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**THE IMPLEMENTATION OF THE ENTERPRISE
CONTENT MANAGEMENT SYSTEMS IN A COMPANY**
**WDRAŻANIE SYSTEMÓW ZARZĄDZANIA TREŚCIĄ
W PRZEDSIĘBIORSTWIE**

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Summary: Modern technological possibilities referring to business intelligence and knowledge management support in an organization comprise mainly software which supports groupware, software used for workflow management, intranets and corporal portals for remote learning, data warehouse and Enterprise Content Management systems. The latter of the mentioned information technologies currently seems to be one of the most crucial structural foundations of business intelligence and knowledge management systems which have been developing rapidly over recent years. The main objective of this paper is to present the author's general methodology of the implementation of the ECM systems in the organization resulting from the preliminary literature review and the extensive practical experience. The first part of the study concentrates on the main definitions. The next and the most important part presents the details of the proposed methodology.

Keywords: Enterprise Content Management, IT-projects, document management.

Streszczenie: Nowoczesne technologie informatyczne, służące wspieraniu rozwiązań klasy *business intelligence* i zarządzania wiedzą, obejmują głównie technologie związane z oprogramowaniem do pracy grupowej, zarządzaniem przepływami pracy, intranetami i portalami korporacyjnymi, narzędziami do nauczania zdalnego, hurtownie danych oraz systemy zarządzania treścią. Ostatnia z wymienionych technologii wydaje się aktualnie jednym z najistotniejszych strukturalnych fundamentów, pozwalających stworzyć w przedsiębiorstwie rozwiązania klasy *business intelligence* i zarządzania wiedzą. Celem artykułu jest przedstawienie autorskiej propozycji koncepcji wdrażania systemu zarządzania treścią w przedsiębiorstwie będącej rezultatem wstępnych badań literaturowych i szerszych doświadczeń praktycznych. Pierwsza część artykułu koncentruje się na najważniejszych definicjach, następna i najważniejsza część zawiera zaś opis zaproponowanej metodyki wdrożeniowej.

Słowa kluczowe: zarządzanie treścią, projekty informatyczne, zarządzanie dokumentami.

1. Introduction

The employees in the organizations take a lot of time to search for needed information or documents that are “hidden” in the resources of a company or an institution. Thanks to modern IT solutions the time required to find information can be significantly reduced. Organizations that have implemented such systems are undoubtedly more efficient and more competitive. To discount advantages of such systems which are the subject of the further consideration it is necessary to use a proper implementation methodology that takes into account their specific features and allow for “safe” realization of the entire project.

The main goal of this article is to present the general concept of the implementation methodology of the Enterprise Content Management (ECM) systems. The proposition of the methodology results mainly from the practical experiences and the literature study of the author. The elements of the methodology were positively verified in practice in several medium-sized industrial and commercial enterprises. It should also be noted that in Polish literature regarding the IT systems a systemic approach to implementing ECM systems is still missing. Therefore, this article is an attempt, at least in part, to complement of this lack.

2. Basic definitions

Enterprise Content Management systems are used to build, organize, manage and store digital information on any medium and in any format. Content management is the basis for knowledge management and business intelligent technologies in any organisation [Kleu et al. 2013].

The Association for Information and Image Management (AIIM) International, the worldwide association for Enterprise Content Management, defined the term ECM as follows:

“Enterprise Content Management is the systematic collection and organization of information that is to be used by a designated audience – business executives, customers, etc. It is a dynamic combination of strategies, methods, and tools used to capture, manage, store, preserve, and deliver information supporting key organizational processes through its entire lifecycle” [AIIM 2015].

The five ECM **components** and **technologies** were also first defined by AIIM:

- Capture,
- Manage,
- Store,
- Preserve,
- Deliver.

Capture involves converting information from paper documents into an electronic format through scanning. Capture is also used to collect electronic files and information into a consistent structure for management. Capture technologies also encompass the

creation of metadata (index values) that describe characteristics of a document for easy location through search technology.

Manage category connects the other components, which can be used in combination or separately. Document management, Web content management, collaboration, workflow and business process management address the dynamic part of the information's lifecycle. Records management focuses on managing finalized documents in accordance with the organization's document retention policy, which in turn must comply with government mandates and industry practices.

Store components temporarily store information that is not required, desired, or ready for long-term storage or preservation.

