A Lean Enterprise Model for Document Control

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Abstract: All enterprises have documents and these documents are a key factor in how the enterprise operates internally and externally. These documents have been created for training purposes, informational resources, and due to regulatory and industry compliance reasons. An enterprise, regardless of size or unique industry segment is pulled in several directions at the same time for the same reason: document control. These varied document control requirements and expectations add burdens of required documentation. This paper addresses the problem of the lack of unified document control. Several open issues are identified concerning the lack of existing methods/technologies in the area of enterprise integration and networking.

Keywords: Enterprise integration, Enterprise networks design and implementation, Business process management systems, Document control.

1. INTRODUCTION

All enterprises have documents and these documents have been created for training purposes, informational resources, and due to regulatory and industry compliance reasons. Each section of an enterprise is expected to produce and control documents that meet the requirements imposed upon them. Human Resources (HR) develops documents and controls for them to assure compliance with the Civil Rights Act, Equal Pay Act, and other government and society imposed regulations. Industrial, Mechanical, and Design Engineering would develop documents and the controls for them to assure compliance with OSHA regulations, environment controls such as ISO14001, and customer requirements. Finance develops documents that provide guidance on how the enterprise complies with Securities and Exchange Commission (SEC) (US), Commissione Nazionale per le Societa e la Borsa (CONSOB) (Italy), or other financial authorities unique to the enterprise.

With each of these organizations within the enterprise, developing their own documents and method of document control, there exists the likelihood that differences in the visual look, numbering scheme, and availability of documents create confusion. By the time one adds Quality Assurance (QA) and Supply Chain documents to satisfy regulatory requirements and training tools, there is also the chance that conflicts exist between functional organizations within an enterprise with respect to the content of documents relating to a similar subject.

Engineering may create a document to govern a process. HR would create a process that would assure that properly trained personnel have been resourced to perform those tasks. Operations would subsequently create step-by-step instructions to assure that the Engineering process was properly followed throughout the production phase. QA would then develop criteria for verification and validation that the process had been followed. Any change to any of these four unique models within the enterprise could potentially affect the other three models.

The importance of documents, document control, and document consistency is key to the functioning of the enterprise as a whole. Adequate document management is an element of overall knowledge management for the enterprise. This represents the intellectual capital of an enterprise. “The effects of a failure of “document control” can be dramatic” (Blair 2002). The lack of document control also has been shown to be a key detriment to quality (Withers 2000). Once this is understood, the motives and rational for consistent and uniform method of document creation and management is clear (Baldwin 2008).

Therefore, the research gap identified is the lack of unified document control resulting in the potential for multiple versions of multiple types of documents. This reduces the overall quality of an enterprise. The paper describes document management and enterprise integration, presents potential methods of addressing the problem and then the “ideal model.”

1.1 Elements of Document Management

Additional elements of document control exist that include document name, revision level and date, page numbering, responsible owner, signatories, font style and size, cover page, revision history, and standard definitions, just to name a few. For the purpose of this paper, these elements have been condensed into the following document management elements:
Content Review: This review includes grammar and spell checking. This step could include the use of the template unique to the organization. The degree of review of the contained text is determined by the organization where the document originates. Often times, there is little coordination across organizational lines within the enterprise.

Assign Number: This number is unique to the organization.

Secure Approvals: The method of approval, whether it is electronic or hardcopy, is unique to the organization.

Document Release: Each organization would make the determination of which documents would be made available but have no control over other organizations within the enterprise making a conflicting decision concerning similar informational documents.

Published & Available: The method of publishing; hard copy manual or electronic, as well as the availability; web based, secure network drive, or distributed manuals would be unique to the organization.

‘Document release’ and ‘published & available’ are separate issues. The senior leadership may release documents such as strategic planning or enterprise business plans, but it may not be desirable that the entire population of the enterprise have access to these documents. The same could be said for selected Human Resource or Security documents. While they may be approved and released, their publication is not intended for the entire population.

1.2 Lean Document Management

Lean is commonly defined as the ‘the relentless elimination of waste’ (Womack and Jones 1986). Womack and Jones define lean further by providing the five principles of lean, which are:

- Value – does the product or service provide value in the view of the end customer?
- Value stream – what are the end to end processes involved?
- Flow – does the product or process seem to move evenly (no quick starts and stops) along?
- Pull – is an upstream step only performed when necessary for the downstream step?
- Perfection – are you always trying to improve?

Francis (1998) found that these five principles also applied to the information domain. Typically, information flow is not considered in improvement efforts similar to material flows. Francis (1998) also found that waste was prevalent along the information value stream. Therefore, enterprise integration may not be achieved without addressing the information flow in an enterprise.

