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INTRODUCTION TO ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS IN SMALL AND MEDIUM-SIZED IT PROJECTS

Abstract: The article presents chosen organizational and technical aspects of using electronic document management systems in IT projects which are small and medium-sized. Section 2 of the study concentrates on the key terminology. Section 3 describes the most important aspects of modelling and implementing of electronic document management systems.

Keywords: document management, electronic document, electronic document management system, project management, IT project.

1. Introduction

The main objective of the article is to introduce a few aspects concerning the use of modern information technologies, which certainly comprises electronic document management systems in IT projects.

The documents represent basic media of the open knowledge in the organisations. For the most part (ca. 80%) this knowledge is represented by electronic documents which contain unstructured and semi-structured data [Gołuchowski 2005].

Many documents such as drawings, memos, specifications, quality manuals, purchase orders, change orders, invoices and standards play a critical role in the management processes of projects. Through the project's life cycle, from the conception to the completion, hundreds or even thousands of documents can be used. Each document conveys information from one stage to another and from one participant to another. One of the critical success factors of a project depends upon the proper understanding of the use, management and control practices associated with documents, as well as different technologies and techniques that are used to create and manage them.

2. Key terminology

This part of the article presents some key terms in the electronic documents management area. The most important term is **computer supported cooperative work** (CSCW). On the one hand, many authors believe that CSCW and groupware are synonyms. On the other hand, different authors claim that while groupware refers to real computer-based systems, CSCW focuses on the study of tools and techniques of groupware as well as their psychological, social, and organizational effects. The definition of Wilson expresses the difference between these two concepts: "CSCW is a generic term, which combines the understanding of the way people work in groups with the enabling technologies of computer networking, and associated hardware, software, services and techniques" [Wilson 1991]. CSCW systems can be divided into three basic categories: groupware, workflow management systems and electronic document management systems.

Groupware is a wide variety of information technology products, which is directed at supporting exchange of information between members of those groups. Within this category we can distinguish the following types of systems: mailing, shared calendars, conference timetables, multi-positional office packets, communicative and application platforms. Groupware is a tool that helps people work together more easily or more effectively. It typically allows them to communicate, coordinate and collaborate. Communication helps people share information, coordination helps people coordinate their individual roles with each other and collaboration helps people work together [Hills 1997, pp. 45-47].

The second category of CSCW systems is **workflow management systems**. Those systems enable defining, creating and managing of workflow, therefore, they are directed at modelling and controlling of business processes. Workflow systems have their roots and initial implementations in document imaging, through companies such as FileNet or Wang. The main application of the document imaging is the replacement of paper-intensive business processes through digitized documents [Khoshafian, Buckiewicz 1995, pp. 211-212].

The third and the last of the above-mentioned categories of CSCW systems are **electronic document management systems** (EDMS). Those systems are directed at both supporting exchange of information as well as automation of certain business processes. Therefore, we can say that they establish a kind of bridge connecting systems for work groups and those which manage workflow. Electronic document management systems commonly provide storage, versioning, metadata, security, as well as indexing and retrieval capabilities.

Document is a recorded information or an object which can be treated as a unit. A document may be on paper, microform, magnetic or any other electronic medium. It may include any combination of text, data, graphics, sound, moving pictures or any other forms of information. A single document may consist of one or several components [http://www.moreq2.eu].

Electronic document is a collection of data, as a separate significative entity, ordered in a defined internal structure and recorded on a data carrier [Act 2005].

In projects we can distinguish many **classes of documents** but in order to accommodate the services associated with each phase of the project, documents are grouped into four main classes:

– communication management documents,
– general reference documents,
– office management documents,
– specific project documents.

Communication management documents are concerned with the communication of information among different parties associated with a project.

General reference documents such as legal regulations, building codes, pricing guides, manufacturers' catalogues, and trade directories are used in the design and decision-making process.

Office management documents are related to daily management of an office. The office could be dealing with more than one project at a time.

Specific project documents are required for the organization, specifications, and management of project specifics.

These groups are of course notional. There is a propensity for many documents to serve a number of different functions, and be references in a number of different contexts.

The documents that are generated in projects are the part of the Project Management Communication area, which is one of the 9 project management knowledge areas described by Project Management Institute in the PMBOK Guide [*A Guide*... 2000, pp. 117-118].

In the next part of the article we concentrate mainly on the communication management documents and office management documents used in IT projects because the typical electronic document management systems are especially dedicated for such kinds of documents.

There are a number of general performance criteria for the use of documents. These criteria are based upon their requirements for internal use within practice and their concurrent use among a large number of industry participants.

The **technical requirements** of documents may be summarized as follows [Sifri 2002, pp. 8-9]:

– Accessible. A document must be easily accessible by a number of different groups or individuals at different levels of authorized use.
– Adaptable. A document's presentation should be easy to modify so that it can be used for a number of different purposes.
– Compact. A document should be suitable for being easily and efficiently stored for access as a part of an office archive or reference system and should occupy as little storage space as possible.

