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EVALUATING BEST PRACTICES IN DOCUMENT MANAGEMENT

A THESIS

SUBMITTED ON 31 OF MARCH, 2011

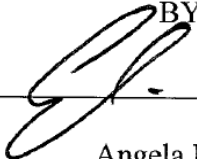
TO THE DEPARTMENT OF INFORMATION TECHNOLOGY

OF THE SCHOOL OF COMPUTER & INFORMATION SCIENCES

OF REGIS UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF MASTER OF SCIENCE IN

INFORMATION TECHNOLOGY MANAGEMENT

BY


Angela Lokie

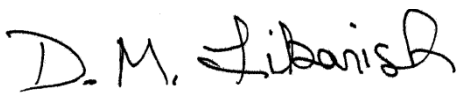
APPROVALS



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Abstract

The purpose of this research is to create a knowledgebase of best practices for records managers to select the vendor that best fits the individual needs of the organization. Investigative interviews were conducted with individuals from Association for Information and Image Management (AIIM) and the Project Management Institute (PMI). These project managers were asked questions in regards to the best practices when implementing a document management system. Best practices are relevant when implementing any document management solution. In order to consider best practices when implementing a document management solution, the following research objectives will be taken into consideration: How do companies currently manage their documents? Who is responsible for the document management? What format is preferred for a document? What are the accepted standards for a document management system? This data was analyzed qualitatively and presented through an explanation of a proper document management project. The critical success factors for a document management project include creating a proper taxonomy, support from management, and in-depth training.

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To my husband, Terry, thank you for giving me the support and encouragement to complete my degree. I could not have done this without you.

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Chapter 1 – Introduction

The design and implementation of a document management system involves many considerations. Among these key considerations are usability and legal requirements. A document management application is counterproductive if it is not considered usable by end-users. Often companies come to a point where they understand that they need a better way to store and retrieve records, but are unsure where to begin and what best practices to follow. Often, while companies are evaluating documents, they realize that they are printing documents just to file them. Documents today are often created electronically. Therefore, the focus should shift from “where to store” to “how to store” the document. “Managing change in today's business climate is complex and challenging. Good business information systems help identify changing business conditions and support the necessary response.” (Sampson, 2002, p. 81)

The purpose of this research was to compile a list of best practices for businesses to consider when implementing a document management system. This research will neither evaluate specific vendors nor recommend one vendor over the other. When vendors design best practices for using their document management solutions, they do not take into account best practices that have universal relevance across all software platforms. This research will offer best practices that are universally applicable.

Best practices are relevant when implementing any document management solution. In order to consider best practices when implementing a document management solution, the following research objectives will be taken into consideration:

1. How do companies currently manage their documents?
2. Who is responsible for the document management?
3. What format is preferred for a document?

4. What are the accepted standards for a document management system?

Chapter 2 – Review of Literature and Research

Organizations are now attempting to leverage technology to create a strategic advantage. "Technological applications help businesses work faster, more efficiently, with fewer resources. They help us manage a rapidly increasing volume of records and information, and they help us communicate faster." (Sampson, 2002, p. 133) A document management system creates and manages documents. It can capture, edit, print, and process documents in physical and electronic form. An analysis of the best practices can help select and implement the correct document management system for your organization. After all, an organization's most valuable asset is its knowledge. "Industry estimates place over 80% of corporate knowledge assets in documents." (Bielawski & Boyle, 1997)

What exactly are these business records and documents? "A business record is any document of business transaction, activity, process, or condition regardless of the medium on which the information is recorded." (Sampson, 2002, p. 255) Record management is concerned with controlling records from their creation, through both active and inactive periods to their destruction. Below is a representation of the life of a document.

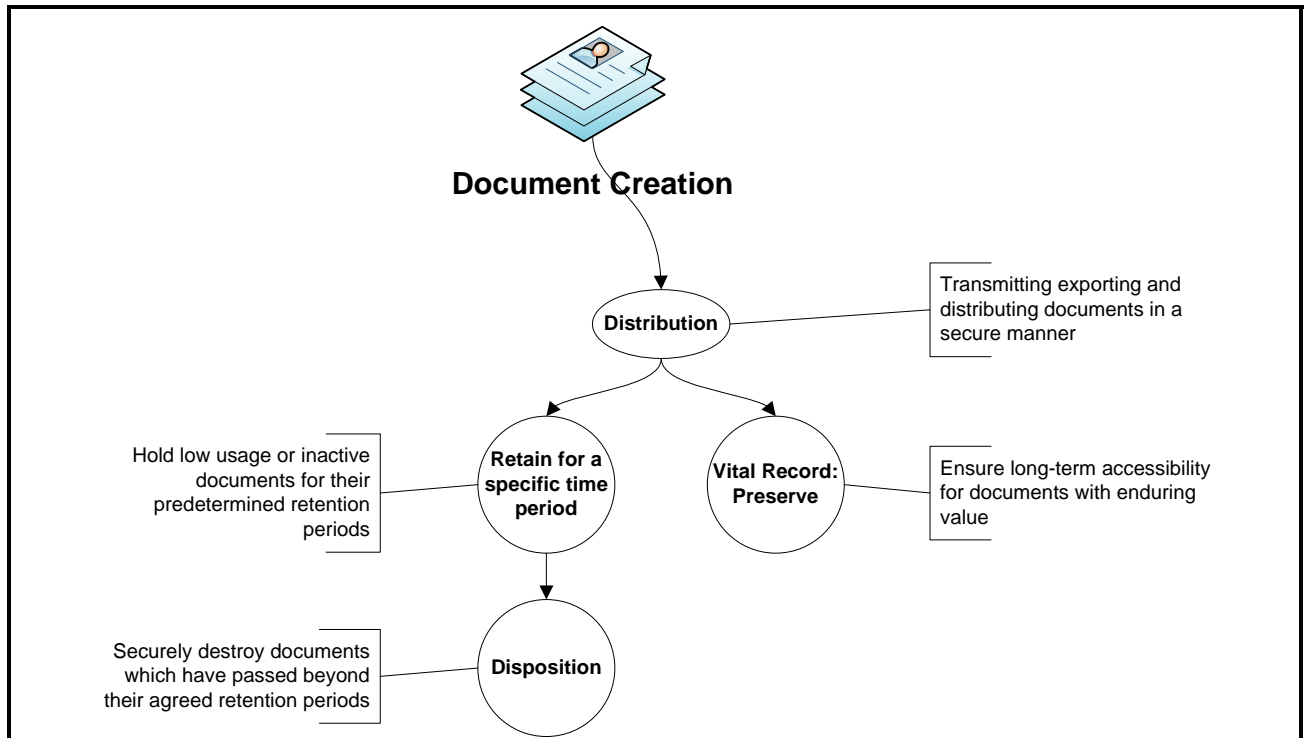


Figure 1. Lifecycle of a document.