2. ENTERPRISE INTEGRATION

The integration of an enterprise is typically considered in three approaches: physical integration, application integration and business integration (Molina 2007). This paper deals primarily with business integration. In the Introduction to Enterprise Integration Modeling, Petrie (1992) describes three approaches to model integration: Master Model, Unified Models, and Federated Models. These approaches have been modified and applied to document control.

While each enterprise would be unique and may contain additional models, such as Supply Chain, Finance, Safety, Maintenance, or other organization’s document management, for the purpose of this paper, we will focus on HR, Engineering, Operations, and QA. The addition of more organizations within the enterprise would further exacerbate the problems and exemplify the recommendations found herein.

If the enterprise utilizes independent models for each organization’s document management process, there is no communication between models. With this independent approach for the enterprise document management model, information is lost and the management of the enterprise knowledge base is at risk of being compromised. This is referred to as the “disintegrated approach” and shown in figure 1.

Where there does exist a link between models, it is rarely universal. Wherever there is a break in the link between models, there is a risk that the organization’s model, and ultimately, the enterprise’s model will be ineffective. Where there is no link between models, information is lost and communication barriers exist that prohibit productivity. Even with these links of communication and commonality, problems are created and gaps exist in the overall knowledge management process model for the enterprise. This is referred to as the “discontinuous integrated approach” and shown in figure 2.

While there are some who feel the important factors for document management rely solely on availability and unified numbering schematic of their documents, this does not eliminate the problematic issues of inconsistency between formats, content, or review and approval processes. This is referred to as the “partial integrated approach” and shown in figure 3.

Without the realization of the importance of documents and the need for a vibrant document management system, each organization within the enterprise will continue to operate within the walls of the silo, which contains their own personal knowledge management. While this knowledge and the documents in which they are contained are at the core of the organization, they are a part of the entire enterprise and should not be held for the exclusive use of the organization that created them.
Regardless of the size of the enterprise, there is a need for cross-functional document management in order to protect the individual and corporate knowledge of the entire enterprise. Rather than individual models that are independent or the communicative models, which are unique, it would best serve the enterprise to utilize one model for the entire enterprise where all organizations could rely on a single method of knowledge management. These
independent models within the enterprise need to be combined in order to reduce redundancy, inconsistency, gaps, and increase availability.

3. POTENTIAL METHODS

Document management does not need to be complex. Often times, the greater the complexity of the model, the higher the likelihood that process of knowledge management will not be followed (Bryant 2009).

For the enterprise to transition from multiple independent document management models to a single enterprise-wide model, two basic approaches are available. The method of integration would depend upon the size of the enterprise, the quantity and complexity of their documents, and resource availability.

3.1 Method A (Different, then integrate – gradual)

For adequate document management and maintenance of knowledge within the enterprise, each document should be periodically reviewed for relevance and currency. One method of transitioning from multiple models to a single model would be to review and appropriately revise each document as the need would arise to modify and alter an existing document. Any new document would utilize the single enterprise model during the development of the document.

Benefits of utilizing this gradual integration to the single enterprise model include the limited number of resources needed to implement. Revision activities are already an ongoing action taken by the various organizations within the enterprise. These revisions would add the element of format, numbering, and publication in a uniform and consistent manner to a cross-functional and thorough review of the contained text.

Drawbacks of this method of integration include the slow transition from the previous enterprise model into this singular document and knowledge management process. While some documents would be revised as a matter of course on a frequently recurring basis due to technological advancements or process enhancements, several documents would not need revisions for several years.

Another drawback to this gradual method of model integration would be that references to other documents could only be updated if the referenced document had already been updated. This would cause some documents to be revised multiple times in order to keep these references correct and current.

It would be recommended that the focus of transition would be on those documents, which require revision. Once those have been addressed, there could be additional enforcements that would require the remaining documents to adopt the new model within a specified time frame. This time frame would be based upon the number of documents captured during their first review cycle, the number of documents remaining, and the available resources to accommodate the transition.

3.2 Method B (Standard and integrate – bulk)

An alternate and more intense method of document management model transition would be to make revisions to all documents as part of an entire update package. These revised documents would be released and published at the same time. This would most likely be the chosen method in the case of a newly developed business enterprise or the sale of an enterprise from one group of investors to another, which could involve a name change or adopting an existing format and numbering scheme of the parent.

Benefits of this method of integration would include the realization that all revisions were made on the front end of the single enterprise model document management system. In addition to all revisions being done prior to release, any referenced documents would also be incorporated during the initial release, thus eliminating the need to revisit documents simply due to reference changes.

One drawback to this method of integration would be the amount of resources necessary to address all released documents as part of the project. Other drawbacks would include the coordination and advance planning necessary to successfully incorporate all released documents. Communication would be critical and key to making this effort more than simply a reformatting and renumbering effort.

