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Roadmap to implement Enterprise Content Management in a Manufacturing industry

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Abstract -

Purpose: The purpose of this document is to outline the roadmap which will help an organization to take a decision to implement Enterprise Content Management.

Design/methodology/approach: The paper presents and analyses a longitudinal study of an ECM project.

Findings: The findings of the paper include a definition of a process model for ECM implementation in a manufacturing industry and SMEs.

Research limitations/implications: An overview of ECM system implementation in manufacturing industry, this paper provides an implementation roadmapin a manufacturing industry.

Practical implications: This paper is application for those organization who are planning to implement ECM.

Originality/value: The paper is an attempttowardECM implementation guideline. In fact, the article is case study of ECM implementation in manufacturing industry.

Keywords - Document Management, Content Management, Enterprise Content Management, Knowledge Management, Small and Medium Sized Enterprise, Enterprise Resource Planning, Electronic Document Management, Project Management

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1. INTRODUCTION

Most organizations nowadays generate information at such a rapid rate that putting it in a format and storing it in a location where it can be discovered again when needed is difficult. According to the Gartner Group, the majority of data in business (75-80 percent) is unstructured or paper format and not in a format that allows it to be retrieved when needed. Many firms today maintain a complicated ad-hoc architecture of systems that do not appear to meet the needs for companywide business processes. Most of the structure data resides in ERP or legacy system and ERP system does not allow exchanging data easilyfor this reason a lot of unstructured data is re-indexed manually, resulting in errors, inaccuracies, and duplications. One of the biggest challenges for businesses is deciding which unstructured data should be controlled and which should be left and unmanaged. There are two aspects to the problem 1. business concerns and 2.technological concerns. The business challenges include determining which information will be handled and how it will be managed, as well as analyzing the information and content needs of various organizational units. The technology issues include a review of existing content management systems and their potential interconnectivity in a larger architecture to adequately fulfil content management requirements. This article examines the issues from both a business and a technological point, offering a framework for developing content management strategies and underlying architectures. We will define the followings in this article.

- Define ECM
- ECM Implementation Strategy
- Test the strategy in a manufacturing organization
- Conclusions

1.1 Defining Enterprise Content Management

To state acommon definition that can clearly identifies what type of technologies constitute ECM will be not easy. There are many players, and they are using various technology for their product. In fact, many vendors are promoting their solutionshighlighting features like “An integrated set

of content, compliance, and collaboration solutions which enable people to collaboratively create, manage, deliver, store and archive information during everyday businessoperations.
Furthermore, it is necessary to understand the various ECMfunctionalities because it explains 'what these technologies can do.As per Grahlmann ECM functionalities can be divided into four main categories:

- Access
- Process
- Service
- Repository.

Grahlmann mentioned that the ECM functionalities whichare useful for organizations forselecting an ECM product and compare the functionalities offered by different vendors is very tedious and most of the companies are not aware of them. It is observed that there is no proper understanding as to how these technologies and its functionalities are important tosupport specific organizational goals and business needs. In 2006Vitariclaims that choosing suitable ECM solution to support content management need is a tedious task since there is no straight forward roadmap thatguides organizations to understand how to use these technologies. Similarly,Votschin 2001states that without a clear-cut understanding about what functionalities are needed to support organizational goals and the solution provided by vendors fail to match with organizational needs most of the time.
Enterprise Content Management (ECM) uses many technologies but mainly it is evolved as the assimilation of two old technologies or solutions for managing unstructured information in organizations.

- Document Management (DM)
- Content Management (CM).

These terms and their differences are explained below

1.2 Document Management

Document Management (DM) is widely usedtechnologyand was widely used as successful tool in the 1980's and 1990's. Document management is the core of any ECM Solutions. It allows managing content of all types and formats across systems. It provides check-in and –out, version control, audit trails, comprehensive search and access control. It also includes metadata categorization to enrich content by structured data in order to create custom properties, control document status and support content search and retrieval.DM systems primarily aim to organize the content and make them accessible. DM systemsusages the following parts:

- **Document Storage:** The system should know the physical location of the files that it tracks without affecting the end user who does not know that location.
- **Document classification:** The user can classify the file types and so that it will easy for the user to search the information.
- **Metadata/Attribute services:** The system can be customized so that it will fetch some metadata from the leading ERP application and some user defined fields.
- **Collaboration services:** Business processes can run across departments, divisions, regions, and even between different organizations and outside their boundaries. Collaboration allows organizations to include all appropriate stakeholders, both within and outside of the organization, in collaborative processes while still within the context of the business process
- **Workflow services:** This service is allowing the user to route the information from one department to another department for necessary actions to be completed.
- **Versioning services:** This service allows the users to track any changes which is done to the document and if necessary, can checked all the changesand retrieve all the old version when required.
- **Read and Write:** The user can read and search the files through full-text searchesprovided they have correct permission to access the documents. The same is applicable to upload and having write permission in the system.