Once a document has been created and distributed through the organization the fate of that document can depend upon many items. Vital company records are permanent and are not destroyed. These documents should be easily accessible to the appropriate employees. Other documents have a disposition schedule and will be destroyed at an agreed upon point in time.

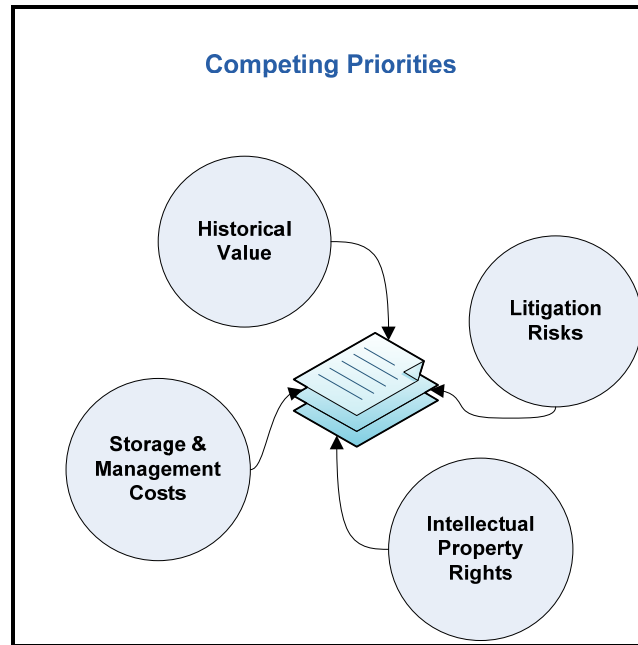


Figure 2. Competing Priorities for Document Management

An organization can have many different reasons or priorities for implementing a document management system. Some of the priorities for the system include historical value, litigation risks, intellectual property rights, storage, and management costs. Many companies are motivated by the realization that some historical documents are stored paper format only. This often will provide a catalyst to explore a better storage system. Whatever the motivation is for implementing the system, best practices should be used for implementation and the design of the system.

Laws and Regulations

There have been several laws passed in the United States that directly influence the storage and management of documents. These laws vary from country to country. In the United States, the Department of Defense (DoD) 5012.2-STD was developed and released in 1997 and updated in 2002. This is the de facto standard for functional requirements for document management software. It established the requirements for managing classified records, and

included requirements to support legislation such as the Freedom of Information Act, Privacy Act, and interoperability. In 2001, the International Organization for Standardization (ISO) released its standard ISO 15489, which was based on the Australian standard. (Adam, 2008) The ISO standard defined who was responsible for the creation, receipt, maintenance, use and disposition of records this included information about business activities and transactions in the form of records. (Adam, 2008) Most software packages today will meet the DoD and/or the ISO standard.

The Sarbanes-Oxley Act (SOX) was the vision of Senator Sarbanes and Representative Oxley, which was passed and signed by President Bush on July 30, 2002. The law was in reaction to the fall of Enron in October 2001 and WorldCom in May 2002 and the accounting and corporate scandals that ensued. “Public companies must formally document, test, and assess their internal control processes, particularly with respect to the adequacy of their financial records management. The records management processes must support the accuracy of financial transactions and the accurate valuation of company assets.” (Queen, 2009) Due to this regulation, records management is an essential component in controlling business processes, assuring accurate financial reporting, and providing reliable audit findings.

HIPAA stands for the Health Insurance Portability and Accountability Act that was enacted in 1996 to help protect an individual’s personal health information (PHI). The Privacy Rule and the Security Rule were put in place in 2003 to provide standards for safeguarding an individual’s PHI from unauthorized individuals. (Taylor, 2002)

Other laws and regulations include Securities and Exchange Commission (SEC) 17a-4, which gives retention periods for securities broker/dealer records. (Data Governance Institute)

There are many more laws and regulations that dictate the retention period and controls of business documents. Other agencies with laws applicable to various organizations may include:

- Securities Exchange Commission (SEC)
- Internal Revenue Service (IRS)
- Federal Communications Commission (FCC)
- Environmental Protection Agency (EPA)
- National Labor Relations Board (NLRB)
- Federal Trade Commission (FTC)
- Equal Employment Opportunity Commission (EEOC)
- Occupational Safety and Health Administration (OSHA)

With these complex rules and regulations, organizations need to have a way to retrieve data in a quick and efficient manner. If a system implementation is completed incorrectly, it can create more headaches for staff and can result in legal trouble. A correctly implemented document management package helps maintain records and enable organizations to meet the legal requirements effortlessly.

Frameworks and Methodologies

One way to implement a document management system is through a methodology called Design and Implementation of Recordkeeping Systems or DIRKS. “The DIRKS methodology is an eight-step process for agencies to use to improve their records management and information management practices, including the design and implementation of new records management systems.” (DIRKS) The DIRKS methodology is outlined in ISO 15489.1, Information and documentation - Records management. It was originally detailed in the earlier national standard, Australian Standard, AS 4390-1996, Records Management. (DIRKS) This methodology was used at the United Nations, and at the Australian Human Rights and Equal Opportunities Commission, (HREOC) in Sydney. (Macintosh, 2004) DIRKS is about building more efficient and accountable business practices through the design and encouragement of good

record keeping across an organization. “The characteristics of DIRKS can be summarized as follows: it takes working environments and organizational structures into consideration for establishing effective recordkeeping systems, and enables any organization—not limited to the government organizations—to establish flexible recordkeeping systems that are suited to the organizations, based on the ‘best practice’.” (Koga, 2007)

Another option is the Eclipse Modeling Framework (EMF) created by IBM in 2005. “The goal of the EMF model is to capture and externalize the variable aspects of a document management application such that each new instance of an EMF model contains only those elements that are relevant to the application.” (Boyette, Krishna, & Srinivasan, 2005) Document management applications could be comprised of a set of subsystems that provide capture, index, search, workflow, fulfillment and archival features. The EMF framework is not applicable to this thesis since it does not discuss the implementation; instead, it provides a unified modeling and code generation tool to unite the subsystems. EMF allows a business user to strengthen and maintain document management applications.

In 2003, Farid Meziane proposed a method for organizing, storing, and retrieving documents based on similarity contents. The method uses techniques based on information retrieval, document indexation, and term extraction and indexing. (Meziane, 2003) This method was designed for use in the construction industry and does not discuss implementation; rather it develops a storage hierarchy for documents.

There are other frameworks beyond the widely accepted ones mentioned above. These other frameworks and methodologies are often vendor or technology specific. An example of a vendor specific framework would be WISDOM Document Management Framework, which enhances SharePoint. (SharePoint Solutions, 2010)

Current Vendor Specific Best Practices

Best practices are about choosing the best available technology to solve stated business challenges and implementing it in a way that will produce the strongest results. A best practice is a technique, method, or process which conventional wisdom regards as more effective at delivering a specific outcome. It is considered more reliable than any other technique, method, or process when applied to a particular condition. Best does not necessarily equate to the suite with the most bells and whistles. Rather, it means locating the best solution for your business needs and deploying it logically according to a well-conceived and thorough plan.