– Extensible. A document should be suitable to be easily added to or modified by a range of authorized participants regardless of the system they use.
– Interchangeable. A document should be suitable for being easily exchanged between a range of computing systems and software applications.
– Portable. A document should be suitable for being easily moved from one physical or logical location to another.
– Reusable. A document should have the capacity to be easily reused or referenced without being duplicated.
– Securable. A document should be capsuitable for being protected or restricted to particular levels of use.
– Verifiable. A document should be suitable for being verified for its authenticity, revision level, and relevance.

To meet the above-mentioned requirements we need the appropriate IT systems, which are briefly presented in the next part of the article.

3. Implementing EDMS in IT projects

We will begin our analysis with the presentation of the general conception of the EDMS implementation in an organisation. The most important assumption in developing of the EDMS is the dual-approach, which means that we can build the model from two views: structural and implementational.

The structural view makes it possible to design a general model of the EDMS, which can be detailed out in the following areas (sub-models):
– architecture,
– data,
– documents,
– functions.

The implementational view makes it possible to define the essential phases of the modelling process. These phases are:
– specification of the goals and tasks of the system,
– design of the general conception and model of the system,
– making the general model of the system more detailed (in its components),
– defining of the implementational (technological) conditions and requirements for the model.

Due to the publishing limitations in the next part of the article we concentrate on the chosen, most important elements of the described approach, and on the chosen class of IT projects, namely implementation projects.

The general model of the EDMS in IT projects (from a small and medium-sized IT company perspective) is presented in Figure 1.

The presented model of the system is composed of several main elements which are strictly connected. The IT company (as the contractor) establishes a framework

for four kinds of the objects identified from the viewpoint of the generated documentation: organisational resources, processes and procedures, electronic documents and IT projects.

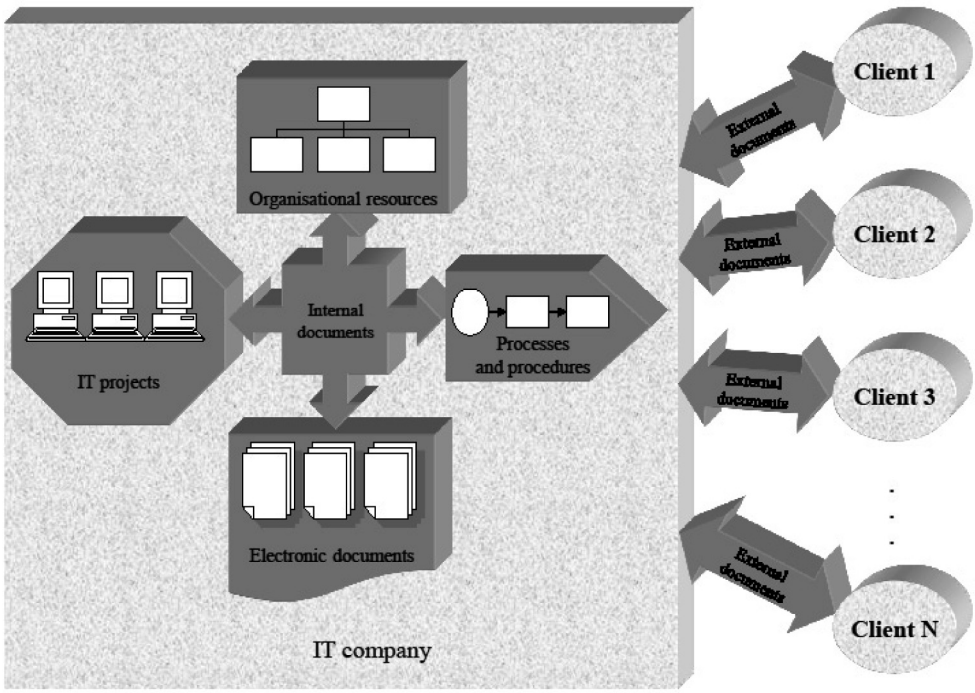

Figure 1. The general model of the EDMS in IT projects

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 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 IT company and the clients. Owing to the maintaining of the actual database of electronic documents, "a record" of the whole undertaking comes into being.

The IT 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 IT 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 IT employees and clients. Formal and well-structured exemplification of these contacts comprise 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 document 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 solutions for small and medium-sized IT firms. One of them is the use of the popular groupware systems like MS Exchange/MS Sharepoint, IBM/Lotus Notes or Novell GroupWise. These software platforms are very comprehensive and flexible but also expensive. For smaller companies and simple projects the office suites like MS Office or OpenOffice seem to be adequate. In the recent versions of these suites we can find advanced groupware functions like saving the documents on online servers and working on them at the same time with someone else. These features evolved very fast and are now exceptionally good in MS Office 2010.