1.3 Content Management

Content management (CM) basically deals in Web-development projects. Web has witnessed a lot of changes in the recent past and the need for strong content management tools became prominent. Many vendors like IBM, OpenText, Onbaseetcaddressed this need and started offering content management systems. Companies started putting their information in web-based solution and it started growing rapidly.Content management (CM) is the process for overall managing,distributing, making it available when it is needed, retrieval, governance of information in any format. This is basically used for overall administration of the digital content lifecycle, from creation to permanent storage or deletion. The content involved may be scan document, tiff file, mail communication, fax as well as text.There are many commonalities between CM systems and DM systems. Both systems seek to classify information, apply metadata from leading application to it, organize its creation through workflow and collaboration, and give end users complete access to read, retrieve and write.

On the other hand, the two systems differ in the following ways which is explained in the below table.

Document Management	Content management
DM systems deal with physical files and store it securely.	As the name suggest CM systems deal with content components. They can hold document and their metadata to make the document more meaningful.
DM systems were created to manage files created by any other applications. These systems make no attempt to open or operate with the contents of any of the files under their control.	CM is a centralized space that store documents and other contextual information and make it available whenever and wherever it is required.
DM systems are to provide access and permission to the files under its control.	To make publications, CM systems require all of the access capabilities of DM systems, as well as the capacity to automatically assemble a publication from the components found.

The study on ECM and its use to support organizational content management goals should be given an attention, especially regarding supporting business processes.This complexity has induced to explore the answer to below question.
"What are the ways that can guide an organization and employee to implement ECM and support their business processes?"

2. ECM IMPLEMENTATION STRATEGY

The main goal of ECM implementation strategy aims to reduce the expenses of creating, maintaining, and distributing content while simultaneously ensuring that it satisfies the organization's needs. An ECM strategy analyses content requirements, develops consistent material for reuse, centralizes content management, and assembles content on demand to meet organizational and customer needs. The first stage in designing an ECM implementation strategy is to analyze existing needs and how they are being met. To put it another way, who requires what information, how information assists users, and how it is made?An ECM solution should have following capabilities.

- Content Management
- Document Management
- Capture
- Records Management
- Archiving
- Document-centric workflow
- Collaboration
- Content access
- Reusable Content Solution
- Collaborative CM processes.
- Classification Process

CM Solution: A comprehensive CM solution that controls material in a single source is required for an ECM approach. Traditional document management features such as protected content access (check-in/check-out), revision control, reporting, advanced search and retrieval techniquesand metadata are all available in most CM systems. ECM, on the other hand, is about how the business expects to use its content, processes, and tools, not just technology. Authors rely on CM to help them write. They may require assistance in locating, distributing, or publishing content, as well as ensuring that the content they share is correct and acceptable.

Capture: Capture supports a wide range of document capture and review scenarios for high- and low-volume requirements. Integrated with the workflow component, organizations can use barcodes and automated metadata collection and categorization to streamline the capture process and ensure valuable content is properly stored and organized in context with related electronic content.

Record Management: Records Management ensures that content is under a formal program which provides consistent control and lifecycle management rules. This includes capabilities to define content retention policies in addition to formalizing the procedures to classify (ensuring appropriate meta-data), retain, destroy and/or archive the records of an organization

Archiving: The archiving capabilities are often referred to as Enterprise Archiving as it provides the capability to do data and document archiving. It can also be leveraged to implement an intelligent storage management to drive decisions on content storage media.
Document Centric Workflow: The workflow capabilities allow both structured and ad-hoc routing of documents for a variety of document automation processes like approval, review and feedback to control every aspect of the document lifecycle.

2.1 Content Audit

To audit the content is the first step in determining ECM requirements. A content audit is used to examine how material is uploaded, downloaded and distributed to diverse audiences. The audit is also used to determine how information might be unified, so obviating the need for multiple authors to "cut and paste.The following questions are pertinent:

- Availability and volume of content for a given department such as marketing, production, procurement and Human Resource?
- What is the rate of growth?
- What kind of information are there?
- Content as per organization unit ? Who is the owner of the content?
- Who uses the content?
- What is the process to reuse the content?
- How the content must be saved and what should be its retention period?
- Any legacy solutions and systems are currentlyin use?