Vendor specific best practices have merit when implementing a specific package. During the initial selection and research for this thesis it was discovered that there was very little documentation on non-vendor specific best practices. For example, Microsoft SharePoint and DocuShare from Xerox both provide the same general services but document the software very differently and do not discuss best practices.

Microsoft SharePoint is a common application used for document management. In Microsoft's documentation it often discusses the technical specifications rather than how to use it as a document management solution. The documentation for implementation of the solutions vaguely discusses the actual storage of the documents. One such example of vaguely discussing it would be as follows, "First, we do not find that a pervasive use of folders in a document library is either helpful or desirable. While an occasional use of folders might help categorize documents, folders are really just a way to apply metadata to a document without having to create a column in the library. Their usability is generally not thought to be helpful in the document library interface. Having said this, for performance reasons, we favor the use of folders over filtered views because folders are twice as fast at bringing up a list of documents as

opposed to filtered views of a larger list. Second, all other things being equal, we would recommend that larger lists be broken down into multiple document libraries.” (Microsoft, 2010) Microsoft’s SharePoint solution often gives you the tools and allows you to implement and mold it into the needs of the organization. This technical approach is acceptable when you have implemented several instances and have learned the best practices and approach.

Another popular document management software package is DocuShare from Xerox. With this product, users can fully control and implement the company’s best practices. “DocuShare CPX delivers an expanded set of advanced capabilities that allows users to build best practices into automated business processes.” (Xerox, 2009) This is a great product, but does not help develop new user’s knowledgebase of where to start. This again is not the case in many organizations where they are implementing a system from the ground up and have relied on file cabinets and shared folders to manage the documents.

Overall, both software packages do not include any best practices as it relates to the document itself; rather they discuss and make recommendations about the technical aspects of the software. When vendors design best practices for using their document management solutions, they often do not take into account best practices that have universal relevance across all software platforms.

When a document management system is properly implemented, it will prevent unnecessary copies of records, which leads itself to the goal of promoting the efficient use and retrieval of information. (Diamond, 1983) Susan Diamond wrote in 1983 that "On average, a misfile costs the organization \$80 in clerical time spent searching for the record.” (Diamond, 1983) Today that cost has climbed to \$120. To file it correctly the first time costs on average only \$30. (Gartner Group Consultancy, Laserfiche, and eCOPY, Inc.) In the event a lost

document needs to be reproduced, which happens 7.5% of the time, it will cost an average of \$220.

(Gartner Group Consultancy, Laserfiche, and eCOPY, Inc.)

Chapter 3 – Methodology

Data regarding document management requirements and implementation guidelines was gathered through unstructured interviews with project managers involved in implementing a document management solution. This data was analyzed qualitatively and is presented through an explanation of a proper document management project.

Population and Sample Size

The participants in the study have various areas of expertise and backgrounds. All participants are professionals with several years of non-profit and for profit experience. Participant one has experience in document management in the real estate industry. Participant two has used SharePoint 2007 in a Military setting where documents are required to be accessible by restricted personnel anywhere in the world. Participant three is a project manager for the implementation of SharePoint document management solutions. Participant four works in a non-profit and manages documents manually through scanning and assigning it a folder. There is not current a system in place to automate the process at the nonprofit. Participant five has over 17 years of experience in the document management field. At the participants' request, no additional information is to be released. Participant six is an author who has worked in the fields of document management and information technology for 25 years and is considered an authority on document strategy design, process improvement and business technology. Participant seven is a project manager who has worked on document management projects for an aerospace company and email document management solutions for another organization. Participant eight has extensive experience in successfully growing enterprise software organizations in product development, product management and project management. This participant brings in vendors side practices and perspective. Participant nine

has been exposed to document management since the beginning of his career. He has spearheaded many initiatives with various companies. Participant ten has been an executive, consulting practice partner, innovative practice director, author, university professor, senior management consultant, mentor, coach, and an effective program manager. He has written a book on document and knowledge management and is currently teaching graduate classes on document management. The participants in this study provided a wide variety of experiences providing a well rounded view of document management in government and private entities.

Investigative interviews were conducted with ten individuals from Association for Information and Image Management (AIIM) and the Project Management Institute (PMI). These project managers were asked questions in regards to the best practices when implementing a document management system. Using the combined knowledge of these groups, the intent was to develop a non-vendor specific list of recommended “best practices”. The unstructured interviews were used to determine the recommendations.

Interview Outline:

The unstructured interviews followed the outline below:

1. Introduce the study and provide participants with an overview of the process.
2. Privacy and Non-disclosure
3. Sample Questions:
 - a. Capture
 - i. What forms of document capture are you currently using?
 - ii. In what format(s) do you store a document? For example: MS office formats, .tiff or PDF
 - b. Indexing

- i. How did you develop your indexing method?
 - ii. Are you indexing the location of paper documents?
 - iii. Would you develop that differently now that the system is in place?
- c. Document Management and Security
 - i. What are the components of an effective records management program?
 - ii. How do you test and decide the security for the documents?
 - iii. Do you allow employees to access documents on mobile devices such as phones?
- d. Business Process Management/Workflow
 - i. Are there any benchmarks or standards of performance in your records-management program?
- e. Integration
 - i. Do you have a specific design approach for systems integrations?
- f. Records Management
 - i. What are the factors to consider when determining the appropriate retention period for records?

Methods and Techniques:

The unstructured interviews were recorded because the questions were open-ended. This allowed participants to expand and provide valuable input. Recording the interviews removed the risk of taking too much time to write information down or missing valuable information. Recording allowed for obtaining explanations and opinions obtained in a shorter period of time. The interviews were conducted over phone or in person in a comfortable, neutral, secure environment. An informed consent document was given to each participant explaining the

objectives of the study, confidentiality, and study procedures. This document was signed by the participant and the interviewer. The privacy of the interviews is imperative to allow for an open discussion with the participants.

The facilitator of the interview discussed the study neutrally and without bias. This included not inducing responses or attitudes. The interviewer used empathy and interpersonal skills to reformulate and clarify the interviewee's response.

Processing of Information

Each unstructured interview generated data with different structures and patterns. Each interview was recorded and the notes were typed up (See Appendix A). A coding system was established. The coding system clumped relevant strips of information from the different interviews. The researcher was able search and extract patterns from the interview transcripts and notes.

Chapter 4 – Project Analysis and Results

Document management can help decrease the time employees spend looking for information. Instead of wasting hours chasing down a signature and ensuring someone in “legal” reviews a document, a document management system can help route documents through a workflow. Starting a document management program can be difficult and daunting task. After ten interviews with document management professionals, several best practices emerged. Best practices are discussed by walking through an ideal implementation.

