an organization's unstructured information, wherever that information exists" (para. 1).

Additionally, Mackie (2013) believes that ECM enables the seamless interconnection of business processes, knowledge workers and organizational information with the ultimate goal of increasing productivity.

Although a simple search may narrow down an organizations overall content collection, the sheer volume of content renders this form of content retrieval ineffective (Frappaolo & Keldsen, 2008). Additionally, organizations without a formal enterprise content management strategy may be inadvertently exposed to a multitude of information related risks ranging from loss of company data to failure to meet regulatory requirements (Lamont, 2012b). Ultimately, as the volume of business content continues to grow, companies must get it under control by making it easily accessible by knowledge workers while meeting mandated compliance and e-discovery requirements (Conray-Murray, 2008). According to The Information Management Journal, organizations that make ECM a strategic priority may benefit from increased effectiveness, productivity, and profitability (“Strategic ECM Boosts Profits,” 2007).

A key component in an ECM system, known as *findability*, refers to the ability to deliver content and documents related to organizational processes. Frappaolo and Keldsen (2008) state that “findability is the art and science of making content findable. The science is library science; the art is language arts and user interface design” (p. 9).

In his 2012 article “What you need to know about ECM”, May (2012) asserts that “organizations that are embracing ECM are converting findability into competitive advantage” (p. 40). Successful findability requires that content be presented in a manner that is conducive to the information seeker and the business at hand (Frappaolo & Keldsen, 2008). Enterprise search in and of itself is not a shortcut solution to enabling findability; the addition of context such as tags and categorization coupled with effective search is what enables findability (Boeri, 2010).

## Purpose

The purpose of this annotated bibliography is to present literature that discusses ways in which an enterprise content management system in general, and findability in particular, may help knowledge workers be more efficient and effective in the execution of their duties. This purpose is addressed through the examination of a core research question: How does *findability*, as part of an ECM system, increase knowledge workers' efficiency and effectiveness? A set of sub-questions directs further investigation into: (a) an examination of two selected key ECM core processes most related to findability, and (b) a discussion of the role of findability as an aid to knowledge workers.

References selected for presentation in this paper provide the basis for development of a brief definition of an ECM and two key core processes. Although an ECM can be succinctly defined as “a formalized means of organizing and storing an organization's documents, and other content, that relate to the organization's processes” (Wikipedia, n.d., para. 1), it is better defined through an understanding of its core processes. There are five basic processes which facilitate the capture, management, storage, preservation, and delivery of an organization's business content (“AIIM - What is ECM? What is enterprise content management?” 2013). For the purposes of this study, focus is on the processes of (a) capture, and (b) delivery, as these are most related to findability. For example, including metadata about the information, as captured, helps to ensure that the right information is available for delivery when needed (“Enterprise content management -- A partnership between business and IT.,” 2007).

References also provide a discussion of the role of *findability* and how it can be utilized within the context of an ECM system to improve knowledge workers' efficiency and effectiveness. This is done with consideration to the fact that in order to effectively carry out



their duties, knowledge workers must have relevant and accurate information at hand (Davenport, 2005). Although findability is executed in the delivery process of an ECM system, consideration must be given to developing findability while working within the capture process during which information should be “thoroughly indexed and stored for easy and secure retrieval by the diverse parties that will need it” (Questsys, 2012, p. 4). This requires planning to capture and catalog paper and electronic content where they are generated, as early in the business process as possible since “the sooner the information is captured and delivered to the business process, the more efficient that process, and employees become” (*Capturing information at the point of origination*, 2012, p. 2).

### **Research Questions**

**Central question.** How does *findability*, as part of an ECM system, increase knowledge workers’ efficiency and effectiveness?

#### **Sub questions.**

- What are the key core processes of an enterprise content management system most relevant to findability?
- What is findability and what role does it play in an ECM system?
- How does findability make a knowledge worker more efficient and effective?

### **Audience**

Although this annotated bibliography is framed in relation to the activities of knowledge workers, it is directed towards company managers, specifically department heads. Most managers realize that their organizations have a problem with effectively managing information and give an average rating of their information management practices as 5.43 out of a possible 10 with a full 33% rating their practices as poor (“Strategic ECM Boosts Profits,” 2007). These

are the folks who will have to not only accept the idea that an ECM solution would benefit the organization, but would also have to support managing the adoption and implementation of an ECM system. As noted by Saxena (2013), “one of the key success factors of a successful roll-out of ECM projects is the buy-in from the senior management of an organization” (p. 9).

