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Evolution of content management systems: Towards a holistic approach

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pp. 71-80

ABSTRACT This article is a bibliographical review of Content Management Systems (CMS) from their inception, when they were centered on managing departmental information, until encompassing the entire organization, where we can talk about Enterprise Content Management (ECM) focused on organizational learning and knowledge management. A four-dimension model is presented for a better understanding of the implications of this type of projects, comparing the issues found on each dimension with the CMS best implementation practices proposed by various authors. Finally, it is emphasized that it is critical to consider not only technology and content, but also the processes and the company where the solution is being implemented, in order to have a holistic view of dimensions and ensure that no detail is left out to maximize the probabilities of success of such project.

KEYWORDS organizational learning, holistic approach, Enterprise Content Management (ECM), knowledge management, implementation issues, Content Management System (CMS).

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Evolución de los sistemas de gestión de contenidos: hacia un enfoque holístico

RESUMEN Este artículo hace una revisión bibliográfica de los sistemas de gestión de contenidos (CMS) desde sus inicios, cuando se centraban en gestionar la información departamental, hasta abarcar toda la organización, donde se puede hablar de gestión de contenidos empresariales (ECM) enfocados en el aprendizaje organizacional y la gestión del conocimiento. Se presenta un modelo con cuatro dimensiones para un mejor entendimiento de las implicaciones de este tipo de proyectos, contrastando los problemas encontrados en cada dimensión con las mejores prácticas en la implementación de CMS propuestas por diversos autores. Finalmente, se enfatiza que es crítico tener en cuenta no solo la tecnología y el contenido, sino también los procesos y la empresa en la cual la solución es implantada, para tener una visión holística de las dimensiones y asegurar que no se escape ningún detalle para maximizar las probabilidades de éxito de dicho proyecto.

PALABRAS CLAVE aprendizaje organizacional, enfoque holístico, gestión de contenidos empresariales (ECM), gestión del conocimiento, problemas en implementación, sistema de gestión de contenidos (CMS).

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Evolução dos sistemas de gestão de conteúdos: rumo a um enfoque holístico

RESUMO Este artigo faz uma revisão bibliográfica dos sistemas de gestão de conteúdos (CMS) desde seu início, quando se centralizavam em administrar a informação departamental, até abranger toda a organização, em que se pode falar de gestão de conteúdos empresariais (ECM) enfocados na aprendizagem organizacional e na gestão do conhecimento. Apresenta-se um modelo com quatro dimensões para um melhor entendimento das implicações desse tipo de projetos, contrastando os problemas encontrados em cada dimensão com as melhores práticas na implantação de CMS propostas por diversos autores. Finalmente, enfatiza-se que é crítico considerar não só a tecnologia e o conteúdo, mas também os processos e a empresa na qual a solução é implantada, para ter uma visão holística das dimensões e garantir que não passe nenhum detalhe para maximizar as probabilidades de sucesso desse processo.

PALAVRAS-CHAVE: aprendizagem organizacional, enfoque holístico, gestão de conteúdos empresariais (ECM), gestão do conhecimento, problemas em implantação, sistema de gestão de conteúdos (CMS).

Introduction

Content management should be considered as a necessary step on information management evolution, as it integrates the management of every type of information (for example: non-structured, structured, semi-structured) through the whole lifecycle of the contents that are produced and used in organizational contexts (Boiko, 2002). In that sense, content management systems (CMS) must meet three basic functions: a) allow digital content in different formats to enter, b) allow the management of such content, and c) allow the subsequent recovery of this content (Serrano-Cobos, 2007). Therefore, those companies that are properly managing their contents shall be capable of giving one step beyond, managing better the knowledge obtained in order to foster organizational learning

At present, in a moment where online presence is essential for every organization, content management systems are especially useful to organize their websites, given that the large amount of digital content grows more and more, so that websites can grow and change rapidly keeping high quality standards (Boiko, 2001). This author defines content management as the process that matches certain information and functionality of each organization with what each stakeholder needs. Therefore, web content management inside an organization can be considered as a continuous series of iterative creation and development phases, reflecting the ever changing and dynamic nature of the content that the organization wishes to show (McKeever, 2003).