Start small; the first iteration of the document management system should address areas where deficiencies or opportunities are the greatest. Departmental document management system deployment demands a holistic, enterprise approach from the start. In most public companies, that will start with a discussion with the Legal department. If the company is not publicly held, you can use reference legal rules and regulations such as SOX or HIPPA to begin your discussion. Publicly held companies are generally held to higher legal reporting standard than non-public companies. After having these discussions with legal and business managers you will be able to define what the organization considers a record, what items needs to be archived, and a disposition schedule.

Management must fully support the project and be vocally a supporter to others within the organization. Executive and senior management must understand and agree on their overall vision to ensure the goals are logical, relevant, and properly scaled. Both sides must work together to establish and communicate a shared vision with achievable goals that bear realistic implementation timelines. Best practices means finding the best solution for short and long-term business needs and deploying it logically according to a well-conceived and thorough plan.

Why Start Small?

There will be lessons learned along the way. When you start small you can leverage those lessons learned to the next iteration of the project. Since you are addressing areas where deficiencies and/or opportunities are the greatest; your successes will be public and acceptance will be greater.

It is easier to address the security and permission concerns of a single department rather than addressing them organization wide. Securing documents is often very complex and should be well thought out.

Building Knowledge - Understand Where You are Now

Participant Two stated that; “Knowledge management and enterprise content management go hand and hand. If you do not understand knowledge (management and how it) is shared or transferred and why and it’s of value in your organization then you should not be designing a system.” Start with a solid understanding of your organization’s functions, processes, politics, and who the decision makers are. Many implementations fail because of problematic or unclear hierarchies and politics. The project manager must work diligently to manage the organizational change, not just IT. The participants explained that it is necessary to determine what your current resources are, by answering some basic questions about the project and the company. Such as, do you have multifunction devices or scanners, which servers will this solution reside on, what technical skills does this organization have? With these questions answered you will start to get a better idea of your current resources.

Detail Where You Want to Be

Discuss the project with the individuals using the system. Including their input can help increase user acceptance. The IT department does not use the systems on a daily basis; therefore,

the users' insights will include information that may not be documented. Senior management or the sponsor for the project should be able to provide high-level direction for the project. IT should not be leading the project according to one interviewee. That person continued to explain that it should be a person with superior organization knowledge and a savvy politician. One participant acknowledged that it only costs losing one court battle due to a lost document to highlight the need for proper document management.

Evaluate, Plan, Execute

There are many types of document capture that should be considered when developing a system. Most systems will not import directly from scanner out of the box. There are many third party software add-ons that create this ability. Often vendors will exhibit the system with the additional add-ons providing a smoke and mirrors demonstration. Participants of the study stated that once you have narrowed down your list of vendors have them use your system to show the capabilities rather than have the vendor use their own computer resources. This reveals a great deal about the systems when you begin to test the application. Participants stated several times that they have seen time after time that people are printing off documents to rescan them into the systems. Print feeds would solve this issue. A print feed would send documents directly into the system rather to the printer.

Participant Nine stated that, "there are still a lot of companies that are using tiff format and this was due to faxes being sent in this format." Participants stated that today documents are typically in PDF format or kept in the native format when imported into the system. The tiff format is significantly larger than PDF format. Participant Two stated that the typical format for a document is "up to the person or owner who manages the document. We try to convince them once they get a final copy or get a digital signature on the document to convert the document to

PDF/A. The document will be something people will be able to get into 10-15 years from now.” Twenty-five percent of participants recommended that documents of record be converted into PDF or PDF/A format. PDF/A is an ISO standard for long term preservation archive format. It is self contained and can be viewed in the future removing the risk of not having a readable format. Most participants in the study recommended using a format that uses less storage. One interviewee reminded that, although storage is relatively inexpensive, the maintenance for the storage system is not.

One hundred percent of the study participants stated that creating a taxonomy for the document system is a critical success factor. Taxonomy takes it a step farther by creating a classification for all the documents being placed into the system; this can also include the disposition schedule for the item. While most products will create a base index, the trick is to make the information stored relevant. Metadata is data about data or keywords that describe the document. Standard basic metadata should include the site location, department, created by or author, and document type. Keep in mind that documents may take the form of a voice file, email, or a Word document. The system you select should allow you to change the metadata and disposition schedule for each document. This will create a flexible and dynamic system that can change or adjust as your organization grows. Creating cohesive indexing plans, search strategies, and records management plans now will save considerable time and frustration later.

Once you have the document stored into the system it is very important to be able search for items. There are three different widely used approaches for searching for documents. The first would be full text. This search examines every word in every stored document and tries to match it to the search criteria. This method is not as popular as searching with metadata. This is the most widely used search in organizations. This search is restricted by the quality of the

metadata selected and stored with the document. The final approach is through use of a refinement panel. This is a newer approach which is catching on with organizations. This panel leverages the metadata and full search, giving you a more accurate search.

Benchmarks should be identified along with the design and implementation of the system. According to participant two, “standard ones include design/mission specifications, how long it takes to upload a document, security, access to documents in remote locations and uptime.” These will vary from organization to organization, but should be identified prior to handing the final system to the users.

According to the interviewees, most organizations start the document management dialog by discussing how to improve the workflow of documents within the organization. Fifty percent of participants interviewed stated that this is becoming a must for most organizations. A good place to start is by identifying current practices with reports, general approvals, or invoices. Be sure to consider how documents, information, and automation will impact other departments. If you do not consider this you will miss opportunities for greater efficiency.

Most participants in the study agreed that mobile viewing of documents is in its infancy. They agree it has its place in the field, but accessing documents on mobile phones is not very useful. One participant was adamant that mobile devices should be leveraged for the approval of time sensitive requests, such as timesheets or check approvals. This can be accomplished by having the document management system send a notification through email for approval. This would require the user to authenticate through the active directory securing the approval.

Security is often a large concern for management. According to the participants interviewed, most packages available today will not show the user items that they do not have security rights to see. This is a simple method to prevent employees from becoming curious and

attempting to circumvent the security in place. Participants stated that security is a balancing act with employee productivity. You must be aware of risks while designing the security for the system. Three of the ten participants stated that starting with the active directory structure for security is a great place to start. Active directory is the central location for network administration and security. Never assume it is always correct and always challenge security standards. Above all, ensure that the software has a built-in, unalterable audit trail.

Governance

Today there are many government and industry specific regulations that require organizations to document their business processes, identify risk, define “internal controls” to mitigate those risks, and demonstrate the effectiveness of these controls. One participant explained this as the discipline of governance, risk, and compliance and believed that the three should be viewed as related functions, with common activities, best approached in a comprehensive, integrated manner. The rules will be different for every organization.