Research has shown that “companies with more than 1,000 employees store, on average, over 235 [terabytes] of data – more data than is contained in the U.S. Library of Congress” (May, 2012, p. 40). Earley (2011) asserts that as the amount of information stored by companies continues to increase at an exponential rate, knowledge workers are finding it increasingly difficult to find the information they are looking for and seeing how it relates to other company information. This lack of findability ultimately results in “inefficiency, ineffectiveness, and lost opportunity, amounting to millions of dollars annually in large enterprises” (Earley, 2011, p. 14). In fact, Forrester Research estimates that every worker spends one day a week looking for information to help them do their job (May, 2012). To mitigate this difficulty, it is imperative that knowledge workers be given a search mechanism that is as intuitive as possible while allowing them to find what they need no matter where in the organization that information exists (Lamont, 2012a).

### **Research Approach**

The research strategies selected for use are suitable for the development of a scholarly annotated bibliography, and are similar to those described by Creswell (2009) for a formal literature review. The development of this annotated bibliography enables the exploration of the existing research about ECM, findability, and its impact on knowledge workers (Bisignani & Brizee, 2013). Additionally, the annotated bibliography format provides specific information about each source in relation to the research questions, and provides the opportunity for further

interpretation and continued research for those that may be interested in doing so (“Annotated bibliographies,” 2013).

### **Search Strategy**

The initial search for relevant literature, using the University of Oregon Libraries site, returns a significant number of full - text articles on ECM. Additional expanded searches include professional sites that center on the management of information including industry specific articles and white papers intended to educate and inform users about information and content management (“AIIM - The global community of information professionals,” 2013) including the AIIM, ECM Connection, and Association of Records Managers and Administrators (ARMA) sites.

Searches of the free text Google Scholar database returned non-academic resources including industry white papers and information technology periodicals. Additional results are from controlled vocabulary databases including ACM Digital Library to focus on the information technology side of ECM and Lexis-Nexis Academic to focus on the business impact of content management.

The primary search terms are *enterprise content management*, the acronym *ECM*, and *findability*. Initial search results helped to establish *content management*, *content capture*, *content delivery*, *document management*, *records management*, *information search*, *information retrieval*, and *business continuity* as additional relevant search terms.

### **Evaluation Criteria**

The references used to support this annotated bibliography are evaluated on several criteria to assess credibility. The primary criterion is to give preference to peer-reviewed resources. However, given the dynamic nature of the subject matter, all materials available from

recognized academic and professional sources are evaluated (Creswell, 2009). Specifically, the guidelines for critical evaluation of information sources are aligned with those recommended by the University of Oregon libraries (Bell & Frantz, 2013). These include evaluation of the author's authority and objectivity as well as the quality, currency, and relevancy of the work itself. Concerning currency, references relevant to the topic and published after 2001 are included. This date is important because this is when the knowledge management industry began to use the term enterprise content management to refer to integrated knowledge management solutions ("AIIM - What is ECM? What is enterprise content management?" 2013).

### **Documentation Approach**

References selected for use in this study are documented through Zotero, an application which is specifically designed to collect and organize research material. Zotero enables the organization of research materials into any number of named collections and sub-collections, which in turn can be organized as desired. Additionally, Zotero enables the use of saved searches, allowing the creation of smart collections that automatically fill with relevant materials as they are added to the collection.

For the purposes of this study, the primary Zotero collection, titled capstone, contains all pertinent research material. Within this collection, several sub-collections and saved searches are created to facilitate ease of retrieval and use as references in this annotated bibliography. These sub-collections and smart searches are listed below:

#### **Sub-collections.**

- Enterprise content management systems
- Information capture
- Information delivery

- Information findability
- Academic writing references

**Smart searches.**

- Sources with included abstracts
- Recent sources (2011 and later)
- Dated sources (2010 and earlier)

Additionally, when possible, materials are embedded into Zotero collections as Adobe portable document format (PDF) files. These PDF files are highlighted and annotated to allow easy recollection of specific information contained within each source.

### **Annotated Bibliography**

The following Annotated Bibliography presents 15 references that examine ways in which an enterprise content management system in general, and findability in particular, may help knowledge workers be more efficient and effective in the execution of their duties. Each annotation consists of three elements: (a) the full bibliographic citation, (b) the published abstract, and (c) a summary that provides the information most relevant to the purpose of this study.