Following the content audit, the organization has a complete picture of all content and how it is used. This type of research identifies which content objects are potentially more important from the standpoint of ECM. These will usually be the ones that are used

more frequently, or those that are employed in significant management decisions or company operations. Because determining whether it is worthwhile or not to place a given content object under ECM requires a significant amount of time and effort, this preceding step has a very practical purpose, it reduces the number of content objects that must be examined.The point is that during audit thousands of documents or content objects can be looked upon but only those process will be analyzed which produces a big chunk of data and they are eligible for deep analysis. ECM content mainly needs Specifies features for every process:

- Search
- Distributeit to right person
- Re-Use if already exist
- Track

Specifications for associate ECM are required. Audit of the content Implementation costs: content structuring, metadata addition, and taxonomies updates Per-object and feature cost/effort Features' worth: ERP Document Management: Find, Distribute, Reuse, Track, and Associate Intranet, Workflows, Databases, and Networking are some of the terms used to describe web content management. Existing Infrastructure, CM Processes, and CM Staffing Portfolio decisions for content objects Analysis of the gaps, Infrastructure requirements, new investments, and assessing the infrastructure demands of a specified content portfolio (e.g. systems, processes, staff) Systems that are currently in use and their interoperability Per-object value of a feature Estimated costs.

2.2 Value Assessment

The next stage is to determine whether the selected process is right object or not under ECM implementation. This is done by examining like how much unstructured data is lying outside and how much data the process is generating annually.If the data volume is high then we need to find out how to make an item

- Searchable
- Distributable
- Reusable
- Traceable
- Associable

To complete the value assessment managers from different department is called and asked to rate their process need for ECM in the scale of 0 to 10.

Search: To find a given object is a function of number of factors such as:

- The number of users searching the information.
- Size of the processor
- Volume of documents
- Time at which the document is searched

Distribute: To distribute the content depends on the cross-authorization matrix where the privacy of the data can be handled properly.

Re-use: To reuse the content is a function where the same content should not be reproduced again and again but at a time can be reused to avoid the repetition.

Track: To track an object relates to the number of the user, role of the user and how many users are trying to track the object simultaneously.

Associate: This can be done automatically where a process can be referenced to another process so that it will be easy for the user to search the information. In some cases it can be done manually by the user too.

2.3 Cost and Effort Assessment

The time and effort required to develop the above functionalities (search, disseminate, reuse, and so on) are inextricably linked to the implementation of ECM. It's critical that these costs are based on current technology and content management practices. It makes a difference if a document is kept on the hard disc of a desktop computer or is already being processed by an enterprise system or a document management system. As a result, we should emphasize that both value and cost should be assessed in the context of the current scenario, also known as the AS IS situation, in which the company's current infrastructure is examined. Unlike the value assessment, the cost assessment should be conducted by information management professionals in partnership with stake holders from the business units or processes. The majority of the costs will be spent on producing and managing the information necessary for successful implementation.These steps which help the implementation of the ECM features influence cost. Broadly retrieval of metadata would be of two types:

- Custom where the ECM system will give the flexibility to define it.
- Metadata or attributes which will directly be populated from ERP system

If an organization is looking for acustomized environment then also the cost goes up. The same is applicable if the volume of data and number of users are high then also cost goes up.

2.4 Applying the Framework

The methodology described above was implemented at a manufacturing company. The organization employs over 3,000 people and has approximately 15 main business processes in several divisions, with SAP serving as the primary application.In this article we will deal with below two business processes that had expressed a greater need for ECM

- Product manufacturing process which starts with product designing till finished good
- Marketing which starts with Inquiry and ends with billing the customer

The Product Manufacturing process covers all the below business activities.

- Product technical details document
- PR: Product roadmap
- CR: Customer requirements
- Design and Drawing of the product

- PDS: Product data sheets

Marketing is one of the revenue generating department and needs special attention where all the incoming and outgoing information is very crucial. Therefore management gives special attention to it. Any loss of information is loss of opportunity for them. Below activities are covered in this.

- Product Brochures
- Shipment and transportation
- Billing the customer

3. TESTING THE METHODOLOGY

First a meeting was organized with all the key managers and specialists from different departments. We call themas “domain experts”, as they areknowing aboutthe nitty gritty of their business processes like how the information is created and processed. First an interview was conducted with these employees and it will give us the know- how of their business processes, who is handling which roles , the existing process flow and how the information is being generated and used by the different works. Together with the steering committeesome key content objects were identified. After this value assessment was conducted in a focus group where meeting with key representatives from marketing and production department was done.In the meeting the roadmap and blue print of the implementation will be done and what impact this will bring to the company is discussed in length. The final part was estimating the efforts which requires input from IT staff and the IT manager. They are the people who know the existing process and solution and would be training all users for the upcoming new ECM solution. Below section will conclude the assessment.

4. CONCLUSIONS

Above is a detailed and comprehensive roadmap for execution. When the reasons and concepts were given to them, the majority of individuals involved in the discussion understood and accepted them.

- ECM Implementation is a complex process so before every meeting a briefing was given to make them understand the process so that the same can be applied in different department too.
- The value, effort, and cost of implementing the ECM solution require a deep understanding of the product.
- For every other process a different set of questionnaires is required to reach to the conclusion.
- A deep analysis of legacy system and data volume with projected growth rate should be done.
- Existing infrastructure is sufficient to the implementation or not, this should be examined.

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