It is important to identify key performance indicators (KPI), expectations, and make known what the benchmarks are. Participants explained that you should be sure to discuss this with the vendor and document expectations. It is critical to limit to the factors that are essential to the project reaching its goals. Keeping the number of KPI's and benchmarks small will allow you to keep everyone's attention focused on achieving the same target. Some sample KPIs include: document storage costs (include paper & electronic), the ratio of paper to electronic documents, and the time to respond to legal discovery of records.

Before a system is finalized and ready for general use you need development of change management practices. Change management reduces the risk of project failure and increases the likelihood of success. Change management is often overlooked until the end; discuss it and begin

using proper procedures during the implementation of the system. When change management is leveraged properly employees have a solid understanding of why change is happening.

Training

All of the participants in the study state that it is very important to create a mindset for document storage. This includes selling the positives and the reasons for the project to the users and management. Once the project is ready, be sure to design a training program that encompasses the reasons why and how document management is going to improve the organization. The training program gives users an overview of records management terminology and concepts. The employees will request additions and changes in time; be sure to discuss the process for change management. Regardless of the media or format of the record, it must be properly managed to be an asset to the organization. The employees will decide if your project meets their needs and if it is successful. Be sure to give them the necessary tools.

Additional Information and Resources

Participants recommended additional organizations and resources for starting or benchmarking a document management system. Organizations such as AIIM (Association for Information and Image Management – www.aiim.org), NARA (National Archives and Records Administration), and ARMA (Association of Records) have created and published industry standards for document and records management. The United States government has standard regulations on the taxonomy. This standard is called DoD Discovery Metadata Specification or DDMS <http://metadata.ces.mil/mdr/irs/DDMS/>.

Chapter 5 – Conclusions

The purpose of this study was not to evaluate all the possible vendors but to develop a way to discuss the organizational needs for a document management system and to create a knowledgebase for records managers to select the vendor that best fits those needs. This study was limited in gathering information using a small sample. It is possible that a larger sample size would increase validity of the study. Due to the time and budget constraints, this study was conducted in a relatively short period; and may have impacted the results of the study.

Today, 90% of corporate memory exists on paper. (Gartner Group Consultancy, Laserfiche, and eCOPY, Inc.) This is a fact that must be accepted by businesses today. When deciding to implement a document management system, there are several almost universal considerations. One consideration would be to meet the legal obligations of the organization; this includes laws, regulations, and even industry specific standards. Another consideration is to be sure to always look for outside dependencies. No one department functions without the support others.

Document management projects may differ from organization to organization. There are certain items that many participants agreed were key points and can be applied to any organization. The participants in the study expressed the need for the project manager to have superior organizational knowledge and to be a savvy politician. This is necessary because the individual will need to understand the end user and not just the technology. The project manager should be aware of risks and opportunities, such as the failure of employees to accept the system or streamlining processes for quicker collections of accounts receivable. The project manager must be thorough and also verify process assumptions, so time and resources are not wasted going in the wrong direction. Discuss the motivation for the project with management, and staff

outside the project, to create some excitement around your project successes. This promotion will create a better environment for project acceptance of the employees.

The leader plays a significant role, but so does the system selected. Be sure to select a system that can grow and change with the company; after all, the only thing that remains the same is change. Do not be afraid to think outside the box; documents management can incorporate items other than paper documents, such as emails or customer service voice recordings. Take the time to examine current processes and identify ways to streamline processes through workflows. While designing workflows for the system be sure that you are not over complicating the process. Over complicating the process creates an environment of dissatisfaction and reduces the chance for project success. Examine the formats of the documents and discuss the best format based upon the documents characteristics. All of the participants in the interviews stated that the taxonomy is very important and should be reviewed often. Make sure to identify the metadata that makes sense and determine the disposition schedule for the document. If the metadata is not relevant, then you will have a difficult time retrieving documents in the future. Have the taxonomy accepted by legal and senior management.

Once the fundamentals of the project have been identified it is important to identify key performance indicators (KPI), expectations, and make known what the benchmarks are. Be sure to discuss this with the vendor and document expectations. It is important to be strategic when selecting the KPIs that are essential to the project reaching its goals. It is important to keep the number of KPI's and benchmarks small to keep everyone's attention focused on achieving the same target. Change management is often overlooked until the end; discuss it and begin using proper procedures during the implementation of the system. Change management is used to

reduce the risk of project failure and to increase the likelihood of success. Another area often overlooked is proper training of staff. Make sure the end users understand and can operate the system. Make sure the employees are consistently viewing the program's ability to meet needs, its dependability, and its trustworthiness in a positive light. Providing proper training for employees helps them develop their skills and knowledge, but it is also can be used as a motivational and a building block to organizational success.

Areas that are considered to be critical success factors include creating a proper taxonomy, support from management, and in-depth training. These key factors are unique for achievement of the document management project. With these three in place your chances for having a successful document management project will grow exponentially.

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Appendix A – Interview Notes

Each participant was asked to explain their qualification, experiences and what characteristics could be used to describe them.

Interview One

The participant is using two third party SOA products.

Capture

Items are kept in native format, but migrating to PDF format. Items are often scanned and added to electronic files. Forms are generated and captured from the system.

Indexing

Documents are organized by the individuals or parties in the real estate contracts. Documents are easily and fully searchable with one exception. You cannot search for documents that are missing signatures.

Document Management and Security

Documents are shared by staff and real estate agents. Agents have different security levels for the office staff.

Business Process Management/Workflow

There is a library of standard forms that once completed start a workflow. This workflow includes the client. Drawback is that there is no print preview for the documents, which are being pre-populated. An area for improvement would be adding an outstanding tasks or alerts to let people know when documents are missing.

Integration

No current integration between software packages. It hinders productivity. One package does integrate with outlook calendars for contract deadlines.

Records Management

Legal binding electronic signatures are used widely in this industry. The products manage disposition based off contract dates. Since these are legally binding contracts the disposition is set by legal requirements.

Interview Two

This participant was using SharePoint 2007 in a Military setting. Documents are required to be accessible by appropriate personnel anywhere in the world.

Capture

Documents are kept in native and PDF format. This includes the option of PDF – A. Participant two stated that the typical format for a document is, “Up to the person or owner who manages the document. We try to convince them once they get a final copy or get a digital signature on the document to convert the document to PDF/A. The document will be something people will be able to get into 10-15 years from now.”

Indexing

Government has standard regulations on the taxonomy. This standard is called DoD Discovery Metadata Specification (DDMS). A link to a copy of this was sent to the interviewer. (<http://metadata.ces.mil/mdr/irs/DDMS/>) There are often issues with individuals setting up taxonomies incorrectly or ignoring the standards. Dublin Core (<http://dublincore.org/>) extends basic metadata. Most systems require the DDMS metadata.

Document Management and Security

There are no mandated definitions on which documents are to be stored. This is up to each division. Most items fall into one of two categories: Classified or Not Classified

Business Process Management/Workflow

The government sets the standards for servers and is responsible for the key performance indicators (KPIs). “Standard ones include design/mission specifications, how long it takes to upload a document, security, access to documents in remote locations and uptime.”