From the point of view of content management tools, they have evolved and they have changed from managing information isolated per areas or divisions to encapsulate all the information management of the company (ECM). According to Bustelo (2003), ECM means managing all type of content created or used in the company and its access by any person of the organization. Therefore, we should consider joint strategies, tools, processes and skills an organization needs to manage its information assets along its whole life cycle, not only considering digital assets but documents, data, reports and websites as well, (Smith & McKeen, 2003).

Päivärinta & Munkvold (2005) argue that ECM represented a comprehensive vision of the information management inside the organizations, characterized by:

- Cohesive management of content lifecycles.
- Content models logically integrated.
- User and company models that dictate production and use of context in a specific context.
- Integrated platforms or technological infrastructures.
- Continuous maintenance administrative processes.

Taking into account this comprehensive vision, Tyrväinen, Päivärinta, Salminen & Iivari (2006) proposed a framework to analyze ECM in a more thorough manner under four dimensions: content, technology, company and process. The content dimension which usually has been more important — has to deal with everything that is found in an entity or information repository, and opposes some issues related with the place where it is stored; for example, the structure, shape or representation. In this dimension, three points of view stand out: the first one is related with the information, how content is represented and made available for users; the second is related with the user, focusing on the relation between content and users, taking into account not only users that create and keep content but also those that read and use it; and the third relates to the system where the content lies and that can be accessed by users (Tyrväinen., 2006). Technology dimension focuses more on the technological basis, e.g. hardware and software used on content management, and the company dimension considers organizational, social and business issues related with content management. Process dimension distinguishes two main process categories: a) development, which includes development, implementation and maintenance processes of the content management systems with the corresponding change management; and b) deployment, which entails the implementation of activities of the content lifecycle (Tyrväinen *et al*., 2006).

In this study we have compared better practices on the implementation of content management systems proposed by different authors with the problems identified in the literature review in order to improve the chance of success in this type of projects; also, results have been classified in the four dimensions mentioned in the prior paragraph, in order to have a complete picture of the problems and possible solutions to provide a holistic approach.

The article is structured as follows: next we explain methodology, design and procedures used, and then compare better practices with problems found; finishing with conclusions and possible future research lines.

Methodology

In order to make this study we had a structured search on the articles that refer to content management systems (CMS) or to enterprise content management (ECM). With this information we could identify the most recurring problems people face when they tackle a project like this; these problems were matched to the dimension where they fit, and then we ranked the better practices found in literature than can help to solve or mitigate that problem.

Design

The design used matches each dimension not only with some problems but also with some better practices based on what we found in the literature review, in order for the results to be ranked and structured in a way easy to use.

Procedure

The steps followed can be seen in the scheme shown in figure 1.

