

Identify And Evaluate The Challenges In Electorinc Document Management By Construction System

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Abstract:

The efficient handling of a range of project data, including as bills of quantities, specifications, and other technical data, is essential to the building process. The way that information is transferred affects how easily it may be absorbed and applied during the construction process. Even though computers are frequently used to create project information, hard copy documentation is still the major way that information is transferred in the construction business. Document management is a collection of components rather than a single thing or piece of technology. The technology, in conjunction with the usage of information and various users in a business process, allows for interaction. As a result, the document management industry can be separated into four main categories: documents, people, procedures, and technology. Whether documents are in hard copy or electronic format, Electronic Document Management (EDM) solutions provide some level of control over information flow throughout the building process. In order to electronically communicate document information from the designer to the contractor, this study offers a method of bar-coding paper-based designs. The study also takes into account the specifications for bar code application standards, which would enhance the process of document data transmission.

Keywords: Project Management, Document Management, Communication, Information Management, Construction Project, Electronic Document Management System

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1. Introduction

Project documentation that can be quickly absorbed is necessary for the construction process. Project delays and poor decisions may occur if papers are not efficiently located and managed. The volume of produced documentation adds to the difficulties of handling construction information. Ineffective document management raises costs for blatant expenses like the price

of filing and storing papers. But a lengthy procedure could also have less noticeable opportunity costs, such the loss of discounts, trouble getting in touch with vendors, and more. Without adequate document control over reviews and revisions, inaccurate documentation may be distributed both internally and outside. Additionally, the time it takes to approve documents may be excessive. Software for document control places restrictions on who can review and edit documents. Additionally, it keeps track of who and when changes are made. The majority of organisations have a wealth of information that is needed for their ongoing projects or for their upcoming projects in the form of documents or the knowledge of their employees. But the lack of communication between individuals and different project teams, poor management of information assets, and a lack of support from knowledge workers render this information unavailable and ineffective. Thus, the demand for a system that could satisfy this criterion and deal with these problems arise.

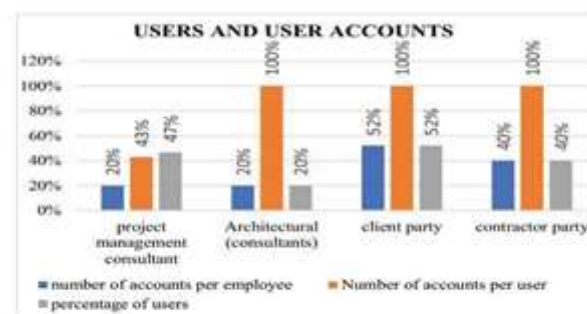


Fig 1: User profiles and user

The X axis of this graph in Fig. 1 has been defined as the sorts of companies that participated in this project "Altair," and the values of the Y axis have been defined as percentages. The graph also shows how each company's users access EDMS through user accounts. All firms, with the exception of the "project management consultant" team, are found to have 100% of the users' accounts. Businesses have used a small number of accounts to reduce costs. But for effective management, sharing a small number of accounts with so many users is unacceptable. To address the issue of not enough accounts, the "Project Management Consultant" created the role of "Document Controllers," and all document users are required to distribute documents through these controllers. They were able to minimise the issues with the "Aconex" EDMS thanks to that.

2. Document control in construction projects

Document control builds a framework that supports document management in building projects. In contrast to document management, which mostly concentrates on the flow of information, document control is the act of recording information for each type of document in a consistent, systematic manner. This also requires processing many versions of reviews, revisions, and approvals and maintaining archives to ensure that stakeholders are referring to the most recent versions.

Consequently, document control gives your team the assurance they need to verify facts using correct documents as proof. As a project moves forward, teams are kept in sync thanks to the established digital workflows, notifications, and review processes that document management and document control combined produce. This kind of cooperation is crucial to developers, financiers, and insurance firms that utilize responsibility to control risk in the high-stakes and razor-thin profit margin world of construction.

3. Benefits of construction document management

1. Makes a single source of truth established

A constant stream of communication is necessary for team collaboration. You require quick access to accurate information like status and pricing when making decisions as straightforward as authorizing a purchase requisition or contractor engagement. Simply put, you and your team require a reliable single source of the truth. All of the papers that are essential to a project should be housed in one convenient location via a modern document management system. This centralization is essential for effective teamwork, cutting down on errors, avoiding duplication of documents, and more.