Integration

Documents can be viewed on government issued devices only or FOUO (For official use only). Army has a SharePoint Standards Guide, which is to be followed when setting up a new farm.

Records Management

These are the most important items to take into account when setting up a document management system. First, make sure you have governance set up. This includes setting expectations, having superiors buy into the program, discuss the risks, and determine what legal requirements you need to take into account to keep up in compliance. Second, make sure you have qualified operators and trained users. This includes people through all the stages of developments. (Assessment, Design, Develop, Implement) Third, make sure your development team is competent and experienced. Fourth, make sure you have proper change control management in place while developing. Finally, verify and create a comprehensive training program.

“Knowledge management and enterprise content management go hand and hand. If you do not understand knowledge is shared or transferred and why and it’s of value in your organization then you should not be designing a system.” Factors to a successful document management program include; business understanding for need (Assessment), understanding of scope, proper leadership, proper change management controls, expectations set by project managers, milestones set and promoted, and a good team to develop the product.

Interview Three

This participant is a project manager for the implementation of document management solutions. They have installed several different types of SharePoint solutions.

Capture

Currently paper documents are imported through scanners and multifunction items. They are also imported directly into the system in their native format. Documents are often captured items in OCR format. There are files other than paper you need to look beyond the paper. In a call center you may be storing audio files and screen captures.

Indexing

The more meta data and tagging you do to the individual files the easier it is to locate the file. You need to be able to search via keywords.

Document Management and Security

Legal requirements often state the retention requirements for documents. Rules may include HIPPA, IRS. Currently contracts are held infinitely and the voice calls are held for 15 days. When you determine the security for the system you should isolate the areas of sensitive data and use strong passwords.

Business Process Management/Workflow

Make sure the company has the mindset for the program. Be careful of documents which might cross departmental lines. For example a document or contract which has a credit card or financial information. Don't limit yourself with only accepting specific document formats.

Integration

Not usually in project scope.

Records Management

There is a fine line between paper and digital documents. You need to be aware of document hoarders.

Interview Four

This participant works for a non-profit and manually stores documents digitally. They do not have a system in place to automate the process.

Capture

Items are scanned via multifunction devices.

Indexing

Once documents are scanned they are manually placed in electronic shared folders for storage.

Document Management and Security

Items are secured through active directory security groups. Loss prevention and office manager have access to the paper files. IT manager and office manager have access to digital documents.

Business Process Management/Workflow

Documents and renewals are set up as an outlook reminder.

Integration

Distribution of board files have moved to digital formats. There are still issues with emailing documents which might be too large for mailboxes.

Records Management

Retention periods are determined by law and an outside accreditation CARF. Documents are deleted from the network or shredded on site by an outside vendor. No approvals are needed

for the disposal of documents. There are government requirements which require a physical signature and they will not accept a scanned or digital signature.

Interview Five

This participant has over 17 years of experience in the document management field.

Capture

There are three different options for scanning hardware. A desktop scanner which can be used up to about 100 pages per week. A workgroup scanner can handle from 100 to one million documents a week. This could include a multifunction device. Finally a production scanner, this has the capacity to handle over a million pages a week. The key is to match the scanner with the task at hand. Documents are scanned into tiff or PDF formats. Depending upon the organization and the legal requirements you may encounter native formats, jpg or PDF/A.

Indexing

When setting up your plan for indexing make sure you take a good look at the organization. You should set up a taxonomy or model with the organization in mind. There is no universal index. You should determine the metadata and then map out the taxonomy model.

Document Management and Security

Often the locations of paper documents are ignored. Whatever approach is taken you must discuss the retention policy. In the future you may see voice activated indexing of documents. Currently there is an OCR engine tool that is used to recognize documents and extract data. The system must be easy to use to allow for high user adaption. When systems are too complex they often fail. Security often mirrors the organizational structure. Start with applying those rules to the system.

Business Process Management/Workflow

Mobile devices are now being used to approve documents in workflows such as approval of timesheets. This depends upon the organization. A good use of mobile devices would be for workers in the field needing access to schematics. There are still security concerns which should be addressed. In their opinion mobile document management applications are not quite there yet.

Integration

Often systems are integrated with an enterprise resource planning or ERP. With this the standard SLA agreement is the benchmark. ODBC compliant databases make for easy integration. Non proprietary systems make integration difficult.

Records Management

The participant felt that he was not the proper person to discuss retention periods and recommended the company seek advice from a qualified records manager. This records manager should have must be familiar with state, local, federal and industry specific regulations. There are new software packages that are offering solutions for creating the disposition schedule. An example would be Information Records Clearing House or IRCH.

Anyone starting from scratch should look at the platform where the solution will reside as a starting point. This narrows down your options quickly. Be aware of proprietary systems due to the high cost to change or make any modifications. This will also back you into a corner and be vendor dependant.

Interview Six

The participant is an author who has worked in the field of document management and information technology for 25 years and considered an authority on document strategy design, process improvement and business technology.

Capture

Always make sure you are speaking the same language as your vendors. Image capture often refers to the scanning, print streams. Data capture refers to the metadata, zonal OCR. Never make assumptions that you or others involved are understanding items until they are defined. Often you start with capturing the image and then move to capturing the data. You can scan at one location (enterprise capture) or have distributed capture. Distributed capture allows for scanning at multiple locations. There are often cases and legal reasons why some items must remain in the native format. This is industry based.

Indexing

This is an area that is critical to the success of your project. There are two types of indexing manual and automatic. Manual is referred to often as data entry. Automatic is using OCR technology to capture data. Make sure you are capture the relevant items and not requiring too much or too little metadata. Discuss your document strategy with others, because there is no one size fits all strategy.

Document Management and Security

Security needs to be kept in mind throughout the project. Always verify personal information is not easily accessible by individuals who should not have access. Mobile technology is good, but there are security concerns. It is a wonderful mechanism for delivery and will be growing in popularity.

Business Process Management/Workflow

When possible and when it makes sense, use auto-assigned metadata data to reduce human error. Make sure that it is well thought out and dynamic. This will allow you to change the rule as needed in the future. Always, review and verify timelines.

Integration

Consider business intelligence. It is often over looked and can be used to leverage the data in the system. Benchmarks often include the following, but weigh them differently: security, communication, knowledge management, operating costs, turnaround time, ROI, efficiency, customer satisfaction, and/or market share.

Records management

Storage of email and faxes should be looked at when considering systems. They recommend that you always challenge and verify all assumptions when creating a document management system. Contact legal council to verify your legal requirements.

Interview Seven

This participant has working in with aerospace and email document management systems.

Capture

The systems included storing and retrieving blueprints through scanning. Other documents, such as emails, were digital formats and were fed into the system. A few years back, tiff format was most often used to store documents. Today native format of digital documents is widely accepted.