Preserve involves the long-term, safe storage and backup of static, unchanging information. Preservation is typically accomplished by the records management features of an ECM system and many are designed to help companies comply with government and industry regulations.

Deliver components of ECM present information from the Manage, Store, and Preserve components. The AIIM component model for ECM is function-based, and does not impose a strict hierarchy; the Deliver components may contain functions used to enter information into other systems (such as transferring information to portable media, or generating formatted output files); or for readying information, such as by converting its format or compressing it, for the "Store" and "Preserve" components. The Deliver category's functionality is also known as "output"; technologies in this category are often termed output management [Enterprise 2015].

At the end of this part of the article it is worth mentioning a relatively new notion, namely **Enterprise Information Management (EIM)**. Enterprise Information Management combines Enterprise Content Management (ECM), Business Process Management (BPM), Customer Experience Management (CEM) and Business Intelligence (BI). EIM takes these approaches to managing information one step further. It is not only the software, it is first of all an attitude which assumes an active management of all information in a company [Bischoff 2015]. However, in this article we concentrate on the ECM because EIM requires further and extended study.

3. The general conception of the implementation of the ECM system

We will begin our analysis with the presentation of the general model of the ECM system in an organisation and then we will go to the description of the proposed implementation methodology. The general model of the ECM system in an organisation (from a small and medium-sized company perspective) is presented in Figure 1.

The presented model of the system is composed of several main elements which are strictly connected. The organisation (as the contractor or service provider) establishes a framework for four kinds of objects identified from the viewpoint of

the generated documentation: organisational resources, processes and procedures, electronic documents and projects.

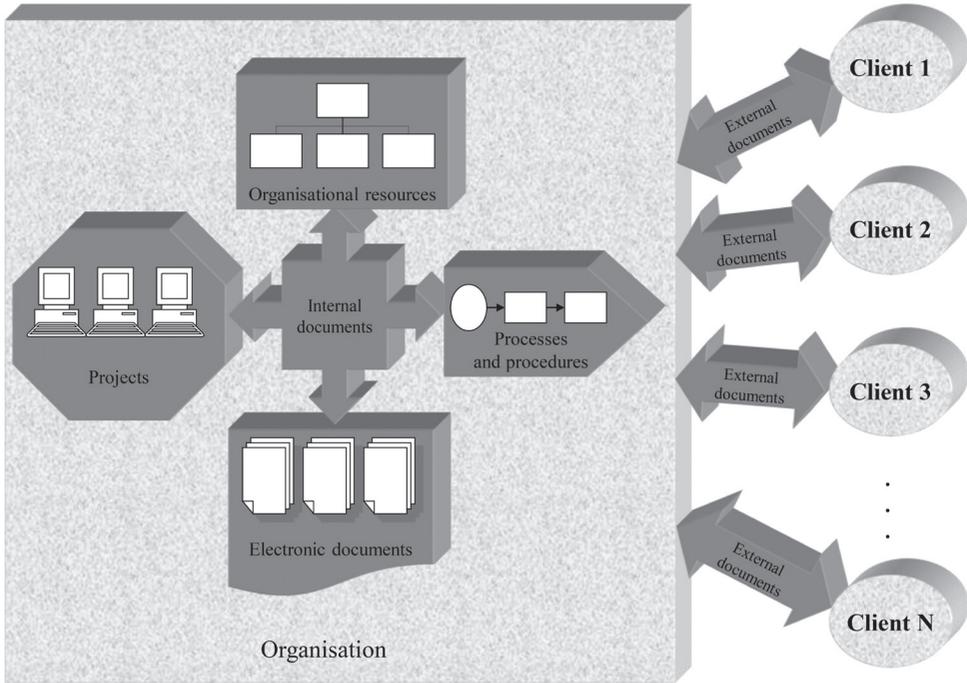


Fig. 1. The general model of the ECM system in an organisation

Source: own study based on [Wójtowicz 2011].

The organisational resources contain the descriptions of the positions and roles of the staff. These descriptions should characterise in a formal way all abilities of the members of the project teams.

The processes and procedures describe all methods of the activities during the project. They can refer not only to the management area of the project, but also to the implementation area.

In the presented model electronic documents create a centralised database which contains formal records of all information that is transferred between the members of the project teams and between a company and the clients. Owing to the maintaining the actual database of electronic documents, “a record” of the whole undertaking comes into being.