References selected for presentation in this section are separated into two categories. The first category includes references that provide information upon which to develop a brief definition of an ECM system, and examine two (of the five) key core processes most relevant to findability. Although an ECM can be succinctly defined as “a formalized means of organizing and storing an organization's documents, and other content, that relate to the organization's processes” (Wikipedia, n.d., para. 1), it is better defined through an understanding of its core processes. There are five basic processes which facilitate the capture, management, storage, preservation, and delivery of an organization’s business content (“AIIM - What is ECM? What is enterprise content management?” 2013). For the purposes of this study, focus is on the processes of (a) capture, and (b) delivery, as these are most related to findability.

References selected for presentation in the second category provide information upon which to develop a discussion of the role of findability and how it can be utilized within the context of an ECM system to improve knowledge workers’ efficiency and effectiveness. This is done with consideration to the fact that in order to effectively carry out their duties, knowledge workers must have relevant and accurate information at hand (Davenport, 2005). Although findability is executed in the delivery process of an ECM system, consideration must be given to

developing findability while working within the capture process during which information should be “thoroughly indexed and stored for easy and secure retrieval by the diverse parties that will need it” (Questsys, 2012, p. 4).

**ECM Definition and Examination of Two Selected Core Processes of an Enterprise Content Management System Related to Findability: Capture and Delivery**

Best practices - electronic document management. (Questsys, 2012). Questsys.

**Abstract.** This is an overview of best practices, including practical considerations for purchasing and implementing an Electronic Document Management (EDM) system. It outlines components to look for in an integrated suite, useful tips for determining which solution is right for you, and cites reliable sources for best practices information. The goal is to help project champions and managers evaluate EDM providers with open eyes and make informed decisions the first time so they can experience maximum payoff and satisfaction sooner rather than later.

**Summary.** This article focuses on helping managers select a content management solution that best fulfills the organization’s data capture and retrieval requirements. The underlying theme is that taking the time early on to create unified plans for information capture, indexing, and search will ultimately result in efficiency gains across the organization. Best practices dictate that after information is captured, it should be indexed and stored in such a way as to make it easily retrievable by the diverse parties that will require it. This can be achieved by implementing a comprehensive *taxonomy* (a controlled vocabulary used to establish hierarchical structure) to capture the important data contained within organizational documents thereby making it more easily retrievable when it is meaningful for making business decisions. This taxonomical metadata allows

the information to be retrieved based on the diverse types of information often contained within a single piece of information. This approach further enables various departments to retrieve information based on differing needs and requirements.

Enterprise content management -- A partnership between business and IT. (2007). *EContent*, 30(6), 29–30.

**Abstract.** This article explains the components of enterprise content management.

According to the author, information use is critical to the success of any organization and information management is the mandate of all information technology (IT) departments.

The author argues that by finding the commonalities between these two objectives, business and IT can effectively assist each other while pursuing their primary goals and the organization wins overall. He asserts that cooperation is simplified with an enterprise-wide platform for content management, since the back-end connections can be built once and are then easily triggered by new departmental solutions.

**Summary.** This article discusses information lifecycle management (ILM) and the challenges presented by the continuous growth of information within the organization. It asserts that effective content management can help knowledge workers by making information easier to find while also helping businesses control costs associated with maintaining information that is no longer applicable. A basic tenet is that *metadata*, i.e., data about the information as captured and created, is crucial to identifying where information is in the information lifecycle and therefore its relative level of importance. Ultimately, properly capturing information, including metadata about that information, ensures that both the business and IT requirements of an organization are identified and addressed in ways that are mutually beneficial.



Gantz, J., & Reinsel, D. (2011). *Extracting value from chaos*.

**Abstract.** The number of “files,” or containers that encapsulate the information in the digital universe, is growing even faster than the information itself as more and more embedded systems pump their bits into the digital cosmos. The amount of information individuals create themselves — writing documents, taking pictures, downloading music, etc. — is far less than the amount of information being created about them in the digital universe. The growth of the digital universe continues to outpace the growth of storage capacity. But keep in mind that a gigabyte of stored content can generate a petabyte or more of transient data that we typically don’t store (e.g., digital TV signals we watch but don’t record, voice calls that are made digital in the network backbone for the duration of a call). So, like our physical universe, the digital universe is something to behold — 1.8 trillion gigabytes in 500 quadrillion “files” — and more than doubling every two years. That’s nearly as many bits of information in the digital universe as stars in our physical universe.