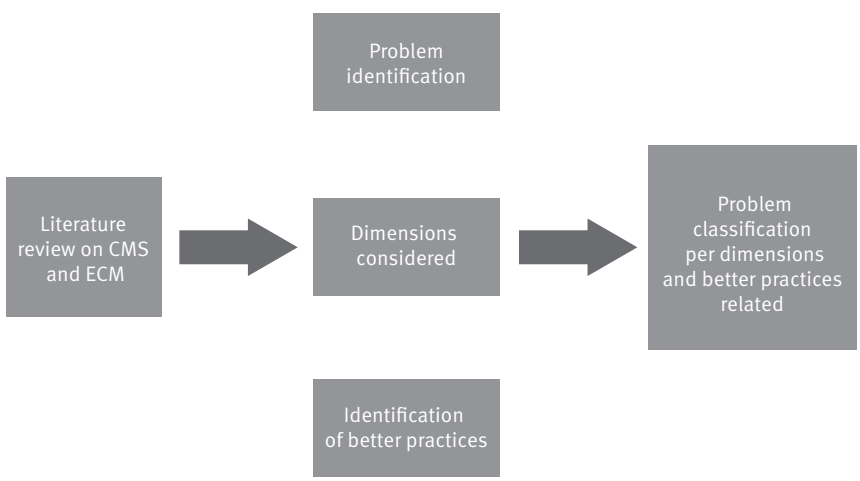
Better practices vs. problems found

To summarize, we can see in table 1 information of articles on CMS or ECM reviewed, as well as main challenges found and suggestions to solve or mitigate them that were presented by the authors in each article.

Content management, on its more global and systemic dimension has to consider different types of information: a) internal , that worries for the information produced while the activity was made; b) external, that comes from external forces, and c) public, such elements that the organization wants to send to the environment (Bustelo & García-Morales, 2001). The information that comes from internal and external providers shall be managed independently from the app that was used to create it; in order to do so, Black (2011) proposes a method that focuses on feedback provided by the vendor; this should be the case for every kind of content as they should be manipulated without thinking about the format (Munkvold *et al.,* 2006) This suggestion also applies when documents are old or when they are going to remain inside the organization for a long time, as after some years the apps used to view those documents could have changed and there would be no way to view them; therefore we suggest documents should be stored in independent formats from the app that would be used to view them (Munkvold *et al.,* 2006) .

It is very important to reuse and widen organizational knowledge, as experience and contents generated inside each organization have to be

FIGURE 1. Procedure to classify problems per dimension and better practices related.



Source: prepared by the authors.

TABLE 1. Articles reviewed with main problems and suggestions presented by the authors

AUTHORS	CHALLENGES	SUGGESTIONS
Alalwan & Weistroffer (2012)	Lack of studies that support knowledge of ECM state of the art	Literature review of 91 articles, organizing them according to three pillars: dimensions (tools, strategy, process and persons); lifecycle of the enterprise system (adoption, acquisition, evolution and evaluation) and strategical and management issues (change management, management commitment).
Bianco & Michelino (2010)	We do not know the interactions between technological and organizational parameters	Identification of socio-technical context that favors technology adoption, as well as organizational parameters influenced by the use of technology
Black (2011)	Ignorance of effective methods to implement a CMS	Presentation of a used method, focusing on feedback issued by the provider
Boiko (2001)	Lack of control on creation and distribution of information and functionality. Most companies have problems defining the value proposal they offer to their clients. Who wants which part of such proposal? And What is the best way to deliver it?	The article establishes necessary conditions to have clear notions on CMS and also shows some web technologies that companies are using to tackle rogue websites.
Bustelo (2003)	In Spain, under the notion of a global system, the focus lies in the part that affects the relation with users or front office, instead than in the inner organization that provides support to the system or back office.	Technology makes real an old yearning of many professionals that for a long time wanted an integrating vision of information management.
Bustelo & García Morales (2001)	Problems with content management; low acceptance of electronic documents as a legal and valid acknowledged type of document; need to manage non-structured information, etc.	Evolve towards not only document management, but also internal and external data management; the rationale behind the use of electronic documents is that it is a more efficient and safer manner to handle documents; better processing possibilities to manage adequately non-structured information, etc.
Lust, Juárez, Collazo, Elen & Clarebout (2012)	Analyze whether the classical assumption of providing a wide set of tools leaving its use under the learner's control is beneficial for learning. We examine then if all students are capable of using CMS tools so that their learning improves.	Results show that not all students benefit from learning with CMS as in several studies many students differ on the use of the tool, and these differences have important effects on development.
McCarthy, Grabill, Hart-Davidson & McLeod (2011)	Users implement CMS in new and innovative manners that were not thought by designers; also, instead of being guided by technology they usually rely on the social implications of technology on its daily use.	Authors argue that we should pay more attention to provide flexible technologies that allow different users to innovate using new tools answering to the social needs of the different environments.
McKeever (2003)	There is a need of more sophisticated Web content management systems (WCMS) due to the continuous proliferation of the content volume.	There is a life cycle for the Web content management systems (WCMS), identifying key market trends aiming to the success of this type of initiatives.
Munkvold, Päivärinta, Hodne & Stangeland (2006)	In the past there were several isolated perspectives on topics related to information resource management and document management, as well as a knowledge management repository model.	ECM deserves special attention as it has a lot of potential as research area, linking other areas that in the past were separated from information management from the point of view of the company.
Päivärinta & Munkvold (2005)	Problems that deserve attention: objectives/ impact on ECM, enterprise model supported by ECM, content model, technological infrastructure, resources and administrative practices, and change management issues.	A framework is considered to ease ECM development from the point of view of the company.