Indexing

At the aerospace company, items were normally indexed by names, programs, systems, specific ids, or page numbers. Email topic and subject was used as metadata when storing emails. Verify that the system is easy to use and index based upon the reasons you are creating the system. Distributed scanning scans items at various locations and allows for easy access to data. This creates a simple and effective way to scan documents.

Document Management and Security

Everything was scanned. No paper remained. Every item that was scanned had a set disposition schedule. Lessons learned are: teach and train users, verify that executive management has accepted and back the project, promote why the project is necessary, and keep communication open. You will be managing change of culture and communication. Therefore it is important to manage people. Retention is often determined by outside agencies such as IRS, Federal or state government. Presently, employees cannot access documents via mobile devices. If they did have access, in a hypothetical situation, they would not be allowed to edit or download documents. There is nothing that is fool proof and 100% secure. For example, there is software out there that allows people to screen scrape data.

Business Process Management/Workflow

Often the benchmarks for the system mirror the SLA for the hardware they reside on. For example the server must remain online 99% of the time; therefore the software will remain online 99% of the time.

Integration

The aerospace company integrated the CAD system with the document management system. This allowed all departments to access the drawings seamlessly.

Records Management

Understand why you need a document management system. Create a good business case to promote the project. Then define scope properly and beware of scope creep. To start your project you should determine if your company policies are up to date and reflect current practices. Then select a few vendors to bring in to present options or start with an RFI. Start small with the project, maybe only one document or a one series of documents. Be thorough with your vendors and decide what is needed and what additional add-ons maybe necessary later.

With the RFP process you should always check references and look for references by people other than the ones supplied to you by the vendor. Verify the contract explicitly states expectations, timelines, and who will be involved in the project. After you have selected the systems and it is installed you should verify the security and set up. Integration is usually completed after the systems are set up. You should always keep your project schedule up to date and publish it where people can see it. Work with staff to create a buy in. When a project is not well received the slimmer chances you will have of a successful project. Always sell the pros of the project and do not let people make assumptions.

Interview Eight

This participant has extensive experience in successfully, growing enterprise software organizations in Product Development, Product Management and Project Management. He is a document industry expert with a broad understanding of not only the technical aspects of the industry, but also the business challenges that must be effectively overcome in order for any company to be profitable. This participant brings in vendors side practices and perspective.

Capture

There are many ways to scan a document into a system via scanner, and other devices. There has been a movement to capture documents before they have been printed via print stream. This saves money, time, and prevents errors. Depending upon the industry you may need to keep it in the original format and ensure it cannot be edited. You can store your document in any format but the goal should always be to keep it as small as possible. Storage is not expensive but managing it is. Older formats include raster and are now moving to a PDF or PDF /a format. Transaction documents should be kept in a PDF format. Internal non-regulated documents can

remain in native office or other formats. You should think about what documents you will need to access in 10-20 years and store them in a PDF/A format.

Indexing

Always be careful when setting this up. First start out with getting to know your application, company and industry. Keep in mind that all industries and regulations do not stay the same. Typical indexes include keywords, account numbers, type of data, and date. This will get you started but be sure to look at your company for specific items.

There are three types of search. The first is keywords based and is a simple search. The second approach is full search. This is great since it allow you to search for any items in a document. This is done through OCR and PDF search. The final search is a combination of the first two. The allows you to search for a document with a specific meta tag and a specific string of words. This creates a stronger search with better results. The final option is not used as often as it should be.

Paper documents can have the locations stored. Best practice would be to scan all “important” documents into the system. Otherwise you could be in a situation where you open up a file drawer to determine the file is missing. The cost of not locating a document varies by industry.

Document Management and Security

Always look at the systems and determine if it is serving its function. Make sure you select a system that is dynamic enough to change with your organization. The participant has learned that adding more metadata is not always a bad thing and can help you in the future.

Never expect to set up a system and walk away from it. You must set up procedures to review and update it for business needs. Be sure to communicate about the project and do not

allow several different disparate systems to be installed in each department. This will create silo for each department and integration difficult.

There are many pros and cons to proprietary and open systems. With a proprietary system you know that it will be stable, you will have support, and longevity, unless the company goes bankrupt. With an open source system, you have a great deal of flexibility as long as you have the support necessary to run and make the changes needed. It is expensive and there is a learning curve. Often there is no support available. In this participants opinion the cost is about the same.

Make sure you are looking at security inward and outward. Most of the security breaches are internal. One example could be someone losing a company laptop with personal customer data. External breaches could also include people outside the company viewing trade secrets. When you secure items you have to realize that it costs you money by making employees spend more time of a task. All databases should be encrypted; there is no excuse for it not to be. The best approach to hire an outside company who specializes in security to evaluate weaknesses. Sometimes the truth is better heard from an outsider who is not politically motivated. There will be many outside standards and regulations that you must meet such as PCI, HIPPA, and DoD.

Business Process Management/Workflow

Benchmarks are determined by the reason in which you are setting the system up. They typically include tasks, such as determining the time saved, and can people do their jobs effectively? In this participant's experience a document should load within one second, or it will disrupt the employees thought process. On the server side, you should maintain 99.9% uptime. The performance standards should be driven by employees and not IT. IT often has no idea what the employees do.

Integration

The easiest place to start on integration is to determine what systems are printing and then scanning documents into the system. This is a costly practice and should be avoided. Some of these systems might include customer service, transaction feeds, and other production systems. Sometimes it can be as simple as having the system capture the print feed.

Records Management

Retention is usually mandated by law. It is less expensive to store digital document than it would be to store the documents off site. Keep in mind there are some documents that might have retention periods of 100 years. Verify that your system can edit and change retention periods, they will change.

Best practices include making sure your system is flexible enough to change along side of your business. Make sure you understand the legal rules for documents both nationally and internationally. They vary greatly, for example the EU has much tougher standards than the US. Some advice to new companies or new people to the industry would be to realize that records management is a black hole, until something goes wrong. Be sure to educate senior and C level employees. Make sure you have a C level champion to help navigate the political issues and navigate interdepartmental workflows. No system will last forever. Always review the processes, technical standards. Set up a change process in the beginning and maintain it.

Interview Nine

This participant has been exposed to document management since the beginning of his career. He has spearheaded many initiatives.

Capture

People implementing SharePoint systems will often use other aftermarket tools that bolt onto the system and import the scanned forms from a multifunction device. Base document

management most systems should have the option to upload the system. The preferred format is PDF. “There are still a lot of companies that are using tiff format and this was due to faxes being sent in this format.” Documents are normally converted to PDF rather than keeping them in the native format.