**Summary.** This white paper explores the explosive growth in transient data and how it can be used to increase findability of underlying “hidden” information within information to aid in business decision making. The author notes that our digital universe is teeming with transient data that exists only long enough to be ingested before disappearing altogether. The value of this transient information should not be marginalized; it can be used to gain exceptional insight from an organization’s unstructured data by allowing extraction of the right information at the right time. In fact, it enables a profound level of findability that often allows workers to find valuable information that they did not even know existed within unstructured data.

Get your data under control with automated content categorization. (2013), 4.

**Abstract.** The rise of mobility, cloud computing, social networking and advanced storage capabilities enables more data to be shared in more ways than ever. This surge in connectivity has resulted in an explosion of data for organizations of all sizes and across all industries. Although this data can provide valuable business intelligence, today's enterprises are often challenged to find the information they need and make it useful.

**Summary.** This article focuses on *automated content categorization* to address the difficulties IT departments are encountering when attempting to apply policies to the management of uncategorized content. The author discusses the benefits and limitations of manual versus automatic content categorization when used to control data overload and make information more accessible and suggests that a hybrid approach may provide the best solution. A *hybrid solution* supports the needs of knowledge workers by pushing random samples of automatically categorized information to subject matter experts (SMEs), resulting in continuous evolution of the automated classification processes. This allows information to be automatically categorized into general categories while providing the minimum level of accuracy required for effective information retrieval by knowledge workers who will be using the information. Ultimately, as the system evolves, it gains the ability to more specifically classify and categorize information.

Lamont, J. (2012a). ECM: solutions for diverse content. *KM World*, 21(6), 8–21.

**Abstract.** The article focuses on the growth of the enterprise content management (ECM) software market. Mark Gilbert, research vice president (VP) of Gartner, says that the resilience is attributed to the productivity gains provided by ECM such as in process and data quality as well as support in gaining compliance. It mentions that the significant interest from organizations was emerging worldwide including Brazil, China, and

Europe.

**Summary.** As the volume of generated information continues to grow at an exponential rate so does its diversity and complexity. As businesses increasingly rely on information generated by customer engagement to compliment internally generated information streams, content generated by social media has become a major contributor to this growth and diversity. This increased content diversity is not limited to a single type of information asset and ranges broadly from simple documents to digitized multimedia files. Because of the significant differences in how this information is used and governed, centralization may not be the most effective storage strategy. This drives the need for a *federated search strategy* (delivery of search results from multiple searchable content providers, simultaneously, via one search query) to make retrieval of this distributed information more intuitive and efficient.

Miles, D. (2011a). *ECM decision processes - who's involved and what are the issues?* (p. 16).

**Abstract.** AIIM research indicates that 73% of organizations have a strategy to provide their knowledge workers with a single, integrated view of all of their information assets. They share the vision of a universal content and records management environment, integrated with the business and its processes. In this paper the authors explore how different organizations tackle IT decision-making in general and ECM decisions in particular. Based on a survey of ECM decision makers, they measure how holistic they are in considering the needs and requirements across the enterprise, and what the implications might be of a very narrow approach based on specific departmental needs. They highlight the implications and recommendations for each of their three constituents:

Line-of-Business, Records & Compliance, and IT.

**Summary.** This article discusses the need for a holistic approach when considering and implementing ECM systems intended to work alongside core transactional type enterprise systems such as enterprise resource planning (ERP) systems. From an ECM perspective, the capture and delivery of information should be closely integrated with incumbent transactional systems with seamless intersections where required. The more readily an ECM solution aligns with existing business systems and associated processes, such as claims processing or customer onboarding, the more likely it is to be effectively utilized during the information capture process. Without this effective utilization, there is a very low probability of future retrieval of information when needed. Ultimately, more closely aligned systems result in improved information access which may translate to the organization being more competitive and profitable.

Miles, D. (2011b). State of the ECM industry 2011: How well is it meeting business needs, 30.

**Abstract.** Over the last few years, Enterprise Content Management has been one of the fastest growing areas of IT, outstripping traditional enterprise applications with its double-digit growth. Driven partly by the need to contain content chaos, but more positively, by the need to maximize employee productivity, improve knowledge sharing and reduce fixed costs, ECM has taken its place at the IT top-table, both as a concept and as a product. There is no doubt that some organizations are struggling to achieve the vision of a single ECM system - one that manages all types of content, across the whole enterprise. In this report, we look at the drivers for ECM investment, the adoption of collaborative technologies, use of outsourcing, user priorities, views of the future as regards cloud and open source, and spend intentions for the next 12 months.