Continue

AUTHORS	CHALLENGES	SUGGESTIONS
Scheepers (2006)	One of the main challenges of ECM is the diversity on information requirements.	Enterprise information portals (EIP) promise to offer to each user customized and tailored content. However, this is too complex for large companies; we recommend identifying segments providing them with a mix of content, distribution, promotion and price. Elaborated concepts are relevant in other contexts that involve large communities with diverse requirements.
Serrano-Cobos (2007)	Ignorance of CMS similitudes and differences with other document management systems (SGD, ECM, etc.).	Definition of CMS functionalities and tips to choose a proper SW.
Smith & McKeen (2003)	Problems identified according to the lifecycle; capture (all the activities associated to content gathering), organization (indexing, classification and content linking and databases to provide access inside and between business units and functions), process (filtering and analyzing content to improve decision making) and maintenance (ensuring that the content remains updated).	While a *top-down* ECM vision includes perfected decision making, better use of information and gathering of competitive intelligence, many projects follow a *bottom-up* vision that is focused on delivering immediate benefits to the projects such as intranet portals, information search and management of web content. An organization that can match content management practices with the proper information and technology behaviors and values on a wider scale can benefit from a meaningful effect on its performance.
Tella & Mutulab (2010)	Traditionally studies have focused on evaluation perspective, offering a limited success discussion of CMS and they have not defined either a systematic and practical guideline to make future evaluations.	The results of the study suggest that qualities of content, system, support service, teaching and learning, self-regulated learning, use/ use intent, user satisfaction and net benefits are important factors to evaluate the success of CMS initiatives.
Tyrväinen, Päivärinta, Salminen & Iivari (2006)	Despite of being a topic with a large amount of practical interest, as of date, ECMs have not been the center of attention of the researcher community of information systems.	In order to foster their study and to guide future researches, this article provides a framework on specific topics that have to be studied in depth for ECM.
Vom Brocke, Simons & Cleven (2011a)	Reduce the information search time, complete compliance requirements, and keep information quality. Quite often the problem is the approach on technological issues instead of organizational issues.	A critical issue for the success of any ECM initiative is the business process structure of organizations.
Vom Brocke, Simons, Herbst, Derungs & Novotny (2011b)	Identification of 21 contemporary challenges for the adoption of ECM along the life cycle of the content (creation, storage and recovery)	This study helps the researchers to theorize on ECM acquisition and to research the role content plays in business process management. After identifying the challenges, they can be used to explain and evaluate ECM investments or to determine the scope and the goals of every ECM initiative.

Source: own elaboration

reused when they are required again, thus saving time and resources in the publications, and implementing a system that allows to reuse the information of previously developed documents on a particular issue. However, not too much attention is paid to the socio-technical context that favors technology adoption, as well as to the organizational parameters influenced by the use of technology, reducing the existing uncertainty due to the ignorance of interactions between technological and organizational parameters (Bianco & Michelino, 2010), as quite often the problem is the approach to technological instead than organizational issues (vom Brocke *et al.* 2011a). For this purpose it is necessary to make the content available to all from a simple enterprise vision, defining clearly the strategy and organizational vision and mission, in order to be able to align people, processes and technology (Scott *et al.,* 2004). This also applies when the content or knowledge is acquired externally, preventing the need to reinvent the wheel

(Bohórquez & Esteves, 2013) and taking advantage of the organizational resources.