The projects are some kind of products offered to the clients. Every project should be described with essential parameters like: budget, plan of work, schedule, resources, etc.

The above-mentioned objects are dynamically interconnected through the internal documents, which means sets of the documents that are restricted (temporarily and

geographically) to the structures of the company. Among the internal documents we can indicate all documents which are important in the project (e.g. descriptions of the implementational procedures, rules, instructions), but are not received and delivered directly from and to the clients.

Often the success of the project depends on the quality of the contacts between employees and clients. Formal and well-structured exemplification of these contacts comprises the external documents. Among the external documents we can indicate the outgoing correspondence and incoming correspondence.

The way of the implementation of the system that supports content management depends mainly on the complexity of the project and the size of the company. Big companies have their own software solutions which are often parts of the complex application supporting the management. In the article we propose the solution primarily for small and medium-sized organisations.

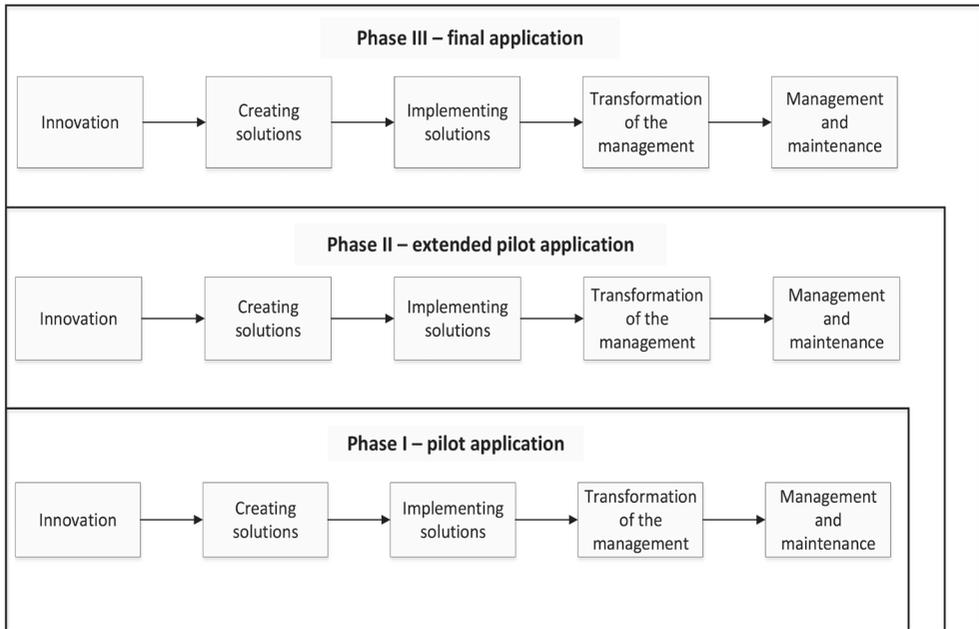


Fig. 2. The general concept of the proposed methodology

Source: own study.

In order to locate **the proposed methodology** within the software development and implementing methodologies, we can say that its assumptions are next to the methodologies called prototyping and incremental developing. The first is the relatively rapid creation of a prototype application that is tested and verified by the client, and then a system is built from the ground up. The second of them is based on

selecting a subset of system functions and iterative process of their implementation. The proposed methodology is built on partial application prototype, which is then expanded and modified to achieve full functionality. It should be noted that, in practice, often a document management system will be prototyped, which is the basis for the creation and expansion of the ECM system.

An important feature of the presented methodology is structural and iterative prototyping of applications that is based on well-defined stages (phases) of development and implementation of the system ECM. After completion of the stage achieved objectives and benefits are compared to incurred costs. To determine successive iterations, we have to indicate the appropriate criteria which allow to measure and estimate the value of each iteration. This approach also allows to use of the EVA/EVM (Earned Value Analysis/Earned Value Management) method, which is based, among others, on the measuring and tracking of the work progress related to costs, time and achieved results, and then comparing the obtained values with a scope of the project [Dudycz, Dyczkowski 2006].

In practice, the application of the described methodology is based on the division of the project into three phases, allowing to develop the pilot application, then the extended pilot application and lastly the final (production) application. The main emphasis in the implementation and development activities is on the development of the working prototype of the application that is tested to detect the potential problems.