Indexing

Indexing and searching are two different things. Indexing is the physical identification and classification of what is in the document. Most systems will do that today and you can always tweak the way they do it. Search will locate the number of a specific term in a document. Each tool is different, but they all provide indexing. Items that affect the relevance of search include keywords or use a refinement panel. The refinement panel will send you a sample set of values that apply to the search result. Taxonomy can be built and developed from these tools. You can add department, location, people and other search criteria based off of the taxonomy. The trends in search are keyword based rather than organic. Vendors are trying to educate the customers on the advantages of using an organic search, like Google. A lesson learned on indexing and search is to make sure you are indexing the correct things. Give people the opportunity to more than one item by looking outside of your organization such as internet site and intranet site.

Document Management and Security

Make sure you select a product that will limit results based upon your security level. For example, if someone outside HR was searching John Smith’s payroll or hiring documents and they should not have access to them. Those documents would not show up in the search results, but if they did have access they would show up. Systems that show the document and then give

a screen saying access denied invokes people's curiosity and often they will start looking for ways around the security. Removing the item from the result reduces this risk.

About 25% of companies are starting to ask for access to documents on mobile devices. It has not become an item that companies must have. What has become a must is mobile approval.

Business Process Management/Workflow

Mobile workflows have helped streamline processes. Most systems are email based and a HTML link will direct them back to the system and ask them to authenticate. Workflow is a huge hot area in document management. The easiest way to set up a workflow is to ask about business process and then automate or improve upon it.

Integration

For integration, we often use EAI tools such as webmethods or tibco. These products will often assist in integration by leveraging a single method for integration. This creates a smaller opportunity for disparate systems.

Records Management

Typically disposition starts with a conversation with legal. SOX or HIPPA will often be a great starting point for the discussion. When a company is private, it is a bit more difficult and a longer discussion with legal. This normally is not an IT discussion. From a package level, almost every system will create archive rules and disposal rules. Each document may have a different rule. Training is very important. People are of two mindsets, either keep everything or destroy everything. Work to change people's opinions and understand why they should be using the system. Symantec has just released a tool that will dump emails into a holding bucket until it is tagged or after 90 days it is disposed of. You need to define the rules up front.

Interview Ten

He started in 1970's in classical electric data processing or EDP and foresaw that traditional data processing was going to change to collaborative systems. Since then this participant has been an executive, consulting practice partner, innovative practice director, author, university professor, senior management consultant, mentor, coach, and an effective program manager. His experience in knowledge management includes work with government and private entities.

Capture

Significant amounts of PDF format and MS formats. Paper is still a significant media in most companies. Most documents originate as a digital document. This is then placed into the system. Companies that he has seen are email centric which for people to store large amounts of data in the exchange systems. Different forms of capture vary by organization. There are larger ERP and HR systems that create a great deal of documents.

Indexing

Very seldom do organizations use folksonomy as their approach for keyword identification. They often do not add metadata. Folksonomy is the practice and method of collaboratively creating and managing tags to annotate and categorize content. Metadata is a critical success factor. We create documents to file, find, and share them. A big weakness in a lot of organizations is that they do not want to add the burden to staff of tagging the documents which leads to people unable to locate the document in the future. The green electronic garbage bag approach is where people just throw items in systems. In contrast the manila folder approached was used for many years to store documents where people were forced to classify a document and they were able to easily find them in the future.

Document Management and Security

IT should not run the document management project. The project should be a management centric, business unit level initiative in which the responsibility and accountability rests with the individuals who create the digital document. The locations of paper documents are not often stored in the document management system. There are exceptions based off of the business mission. To make sure the relevant documents are making it to the system he would recommend adding it to people performance reviews. Pushing the responsibility to each and every person within the organization.

Security should be done at a policy level of an organization. Most companies have a foggy policy in regards to document classification. Starting from the beginning and taking the functional classification creates too many security classifications. Security also should be done at an individual level. This is where manager should coach and mentor their employees.

Mobile device viewing is in its infancy. If employees are required to look at these small devices and to read or view documents we will see in the next 10-15 years more vision problems.

Business Process Management/Workflow

There are a great deal of studies done by Association for Information and Image Management (AIIM) and American Productivity & Quality Center (APQC) and he normally would recommend people to start there.

Integration

The approach he has recommended is to use ISO standards for document or object exchange. This will make it easier for organizations to the API interface for organization in integrate the different elements.

Records Management

When creating the retention periods for documents you must take into account if the item has legal or archive requirements. The participant has seen very few completely successful programs. A successful system will address the lifecycle (Create capture, file, find, share, and retire) of the documents.

Make sure when starting a document management program that you have support from upper level management. Without this support you will have a hard time having a successful project. This biggest issue that he sees time over time is the excuse that people do not have time to categorize the documents, when in fact they are wasting a great deal of time searching for documents. There is a resistant there is a categorical and cultural resistance to organizing things from the beginning. People often do not see the return on investment.

When starting a document management project, the participant feels that you should first look at yourself and then the department. You should be able to demonstrate and be a role model to others for best practices on how you organize your workplace. If they are sloppy and not organized, people will be less willing to follow. Start with allied business units which have a need for this specific project. Then work outward from there. Working with the entire organization often will lead to project failure. Without executive support and incentives people are less likely to support the project.

Appendix B – Additional Resources Received from Interviews**Interview Two**

Email Received: Thu, Mar 3, 2011 - Mark

Angela,

Attached is the document I mentioned.

Rehman, S.U. (2006). New age competencies for information professionals. In C. Khoo, D. Singh & A.S. Chaudhry (Eds.), *Proceedings of the Asia-Pacific Conference on Library & Information Education & Practice 2006 (A-LIEP 2006), Singapore, 3-6 April 2006* (pp. 27-34). Singapore: School of Communication & Information, Nanyang Technological University.

Interview Six

Email Received: Mon, Mar 7, 2011

You may find this white paper helpful. http://document-strategy.com/White_Paper_The_Capture_Continuum.pdf. As well as content available at <http://www.document-strategy.com>.

Email Received: Mon, Mar 8, 2011

It was great speaking with you. Good luck! You may also find some interest in this email archive management white paper. http://www.document-strategy.com/White_Paper_The_Strategic_Importance_of_Email_Management_Kevin_C_raine.pdf

Glossary of Abbreviations and Acronyms

Business Record - Any document of business transaction, activity, process, or condition regardless of the medium on which the information is recorded.

DIRKS - Design and Implementation of Recordkeeping Systems is a methodology improve their records management

Document Management System – Manages and creates documents in physical and electronic form.

DoD - Department of Defense

EMF - Eclipse Modeling Framework created by IBM in 2005

HIPPA - Health Insurance Portability and Accountability Act that was enacted in 1996 to safeguard personal health information.

ISO - International Organization for Standardization

KPI - Key performance indicator

OCR - Optical character recognition is the conversion of images of text into characters.

Raster - A raster file is usually difficult to modify without loss of information. The information is directly mapped to the display grid and is distorted as the document is enlarged.

SEC - Securities and Exchange Commission is an independent U.S. Government agency

SOX - Sarbanes-Oxley Act is a regulation that discusses business records requirements, including electronic records and electronic messages.