Another important problem, from the point of view of management, is that most content management initiatives are not clearly aligned to the organizational strategy, and they are perceived from within the organization as isolated projects that will only favor certain areas without an organizational scope. In order to overcome this problem, the best option is to align every content management initiative with the organizational strategy, in order to associate it to a revenue generation process, identifying the necessary information to increase sales or reduce costs (e.g. positioning, alliances, schedules and profits/losses). Once we have identified those needs, we have to link the needs of the users and the information that will generate the income and the expected growth (Scott *et al.,* 2004), in order to convince the interested parties to be involved so that they feel that the initiative also favors them. Scheepers (2006) considered that diversity on information requirements is one of the main challenges of ECM with which the enterprise information portals (EIP) are called to offer to each user customized and tailored content. However, as this is too complex for large companies, we recommend to identify segments providing them a mix of content, distribution, promotion and price.

McCarthy *et al.* (2011) found that users usually implement CMS in new and creative ways that were not anticipated by the designers, and this can be explained because instead of letting themselves being guided by technology, they usually rely on the social implications technology brings to their daily lives. These authors propose paying more attention on providing flexible technologies that enable different types of users to innovate using new tools answering to the social needs of their different environments. In a later study, Lust *et al,.*(2011) analyze whether the idea of providing a wide set of tools to be controlled by the learner is beneficial for learning, in order to do so they pondered whether students were capable to use CMS tools in a way that improved their learning. However, results show that not all students reaped benefits from learning with CMS as many of them differ in the way they use the tool, and these differences have striking effects on performance. Therefore, the quality of content, system, support service, teaching and learning, as well as self-regulated learning, use/use intent, user satisfaction and net benefits are important factors to evaluate the success of CMS initiatives (Tella & Mutulab, 2010).

Munkvold *et al.* (2006) identified that people used to distribute document copies as attached files in electronic mails, instead of notifying about this content through a link to the shared document. This behavior leads to multiple versions of the same document and does not favor a real collaborative work inside the organization, because as we have multiple authors, syncing these documents becomes a headache when we need to compare different versions of each one of them. Additionally, there is a need to shape and manage not only the communication content concerning a reality outside its container, but also the information about the ways in which content is grouped, structured and stored in its container (Tyrväinen *et al.,* 2006).

Finally, the few studies available on content management systems from an organizational point of view show that those systems usually are the result of developments oriented to what the market wants and in most cases that end up completed almost by accident, instead of being developed according to a carefully thought and comprehensive framework (Tyrväinen *et al.,* 2006). In this sense we recommend to have a good theoretical foundation, as the one proposed by Tyrväinen and his colleagues (2006) in order to be able to understand all the dimensions that are affected by the content management systems, and in this way being able to use the technological tool that suits better the organizational needs. Also, in this type of projects, one of the critical success factors is being able to manage change in a proper manner, motivating users so that administrative and technological changes are adopted without too much resistance, making organizations capable to tap the largest benefit possible to content management (Munkvold *et al.,* 2006). In table 2 we can find the main problems found and the better practices suggested to solve them.

Final thoughts and future work

The main conclusion of this work is that there is still a lot to be done on content management, not only from the point of view of systems or technologies in charge to handle them, but we have to see beyond and start to take into account other dimensions that are also important and that usually are left aside. The article shows a more

TABLE 2. Main problems found by each dimension and better practices suggested on each case