**Summary.** This research paper explores ECM technologies and trends across multiple industries. Central to this exploration is the fact that most organizations are striving to realize the vision of a consolidated information management solution that links all applications and repositories to allow for universal search and retrieval of information. The anticipated process optimization, efficiency gains, and cost reduction are identified as driving organizational investment. In fact, the implementation of a consolidated system of electronic records management is the highest priority for most organizations, followed closely by the desire to realize a comprehensive organizational taxonomy. The achievement of these two priorities is expected to satisfy the top business drivers which are to increase collaboration within and between teams followed closely by the need for general information sharing.

#### **Examination of the Role of Findability in an ECM and the Relationship to Worker Efficiency and Effectiveness**

Boeri, R. (2010). Enterprise search or content management? *EContent*, 33(4), 23–23.

**Abstract.** The article discusses the content management interoperability standard (CMIS) proposed by enterprise content management (ECM) vendors in September 2008 to enable sharing of ECM repositories. The specifications were given to OASIS in 2008 and as of May 2010, the tool was in the technical review stage. In the absence of interoperability, companies are using enterprise search (ES) which experts say have improved significantly. The author posits that the search for solutions should be approached with both ECM and ES.

**Summary.** Implementing the appropriate enterprise search (ES) solutions can provide an effective near term tactical solution to the findability problems encountered when trying

to find pertinent information in spanning multiple, often disconnected, enterprise knowledge repositories. However, this is typically only feasible when implementing a targeted ES solution that is appropriate for the disconnected information repository that is being indexed and searched. ES is considered more of a stopgap than a shortcut to solving findability problems. A more appropriate, albeit more resources intensive, solution requires focusing on two distinct areas: (a) enabling information sharing across multiple disparate content management repositories through some form of integration, and (b) categorization and tagging of existing data coupled with the implementation of a system of governance that requires all future data be tagged and categorized at the time of capture or creation.

Earley, S. (2011). Content curation: Contributing to improved “findability”: Librarians are well suited to roles that make it easier to find information, and content curation is one such role. *Information Outlook*, 15(8), 14–16.

**Abstract.** According to a study by IBM, growth in the need for content curation is attributable largely to rapid increases in the number of objects about which we capture information. We need business input and subject matter expertise when dealing with unstructured content and the terminology used to describe that content. Metadata and taxonomy processes need to include representation from various stakeholders and subject matter experts.

**Summary.** Information Outlook is a digital magazine published by the Special Libraries Association (SLA). In this study, the author surmises that as exponentially more information is captured, it is becoming increasingly difficult to find specific information or to see connections between related pieces of information. He outlines the three key

aspects of content curation, defined as the process of semi-manually selecting and organizing content, which can be leveraged to regain control. These three aspects are” (a) the use of taxonomies and metadata to organize information, (b) the implementation of a governance process to identify objectives and enforce policies related to those taxonomies and metadata, and (c) life cycle management to facilitate processes designed to reduce distraction from unnecessary content. The use of metadata coupled with a controlled vocabulary makes it easier for knowledge workers to find relevant information, while governance ensures that the taxonomical structure works across the organization. The author notes that it is important to understand that implementing an effective taxonomy is a process and not an outcome.

Frappaolo, C., & Keldsen, D. (2008). *Findability: The art and science of making content easy to find*. (p. 70). Retrieved from <http://www.aiim.org/pdffdocuments/34835.pdf>

**Abstract.** This study is focused on a genre of technologies—some old, some new—and related content management models that establish an enterprise approach to searching, navigating, discovering, and retrieving content—in a word, Findability. AIIM used two main sources to construct this report. The first was the accumulated experience and ongoing market analysis work performed by the AIIM Market Intelligence group. The second was a survey AIIM Market Intelligence developed and administered. The survey was taken by 500 individuals between April 28 and May 9, 2008. This Market IQ covers the concept of Findability from multiple perspectives, providing a thorough education on the topic. In order to achieve a balanced understanding of Findability, the reader is encouraged to read the report in its entirety, in the order presented. The report, however, has been structured into six sections, each providing a specific perspective on Findability.

**Summary.** This study covers definition, technologies, strategies and importance of findability. One central concept of the study is that most organizations do not fully comprehend or appreciate findability and have trouble understanding how it differs from search. This lack of ability to differentiate between the two has led to the common misunderstanding that ineffective findability is as a result of poor search engine technology. The reality is that search is simply a subcomponent of findability. When considering the larger scope of findability, search is empowered by content that is “aware” of its potential value to the any number of information seekers, all of which may have the potential to pull differing information from the same data. This awareness is imparted by combination of tagging, taxonomies, and indexing.