2. The improvement of communication between departments and stakeholders

In addition to providing a centralized location for the storage of important documents, effective document management can enhance the caliber of communication between and across departments as well as among internal and external stakeholders, including:

Contractors and subcontractors: Since it's possible that they won't be present in person at staff and team meetings, it's important for them to have dependable access to information about any changes pertaining to their specific functional areas. Consider the scenario where an electrician is awaiting word on a change to move some existing wire. With a solid document management system, the electrician can easily locate the documents necessary for moving forward, such as approvals and updated work orders, without having to bother the general contractor.

Project managers: PMs are crucial to the success of construction projects because they manage tight deadlines and tight budgets. PMs can make things better with the help of documentation management solutions. For instance, teams can save time and reduce the loss of unneeded resources spent working off of obsolete information by making sure they are aware of exactly where forms are stored and that what they will see is the most recent version.

Accounting: Before sending out material requests for procurement, a good document management system can automatically remind the accounting team to evaluate topics like cost centers. Overall, less time is spent on reconciliations by the company.

Workers on the job site: The people doing the work on the job site are frequently excluded from a significant percentage of communications relating to a project. But an efficient document management procedure guarantees that important communications, such those affecting safety, consistently reach everyone in a timely manner.

3. Controls and cuts down on spending

Enterprise projects frequently experience cost overruns, with nine out of ten projects going above their initial budgets. Having a smooth document management procedure in place is one of the best ways to prevent expense overruns. When everyone follows the same set of plans and is aware of when modifications are made, your organization gains. A general contractor (GC), for instance, knows what to priorities when they have access to the most recent drawings, schedules, and job scopes. Additionally, he or she will be aware of which adjustments to make and which to ignore. With this information at hand, the GC can concentrate on the appropriate jobs at the appropriate moment, which lowers expenses overall.

4. Establishes a standardized process for handling and organizing documents

A document management system's fundamental function is to operationalize an organization's handling of papers at every level. With a few reliable clicks and keystrokes, it eliminates the need for the old paper chase to locate copies of approved invoices or date stamps for materials that were received. As a result, administrative responsibilities are reduced to a minimum and an effective standard procedure takes the place of a deluge of paperwork.

Six guidelines for establishing a document management process

Understanding how document management functions in the usual construction project workflow is one thing. It's altogether different to put in place a document management system that works for your team. If you're thinking about establishing or enhancing a document management process, take these six suggestions into account:

1. Evaluate Your Current System: It's usually a good idea to start by carefully analyzing your present strategy. Consider how you're documenting the flow of activities as they develop from beginning to end. Start by posing the following straightforward queries:
 - How are assessments made to raise standards?
 - What documents are required for external step validation?
 - What processes tend to be effective?
2. Consider Your Company Culture: Think of it as an ocean's current. If you cooperate with it as opposed to fighting it, you'll be more successful. Start by looking at the culture that most businesses have created based on what works for them. Take a look at how individuals and departments now operate. Think about the following:
 - How are common processes like forecasting, purchasing, and new product creation carried out today? Establish who views which documents, when, and what actions are taken in relation to them (such as reviews, sign-offs, and the like).
3. Identify a go-to team or a point person: A large organizational investment, the adoption of a document management system necessitates the accountability of a point person and/or a go-to team to assign tasks to and complete them. Before you formally assign someone to a task, be sure the person's or people's bosses support the initiative as well.
4. Centralize Existing Papers and Standardize Your Processes: As you evaluate your current systems, you should start centralizing existing documents and standardizing your procedures. When stakeholders are included in the review, it can be a fantastic opportunity to identify how different companywide techniques operate and to win their support. The techniques used throughout the organization can be based on the methods that were found to be the most effective.
5. Rely on the Correct Software: You have a variety of options when creating your document management system. Choose software that will be strong enough to manage your needs because your system's integrity will depend on it. As you explore your options, think about if a solution:
 - Establishes centralized information access.