DIMENSION	PROBLEMS FOUND	BETTER PRACTICES
Content	Documents created by different tools are difficult to display over time.	Every document shall be stored independently from the format in which it was made to enable its later use, easing its content reuse both internal and externally.
	Diversity on information requirements; each user need varied content.	Offer to each type of user an adequate mix of content, distribution, promotion and price.
	Content generated internally and externally is not made available to the whole organization.	Provide information according to the needs of each user, no matter where it has been generated.
Process	Documents sent as attachment make collaborative work difficult and promote the existence of multiple versions.	Sending a link to documents stored in shared repositories for joint work avoids version proliferation.
	Processes do not take into account search time reduction, or an adequate definition of requirements or information quality.	In order to manage businesses processes we have to determine the scope and goals of each one of them, taking into account their requirements and all information available.
Enterprise	Content management initiatives are not aligned with the organizational strategy and they are seen as isolated projects	Align every content management initiative with the organizational strategy, showing their impact in the results.
	Not all users get benefited or access the tools provided by CMS	Train users so that they garner the best value of CMS tools, improving their performance.
Technology	Content management projects are completed almost by chance and without a proper change management.	Have good theoretical grounds to see implications of content management in the whole company, and using appropriate technologies, managing the change properly.
	Users only take into account technological CMS factors.	Users should be trained to consider social implications brought by CMS.
	Ignorance of all the technological possibilities of CMS, to contribute with their labor.	Provide CMS with flexible technologies that promote innovation to different types of users according to their needs.

Source: own elaboration

complete conceptual framework that takes into account both technology and content, as well as the processes and the company in which the solution will be implemented, in order to have a holistic perspective of the dimensions involved in the content management projects and to ensure that no detail is left behind, for the sake of maximizing the success odds of such project. Another important issue – that goes beyond the scope of this research – is that we have found some interactions between the dimensions considered to be taken into account to have a complete picture and not a partial view of what really happens with CMS. This finding should be a starting point for future researches, for the purpose of knowing better the dynamics available in this type of projects.

Content management should represent for every organization the integrated management of life cycles of all the content types as well as recorded information and its metadata, organized according to the corporative taxonomy, with the support of adequate technological and administrative infrastructure; since in order to establish and keep content management in the ever changing world of opportunities and business requisites we require a coordinated change management of organizational content (Munkvold *et al.,* 2006). Therefore we need more studies to analyze the benefits of content management systems in the short and long term that also research how can we achieve a higher effectiveness to overcome the challenges of content management based in a complete solution for full user integration, determining critical success factors for such integration (Alalwan & Weistroffer, 2012).

Tyrväinen *et al.* (2006) recommend more investigation from a content perspective about how users are taken into account for enterprise content management solutions, as in most cases these people are not even asked to know about their information needs, nor about the documents they handle every day, nor what they would like to have in the near future. Also, we have to analyze the impact of these systems in the organizational

business processes, as well as in the replacement of processes handled in physical format or by people, transforming them into processes handled through digital content (McKeever, 2003). It is worthy to mention that every ECM initiative should consider the structure of the business processes of the organizations as a critical success factor, additional to content that plays a critical role in the company process management, which can be used to provide grounds or evaluate the investment proposed on ECM or to determine the scope and goals of those initiatives (vom Brocke *et al.,* 2011b).

Pälvärinta & Munkvold (2005) proposed that enterprise content management can contribute to a vision based on resources and to a vision based in processes, focusing in the resource of coded knowledge for organizational units, in the interest of developing knowledge capabilities, and through the support to business processes, this is explained due to the fact that the integrated content management solutions require a large amount of technological and socio-organizational competences, as well as change management competences in order to meet the current organizational goals, that can be adapted according to the future requirements. In this sense, the development of a content management system is not a unique project that implies a specific set of technologies but it has to be seen as something continuous and even evolutionary, as it deals with a process to cultivate and elaborate contents of a company, its infrastructure and their administrative practices in the framework of a continuous change of organizations, markets and technology (Pälvärinta & Munkvold, 2005). In this sense, a future research line can be the analysis of how CMS and ECM have evolved over time, and how in this evolutionary process different dimensions are interacting with each other to redefine what we know today as content management systems.

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