4. IDEAL MODEL

The ideal lean enterprise model (as shown in figure 4) for document control would include the same elements of document management as the independent models; content review, number assignment, approval, release, and publication. However, these would be the same for all documents regardless of their origination or intended audience. Every step of the process would be the same in order to maintain consistency within the text of all documents as well as providing the same visual look and feel to the layout of each document. The numbering scheme would be readily identifiable to all within the company as well as external sources required to view or comply with documents from the enterprise.

4.1 Ideal Model Elements

While the elements of this lean enterprise model for document management are the same as with the independent organizational document management models, the steps for each element are the same for all documents and include:

Content Review - This includes a review of the text for consistent use of terms and requirements. This step in the model would involve assuring correct enterprise image and marketing tools. Additional requirements would include the use of a standardized template made up of a consistent layout of sections, font, and visual effects. This review would include an evaluation of existing documents throughout the enterprise for similar content and consolidation of information from multiple sources into a single source.
Assign Number - While the numbers are similar, the originating organization should be readily apparent, as well as the level of detail contained within the document based upon its numbering scheme. There should be specific logic that is documented and included in the sequential numbering of all the documents converted to this enterprise wide model.

Secure Approvals - The required signatories for documents would need to be specified and unique for each document, but should include at a minimum, the top level management of the organizations affected by the document.

Document Release - Documents not intended to be made available to the entire enterprise population would need to be identified by subject and topic. In this manner, documents containing similar sensitive information could be screened during the Content Review process. This would assure that discrete information is not published in conflict with leadership intentions.

Published & Available - Documents would be made available in the same manner throughout the enterprise. Electronic or web based is generally the most preferable, but there may be occasions where a hard copy of all documents, selected subject matter documents, or specific documents would need to be made available to either the general population or select groups of users.

Additional features could include a search function or document grouping by title, subject, or area. However, for the purposes of this paper, those elements of document control are not discussed further.

4.2 Ideal Model Considerations

There should be a unified document management organization to make decisions relating to knowledge management and document production, which would include a consistent view and layout of all documents throughout the enterprise. This group would be responsible for making documents consistent and available to the users across all portions of the enterprise.

As there is many of the processes of document management that can be automated and upwards of 33% of companies are planning to outsource some of their document processing functions (Océ Business Services 2009), the system of document management should not necessarily be an ‘out-of-the-box’ system. To be effective and considering the environment and culture, a document management process should make sense and be effective for the enterprise (Baldwin 2008).

Whether the enterprise makes the decision to automate or outsource portions of the document management model, it should be aware that this will comprise the basis of their knowledge management within the entire enterprise.

Organizations would feed their information and requirements to this single point group for review and incorporation into the enterprise. Existing documents on similar subjects could be reviewed, revised, or deleted in order to retain knowledge, maintain consistency, and assure compliance.

Benefits of this lean enterprise model would include the deconstruction of the silos that have been created due to the single-mindedness of each organization. There would be a reduction of documents with duplicate information and information that is repeated in another way for a different audience. This would give all organizations the same language, instructions, and definitions.

With this consistency and uniform process, as an example, it has been estimated that if Engineering and QA each had a staff of 1 person and Operations and HR each utilized a person, half-time, rather than 3 persons, only 2½ would be required to perform the same tasks. Table 1 displays the example resource allocation.

With a single group focused on document management, cross-training would not be required by those responsible for the elements of the model in order to move from processing an HR document from content review through publication to performing the same tasks with an Operations document. The process would be the same for both organizations.
Table 1. Potential Resource Allocation

<table>
<thead>
<tr>
<th>Manpower Allocation (estimated)</th>
<th>Independent Models (current staff)</th>
<th>Enterprise Model (projected staff)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR</td>
<td>0.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Engineering</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Operations</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>QA</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.0</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Productivity would not be affected by absences of a single individual. Document development and revision delays would be reduced since resource allocation could be shifted to focus on priorities mandated by the enterprise rather than manpower availability within a single organization.

A drawback to adopting a single source lean enterprise model for document management would be that there could potentially be an increase in documents throughout the enterprise. Once there is focus and attention on the need of knowledge management through the use of governing documents, key players within the enterprise may recognize the gaps that currently exist in the true representation of the intellect of the enterprise as a whole.

5. SUMMARY

This paper outlines a current state of document management within an enterprise as well as transition methods for moving from multiple independent organizational document management models within an enterprise to a single enterprise-wide document management model. Also outlined is a future state of this element of enterprise knowledge management. Benefits and drawbacks are noted for various steps and options throughout the overall decision to adopt the recommendations contained herein.

6. FUTURE WORK

Lean has positively impacted the manufacturing world. Lean should also positively impact the information world as well. Further research into the applicability of lean to the information world, with a particular interest in the document control aspects is needed to see significant improvement in that domain. Additional work will be performed as to the applicability of a ‘living enterprise model’ to information as well as the concepts of model reuse and a model repository (Whitman 2005).

REFERENCES