- Increases teams' productivity in carrying out routine work by automatically generating notifications and keeping track of updates.
 - Enhances teamwork and communication, particularly while working remotely or in the field and using the cloud.
6. Obtain Feedback and Make Adjustments as You Build Your System: Always bear in mind that your system must function for the users. Naturally, you'll want input and support while you design a new document management system. When implementing changes, you should also seek feedback in order to tailor your implementation as necessary.

3. Issues Faced in Documentation Construction Industry

Before the proposed theoretical framework for the study can be further implemented, three points must be clarified. The EDMS implementation process's meaning is the first problem. It is necessary to take into account all the events and actions involved in a sequential fashion in order to truly comprehend the features of the success or failure of the EDMS deployment process. The first activity of creating a system should be considered to be the beginning of implementation, and it shouldn't cease until the user is happy with the system [5]-[6]. So, in order to comprehend what actually transpired during the process, the study should adopt a perspective that may encompass the majority of the activities in the system development life cycle. Therefore, a broader definition seems more appropriate to include aspects that contribute to implementation success.

The second issue is that there are many different factors that go into deploying an EDMS successfully. The standards rely on the context and application of the EDMS. This includes top management support, budgeting, anti-corruption efforts, implementation personnel, security and privacy concerns, data quality needs, user requirements, cooperation, integration, awareness, change-resistance, and staff training. The generalizability of the results presented is quite limited. Regarding their placement within the broader implementation process, the topics that were clarified weren't totally covered. One of the motivating factors for this study is the fact that these criteria do not sufficiently reflect the complete implementation process.

The third problem has to do with the method used to look at EDMS implementation. Due to the fact that so many authors in the literature used the factor approach, EDMS implementation is still unnoticeable. A number of studies were highlighted to draw attention to the process perspective of electronic government implementation. They suggested that the lack of

technological know-how, human resources, and the bureaucratic management style of government could make implementation difficult. Therefore, a process approach is a crucial first step in studying and comprehending the local government's deployment of EDMS.

4. Literature Review

Seonghyeon Moon, Yoonjung Shin, Bon-Gang Hwang, and Seokho Chi "Document Management System Using Text Mining for Information Acquisition of International Construction" *KSCE Journal of Civil Engineering* (0000) 00(00):1-8 DOI 10.1007/s12205-018-1528-y, November 2018

Text mining is necessary to locate this data because it typically exists in unstructured text data, such as news articles and reports. This project's goal is to develop a working prototype for a construction document management system for a global contract that provides users with the information they need right away. A web crawling algorithm is used by the system known as UNI (User Needed Information)-Tacit to collect text data containing the most recent information about the global construction market. Natural Language Processing is then used to automatically tag each document with the most relevant keywords, and word clouds are then produced as a result. It is envisaged that the created approach, whose efficacy was proven by the survey, will assist gather and organise the most recent construction industry news, giving decision-makers a better understanding of the target countries.

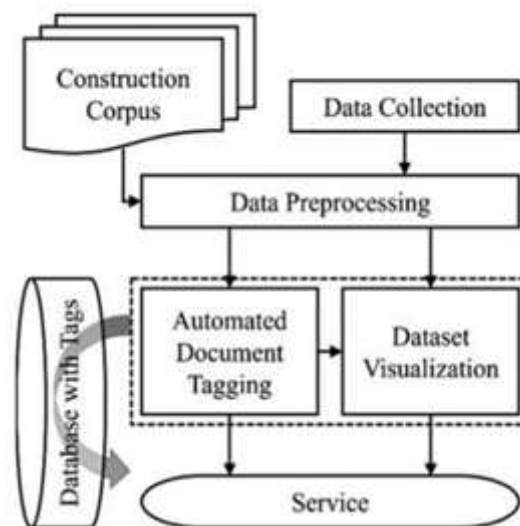


Fig.1. Overview of UNI-Tacit System

By providing customers with results that are individually catered to their needs, UNI-visualisation Tacit's functionality will eventually be improved. The fact that there is still a sizable amount of content available for consumers to read would also lead to the implementation of automatic summary techniques to improve the effectiveness of information provision.