Hedden, H. (2008). How semantic tagging increases findability. *EContent*, 31(8), 38–43.

**Abstract.** The article explains how semantic tagging increases findability. Semantic tagging is a term that describes many of the findability approaches. Semantic tagging may be used interchangeably with semantic indexing in contexts where indexing is used for tagging. Nevertheless, in the quest for better methods of findability, the term semantic tagging is starting to appear in descriptions of information services and products, blogs, online articles, and presentations. It can also be defined as the assigning of selected controlled vocabulary terms to content items to reflect the meaning of the content.

**Summary.** In this article, Hedden discusses *semantic tagging* (tagging for meaning) and how it differs from traditional information indexing and cataloguing techniques, arguing that the latter method does not sufficiently meet knowledge workers’ needs. Semantic indexing is context driven and focuses on concepts contained within a body of



information rather than indexing that body as a whole. For this reason, it focuses on pieces of information at a finer, more specific level of detail. The result is what the author refers to as a “thesaurus” style of taxonomy encompassing collections of equivalent terms that translate to concepts contained within the information. This, in turn, empowers knowledge workers to find and retrieve information that is more contextually relevant.

Lamont, J. (2008). ECM: Collaboration rules! *KM World*, 17(9), 10–26.

**Abstract.** The article discusses the importance of Web 2.0 functions in enterprise content management (ECM). According to supervisor of information management Terri Zimmer of R. V. Anderson Associates (RVA), Presto 2.0 application from Inmagic Inc. has new capabilities such as RSS feeds which combine knowledge repository with an interactive community. Meanwhile, Cabinet NG Inc. has provided file management, workflow, and application integration for small to medium-sized business (SMB) market.

**Summary.** This article uses several case studies to illustrate the importance of incorporating Web 2.0 functionality in ECM solutions with Web 2.0 being defined as dynamic or user-generated content and the integrated social networking. This coalescence of content and social media facilitates more seamless collaboration efforts between knowledge workers. A collaborative categorization of information allows people to connect to information based on the issues and problems they are trying to solve rather than the traditional departmental categorization of information. This includes enabling information users to put data in context by tagging and rating which creates a sort of *folksonomy* (a type of collaborative tagging system, developed by users) that assists the ECM in determining information applicability. The resultant knowledge

repository enables knowledge workers to be more effective in problem solving and decision making.

Mackie, M. L. (2013). Enabling enterprise content management with confidence. *KM World*, 22(3), S4–S5.

**Abstract.** The article focuses on the management of enterprise content within organizations to improve business processes and competitiveness for survival. It mentions that ECM is characterized by integrated platforms and architectural frameworks which could provide cooperation, higher productivity and effective content lifecycle management. It states that Microsoft SharePoint 2013 is the latest ECM iteration of the product by Microsoft (first launched in 2001), which is considered as the significant step in achieving document management.

**Summary.** This article focuses on the ultimate goal of managing information as well as how an ECM can help to achieve that goal. The author asserts that the goal is essentially to seamlessly connect an organization's business processes, knowledge workers, and information. The article presents a discussion about three key activities required to make this happen: (a) establishing control over the ever growing volume of information to lessen duplication and minimize time required for retrieval, (b) streamlining the process of making information more findable to enable and enhance collaboration, and (c) meeting regulatory requirements to ensure information is available for those who need it and protected from those who do not. Of specific noteworthiness is the ability of an enterprise content management system to facilitate the use of managed metadata, thereby allowing knowledge workers to tag content within a taxonomy or folksonomy of terms.

This greatly improves content discovery by allowing those same knowledge workers to search and refine by terms that may not be contained within the information itself.

May, T. (2012). What you need to know about ECM. *Computerworld*, 46(5), 40–40.

**Abstract.** The article presents the author's views on enterprise content management (ECM). He says that with significant increase in the volume of information, *extracting value from information* has become the priority of chief information officers (CIOs) and information technology leadership. He defines ECM as methods and tools used to store and deliver information related to organizational processes. He says that ECM is being embraced by organized to convert *findability* into competitive advantage.

**Summary.** This article discusses the importance of findability to the success of the organization. Considering the fact that most large organizations consisting of 1,000 employees or more store more data than is contained in the entire Library of Congress, companies are beginning to focus to extracting value from information by leveraging ECM. They are attempting to leverage ECM to boost findability by presenting diverse information in a consistent and easily understood format. The competitive advantage comes in their ability to reduce the time required for knowledge workers to find and digest the information already held by the organization. Ultimately, improving findability improves efficiency by ensuring that knowledge workers can find the most pertinent information, and perhaps as importantly, find it more expeditiously.