The general concept of the proposed methodology is shown in Figure 2.

The Phase I – pilot application provides: the management of the access rights to the documents, grouping documents by the rules and creating a hierarchy of documents, automatically annotate documents and giving them unique identifiers, create new documents using forms, search and view documents, archive important documents.

The Phase II – extended pilot application includes the functional scope of the pilot application and the features for: the efficient distribution of documents and information to the individual recipients, tracking of any document within the organization (who and when received a document, when read it, what did with it, etc.) immediate check, who is working on a document and what is happening with this document, receiving reports (eg. cases that were not dealt with within the required deadline), or time for common tasks.

The final application phase (III) – includes the features of the expanded pilot application accompanied by: defining the workflow of the documents in accordance with the procedures, automatic recording information regarding the routes of the documents, providing the information, what actions are to be performed by the employee to complete the stage of the business process, quick finding (locating) of the document and checking the status of a document in any phase of the procedure.

For each of these phases we can distinguish five essential steps, namely:

1. innovation,
2. creating solutions,
3. implementing solutions,

4. transformation of management,
5. management and maintenance.

Innovation is a redesigning of the relevant processes and activities in the company on the basis of the analysis of the existing structure and the firm's goals.

The analysis of the current situation consists first of all of:

1. determination of the environment in which the company operates,
2. description of the company's objectives and strategies,
3. presentation of the technical infrastructure,
4. developing the competence matrix,
5. creating a the map of the processes (operations, flows, requirements, metrics),
6. identification of the technology which is used and required by the teamwork.

Based on these data the innovation report (proposed changes) can be created containing a new concept of the processes and solutions. The innovation process may involve the entire organization, selected departments or working teams.

Creating solutions means the transformation of the changes described in the innovations report into the prototype of the application, which is a result of joint teamwork of the analysts, IT-company (supplier) and future users (client).

Implementing solutions – this step includes activities and tasks related to the implementation of the developed applications:

1. defining the scheme to create applications in iterative process of change of the components using the method of the “increase value”,
2. developing the standards for application (interface, communication),
3. defining the system architecture,
4. elaborating the strategy of the further development of the applications and system's environment.

Transformation of the management is a step in which we can formulate the strategies and take actions to support the necessary changes in the behaviour and technical culture of employees affected by the implementation of the new processes. The trainings and workshops carried out at this stage allow to moderate the natural, negative reaction to the changes in the style and manner of work which are necessary for the redesign of the business processes and the introduction of the new technologies.

Management and maintenance ensures the final success of the all endeavours undertaken during the implementation of the system. This step defines and imposes the steps and methods of the review of the success factors, but also sets out the principles of the communication with the client both during the project and also when the project is completed.

The general implementation concept that was previously presented in outline, needs to be complemented by a list of the implementation tasks, containing the most important works carried out during the implementation process. These works may be performed both during the development of the pilot application, the extended pilot application as well as the final (production) application. That list includes Table 1.

Table 1. A sample excerpt of the list of the implementation tasks for the ECM system

Number	The description of the task
1	PRE-IMPLEMENTATION ANALYSIS
1.1	Gathering of the materials necessary for the preparation of the pre-implementation analysis
1.2	Pre-implementation analysis and the development of conception of the implementation in the following areas: <ul style="list-style-type: none"> • workflows of the invoices, • workflows of the internal and external documents, • schemes of the workflows, • roles in the process of the workflows, • defining the reports, • integration with external systems, such as ERP, • integration with external devices, e.g. scanners.
2	INSTALLATION AND CONFIGURATION
2.1	Installation and configuration of the system on a server
2.2	Adapting of the system to the customer’s IT infrastructure Installation of the system on a workstation(s) of the end user(s)
2.3	Entering the user accounts and organizational structure
3	TRAININGS
3.1	System administrator’s training for the basic configuration
3.2	Training for the secretary to use the function of the incoming and outgoing correspondence
3.3	Training for the departments’ representatives for the use of the modelled processes.
4	(RELEVANT) IMPLEMENTATION
4.1	Import of the contractor’s database
4.2	Realization of the procedure of the workflow of the invoices.
4.3	Realization of the other workflows (e.g. inquiries, order processing, holidays, business trips)
4.4	Execution of the automated import of data from the ERP system (e.g. the download of the sales invoices).
4.5	Integration with the ERP system, including: <ul style="list-style-type: none"> – download of the contractors data from the ERP system, – export of the documents from the ECM system to the ERP system.
4.6	Preparation of the reports.
5	DOCUMENTATION
5.1	Development of the documentation corresponding to the workflows of the documents
5.2	Development of the technical documentation relating to the integration with external systems
6	OTHER TASKS
6.1	Project management
6.2	Remote consultation
6.3	Technical support

Source: own study.