Yimin Zhu, Raja R.A. Issa "Viewer controllable visualization for construction document processing" *Automation in Construction* 12 (2003) 255 – 269 August 2002

The current state of construction document management systems cannot handle the demands of giving document viewers more useful and effective tools to deal with issues in a fast-moving, global business environment. One of the problems is that a lot of those solutions only electronically reproduce paper-based construction data from "fixed" and "separate" perspectives. This study contends that processing construction papers requires a variety of information flows, including object views, vertical flow, and horizontal flow. The method described in this study can be used to create "live" documents that, depending on the needs of document viewers, can incorporate data and information of various types, such as schedule and budget, from various sources, including both public and private data. These concepts and notions are supported by the approach offered. The object viewpoint analysis of building documents is the only subject of this work. The designs for the horizontal flow and the vertical flow should be considered in further research in order to enhance the system. An integrated process and data model, which should be the focus of further research, should support the key elements of processing construction documents.

Documents are typically thought of as information carriers that businesses employ to codify, plan, certify, remember, and inform [3]. Paper-based documents and electronic documents are the two types of documents that circulate in any organisation. Document management systems may not be essential to the accomplishment of a project in the context of construction. It cannot, however, avoid the administration of documents because they are necessary for the creation of papers like architectural drawings, mark-ups, and RFIs and because a mistake in one document could result in expensive execution issues. It recognises the significance of successfully and efficiently managing all of those records.

5. Conclusion:

To conclude the Paper, we first benefits of document management, implementation and EDMS techniques to address the current status of Electronic Document Managements system.

The benefits that the EDMS can provide depend on the department type. Drawings and bills are produced on alot of paper, making it difficult to reduce the amount ofpaper used.

At the very least in the beginning, guidance and tutorials should be given to individuals who lack expertise and experience with EDMS.

By restricting user accounts and implementing functions that are in line with the project budget, theseissues can be lessened using EDMS, which also makes work more effective than paper work.

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References:

Bibliography

1. E.F. Finch, R. Flanagan, L.E. Marsh "Electronic document management in construction using auto-ID" Elsevier Journal Year 1997 Automation in Construction 5 (1996) 313-321
2. Turk and B. Bjork, Document management systems as an (1981). integral step towards CIC, in: Workshop on Computer Integrated Construction, 22-24 August, CIB W78, Helsinki, Finland (1994).
3. J. E. Tyler, "Asset management the track towards quality documentation," Rec. Manag. J., 2017.
4. Shin, Y. (2015). Designing a system prototype for construction document management using automated tagging and visualization, MSc Thesis, Seoul National University, Seoul, Korea.

5. B. E. Asogwa, "The Challenge of Managing Electronic Records in Developing Countries: Implications for Records Managers in Sub Saharan Africa", *Records Management Journal*, 22, 2012, Pp. 198-211.
6. M. Bahari, "Citizen Relationship Management Implementation in Local Government-Towards A Theoretical Research Framework", *Journal of Information Systems Research and Innovation*, 2, 2012, Pp. 51-61.
7. Zhang, J. S. and El-Gohary, N. M. (2016). "Semantic NLP-based information extraction from construction regulatory documents for automated compliance checking." *Journal of Computing in Civil Engineering*, Vol. 30, No.2, pp. 1-14, DOI: 10.1061/(ASCE) CP.1943-5487.0000346.
8. Qady, M. A. and Kandil, A. (2013b). "Document management in construction: Practices and opinions." *Journal of Construction Engineering and Management*, Vol. 139, No. 10, pp. 1-7.
9. N.-J. Shih, managing construction drawing documents with an automatic indexing system, *Automation and Robotics in Construction*, XI (1994) 547-554.
10. E.F. Finch, R. Flanagan, L.E. March, Electronic document management in construction using Auto-ID, *Journal of Automation in Construction* 5 (1996) 313 – 321.
11. Y. Zhu, Implementation of dynamic hypermedia generation for construction document processing, MS Thesis, University of Florida, Gainesville, FL, USA, 1999.
12. Z.L. Ma, J. Yang, A study on data standard for documents in construction projects, *Journal of Harbin Institute of Technology* 35 (1) (2003) 64 – 68 (in Chinese).
Webliography <https://www.ecosys.net/knowledge/ultimate-guide-to-construction-document-management/>