Considering that the average knowledge worker spends one day a week looking for the information necessary to do their job, this advantage could prove to be substantial.

Saxena, V. (2013). *Making ECM projects relevant to business* (pp. 1–12).

**Abstract.** Before an initiation of an IT project, it is very important to define its business benefits. This will help in better calculation of the Return on Investment of a project. It will ensure that the IT projects are not being considered as a cost but as an investment. The projects in which the business benefits have been articulated in a well-defined manner have higher chances of a successful outcome. The paper provides deep insight into various business benefits which can be realized by implementation of an ECM project. It describes various factors which can be considered during the formulation of a business case for a project. In any ECM projects, generally one or more of these benefits are obtained. While describing the various business benefits, the paper also provides detail about which element of ECM are relevant for a particular business benefit.

**Summary.** This paper focuses on the concept that although an ECM project is a technology implementation, its purpose is to satisfy a business need. Generally expected business benefits include a single repository for content storage, easy retrieval of content, and easy sharing of information. ECM systems can also support improved regulatory compliance through appropriate document classification and enforcement of information access and retention policies. Additionally, an ECM system can assist in automating the business process for knowledge workers helping them to become more efficient and effective through the reduction of manual processes and ability to rapidly change processes across the organization as needed to meet evolving requirements. Finally, they help ensure business continuity by offering a secure, highly manageable, and shareable information repository that allows for quick recovery of critical content.

### Conclusion

The unrelenting growth of information presents a challenge to all organizations; if not properly managed, the sheer volume has the potential to seriously impair their ability meet strategic and business goals. Information, including structured data (e.g. data stored in relational databases) and unstructured content (e.g. data stored in file systems, content management systems, email servers, and more), is growing up to 200 percent per year (“Enterprise content management -- A partnership between business and IT.,” 2007). As noted by Miles (2011b), the effectiveness and efficiency of knowledge workers is compromised through time wasted searching for information that cannot be found and often ends up being recreated. This is a substantial impact given the fact that the majority of organizations consider efficiency improvements to be their most significant information management related business driver (Miles, 2011b).

Mackie (2013) believes that organizations implementing an ECM solution benefit from increase productivity of employees. Saxena (2013) lists various business benefits through ECM system implementation, including (a) a single repository for content storage, (b) easy retrieval of content, and (c) easy sharing of information. “In fact overall organizational profitability and effectiveness increases as ECM becomes a strategic priority” (“Strategic ECM Boosts Profits,” 2007, p. 2).

The purpose of this annotated bibliography is to present literature that discusses ways in which an enterprise content management system in general, and *findability* in particular, may help knowledge workers be more efficient and effective in the execution of their duties. The analysis of the references selected for presentation in the Annotated Bibliography section of this study is intended to help managers in organizations understand how enterprise content

management (ECM) in general, and findability in particular can improve knowledge workers' effectiveness and efficiency, resulting in an overall increase in productivity. The primary focus is on two core ECM processes, most relevant to findability, including capture and delivery.

### **Findability as Part of an ECM System**

Findability is a critical element to an ECM strategy that ensures enterprise content is easy to discover or locate ("Enterprise content management - Findability: a quick-reference summary," 2013). Moreville (2005, p. 4) more specifically defines findability as (a) the quality of being locatable or navigable, (b) the degree to which a particular object is easy to discover, or (c) the degree to which a system of environment supports navigation and retrieval. According to AIIM (2013), when looked at in the context of an ECM strategy, "the role of findability is to provide an effective means for users to recall or identify and extract content from the ECM system" (para. 3). Frappaolo and Keldsen (2008) underscore the importance of this ability to identify and extract content by succinctly surmising that "content without access is worthless" (p. 9).

### **Capture and Delivery**

Although an ECM can be succinctly defined as "a formalized means of organizing and storing an organization's documents, and other content, that relate to the organization's processes" (Wikipedia, n.d., para. 1), it is better defined through an understanding of its core processes. There are five basic processes which facilitate the capture, management, storage, preservation, and delivery of an organization's business content ("AIIM - What is ECM? What is enterprise content management?" 2013). When examining how these core processes influence findability, capture and delivery of information are the principal drivers.