It is worth paying attention to the tasks 4.4 and 4.5 related to the integration with the ERP system. It is one of the critical points of the implementation project, because it requires close cooperation between the suppliers of IT solutions [Marciniak 2010].

As described, the implementation of an Enterprise Content Management system, requires a staged approach¹, gradually increasing the functional range of the system operating in a given enterprise [Kowalczyk 2015]. In practice, in most cases, initially the range of system operation covers only selected documents.

In many enterprises most often filled in documents are holiday requests and business trips settlements. It is useful to implement, in the first place, a circulation system for this kind of documents, which can be integrated with other systems functioning in the enterprise.

Introducing a holiday request in the system will require its confirmation by a supervisor, and afterwards it can result in an automatic creation of suitable records in the personnel module. If the enterprise calculates work time, the system can also be integrated with the ERP system, thanks to which work time calculation can be linked to the information about absences.

Filling in a business trip form in the system will require its confirmation by a supervisor, including the information about means of transport, and then inserting the information concerning an employee's absence in the personnel module of the ERP system. This application could also automatically settle allowances on the basis of inserted information about dates and times of the trip, and accept kilometrage settlement of a trip made with a private car. After inserting all data, it will be accepted as far as the merits and accounts of the case are concerned, and then the system will generate a document which will be the basis of realising the money due transfer.

Examples of other often automated processes, with which documents such as personnel forms are linked, are the following:

- registration and acceptance process of a pay raise request, workplace change and employment form change,
- employing new employees and workplace organisation,
- employee's dismissals and handling a new employee orientation checklist,
- accounting of company cars.

Other documents subjected to workflow are most often documents including inward and outward correspondence. Inward correspondence function is linked to the following operations (actions): receiving and describing of correspondence (describing the attributes of correspondence, number of attachments, etc.), scanning of paper correspondence, attaching a picture of scanned correspondence (or e-mail attached file) to the description of correspondence, automatic registration in the correspondence register (number, date and hour of registration), decreeing (forwarding) of correspondence, correspondence return, setting a reply date.

¹ In the "world" of the ERP systems known as *phased rollout* approach.

Function of outward correspondence handling covers such operations as: preparing an electronic document (in a suitable programme), describing correspondence in the system, attaching an electronic document to the description in the system, linking outward correspondence with appropriate enterprises, verifying and signing outward correspondence by people in charge, automatically registering in the correspondence register, printing the contents of letters sent by traditional mail (fax) or sending by e-mail.

A very important question during the implementation of the ECM systems is an appropriate classification of documents. It is most often realised by granting metadata to documents, which means additional attributes constituting so called document metrics. In this case it is possible to use two basic methods, which are taxonomy (categorising with the use of specified classification trees) and folksonomy (categorising with the use of any chosen key words). The application of the second method involves a few problems, for example, the user tagging a document follows his/her subjective impressions and needs, because there are no formal rules of description. However, a skilful combination of taxonomy and folksonomy can lead to receiving a more flexible tool to facilitate document classifying and tagging.

4. Conclusions

To sum up the described considerations it should be highlighted that the ECM solutions are specific because they support the “core” flow of the information in any organization. Therefore it is necessary to work out of the detailed methods and procedures during the implementation project which can be used for the entire period of “life” of the system in the organization.

During the implementation of the ECM system it is often necessary to create new and/or change the existing procedures within the organization. It means that this process cannot be seen only as an installation of software, but as a change in the business model of the company. To achieve this it is necessary to integrate and control business processes with resources of the company, forcing compliance with laws, regulations, rules, standards, etc. The ECM system cannot be implemented on the principle called “implement and forget”. This class of the IT system must be under constant supervision and requires continuous update, customization, modification and expansion [Implementing 2015].

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