Questsys (2012) proposes that effective findability begins within the capture process, during which information should be “thoroughly indexed and stored for easy and secure retrieval by the diverse parties that will need it” (Questsys, 2012, p. 4). This requires planning to capture and catalog paper and electronic content where they are generated, as early in the business process as possible since “the sooner the information is captured and delivered to the business process, the more efficient that process, and employees become” (*Capturing information at the point of origination*, 2012, p. 2). As Early (2011) points out, the key to effectively capturing information for the sake of findability lies in capturing not just the information itself, but in capturing all of the information about that information. This is facilitated by the inclusion of metadata, taxonomy, and folksonomy which allow the information to become more findable and therefore easier to retrieve and deliver to the information searcher (Cameron, 2013).

**Metadata and taxonomy.** Organizational managers often assume that a robust federated enterprise search solution is a viable shortcut to solving findability problems. In fact, Boeri (2010) posits that search may get you part of the way to findability, it is considerably more effective when used in conjunction with supporting information such as tagging and categorization. With the sheer volume of information residing within today’s organizations, simple search is essentially useless because it does not provide a level of granularity low enough to narrow the information to that which is need to meet specific needs and perspectives (Frappalo & Keldsen, 2008).

One way that an ECM increases findability is the ability to describe the information contained within using metadata and taxonomy. “ Metadata provide the ‘keywords’ and ‘describing words’ that identify and describe the content and can indicate its value to the organization” (e.g. a contract that is approved and is current can be differentiated from a draft

contract or an annulled contract) (“Enterprise content management -- A partnership between business and IT.,” 2007, p. 2). In fact, metadata is growing twice as fast as the data it defines (Gantz & Reinsel, 2011) because organizations are realizing “metadata about the information, as captured and created by a content management system, is crucial to helping people find the information they need” (“Enterprise content management -- A partnership between business and IT.,” 2007, p. 1).

Taxonomies compliment this metadata by defining the hierarchical relationship between pieces of information (Frappaolo & Keldsen, 2008). Hedden (2008) notes that it is important to consider that a taxonomy does not necessarily contain a definition of the topics contained within, but rather information regarding the relationship of the topics to one another resulting in a type of informational thesaurus. This thesaurus is essentially a network of words, word meanings, and relationships that allow conceptual definitions to be put into context. (Hedden, 2008). Early (2011) offers an even broader view of taxonomy as “a means of putting in place the blueprint for how information architectures are developed, managed, applied, and maintained throughout an organization” (p. 3). Frappaolo and Keldsen (2008) emphasize that this form of intelligent content processing ultimately allows the information to become more findable.

### **Impact on Effectiveness and Efficiency**

The amount of time knowledge workers spend reviewing “irrelevant material” is growing at a phenomenal pace because the amount of digital content being stored is also growing at a phenomenal pace (Frappaolo & Keldsen, 2008). Earley (2011) stresses that as this content continues to grow, knowledge workers are finding it proportionally more difficult to find the information they are looking for, resulting in ineffectiveness and inefficiency.



Making this information findable allows knowledge workers to quickly find accurate information which in turn makes them more effective and efficient (Earley, 2011). Mackie (2013) describes how an ECM can help to achieve that goal, by seamlessly connecting an organization's business processes, knowledge workers, and information. He examines three key activities required to make this happen: (a) establishing control over the ever growing volume of information to lessen duplication and minimize time required for retrieval, (b) streamlining the process of making information more findable to enable and enhance collaboration, and (c) meeting regulatory requirements to ensure information is available for those who need it and protected from those who do not. Of specific noteworthiness is the ability of an enterprise content management system to facilitate the use of managed metadata, thereby allowing knowledge workers to tag content within a taxonomy or folksonomy of terms. This greatly improves content discovery by allowing those same knowledge workers to search and refine by terms that may not be contained within the information itself.

Organizations with ECM based findability strategies are five times more likely to be more effective in managing that information; in fact, "overall organizational profitability and effectiveness increases as ECM and findability become a strategic priority" (Strategic ECM Boosts Profits, 2007, p. 14). Saxena (2013) states that although an ECM project is a technology implementation, its purpose is to satisfy a business need. Generally expected business benefits include a single repository for content storage, easy retrieval of content, and easy sharing of information. ECM systems can also support improved regulatory compliance through appropriate document classification and enforcement of information access and retention policies. Additionally, an ECM system can assist in automating the business process for knowledge workers helping them to become more efficient and effective through the reduction of manual

processes and ability to rapidly change processes across the organization as needed to meet evolving requirements.

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