An alternative to the commercial offline office suites can be free online office suites. An **online office suite** or online productivity suite is a type of office suite offered by websites in the form of software as a service. They can be accessed online from any Internet-enabled device running any operating system. This allows people to work together worldwide and at any time, thereby leading to international web-based collaboration and virtual teamwork. Usually, the basic versions are offered for free and for more advanced versions one is required to pay a nominal subscription fee [http://en.wikipedia.org/wiki/Online_office_suite]. The examples of the online office suites are Google Docs, Microsoft Office Web Apps or ZOHO. The main page of the Google Docs and types of new files are presented in Figure 2.

One of the most important advantages of all online office suites is very easy documents sharing. If the people who we want to share a given document with have an account in the application, we just enter the e-mail addresses and send them an invitation. Anyone we have invited to either edit or view our document, spreadsheet or presentation can access it as soon as they sign in. Many people can view and make changes at the same time.

Online office suits are IT dedicated for small and medium sized companies. They represent the modern trends in IT market: cloud computing and SaaS model, which seem to be an attractive alternative to the “traditional” IT-solution [Maciejewski 2010].

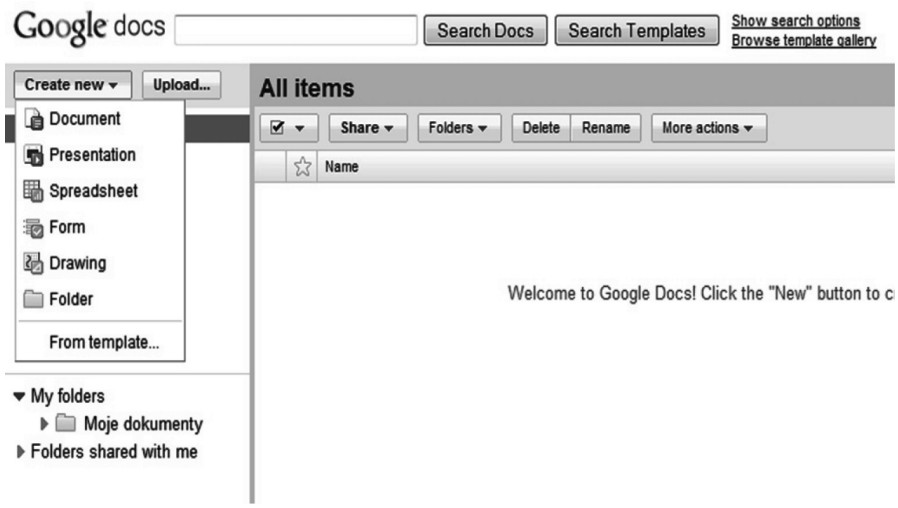

Figure 2. Types of new files in Google Docs

Source: own study based on [http://docs.google.com].

The window for document sharing is presented in Figure 3.

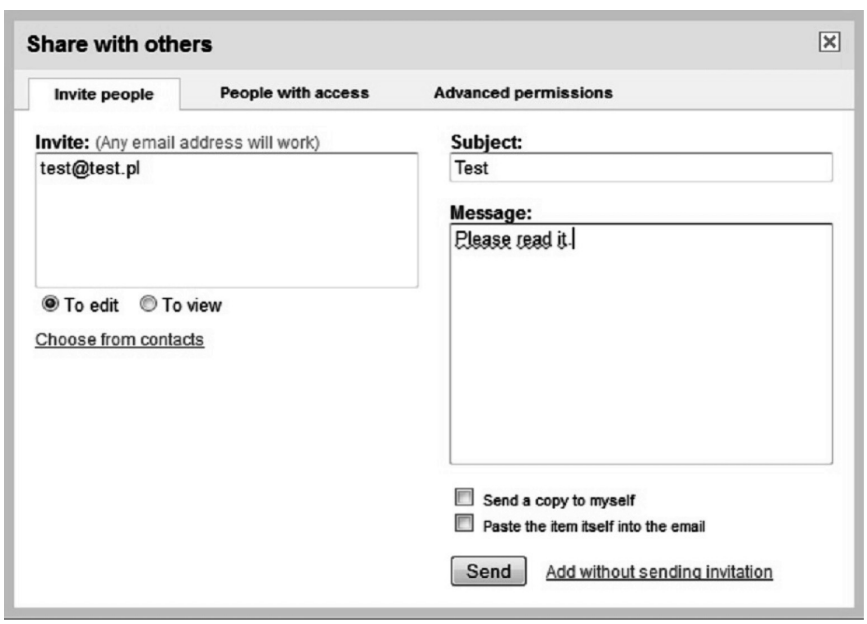

Figure 3. Window "Share with others" in Google Docs

Source: own study based on [http://docs.google.com].

Now we introduce some other advantages and disadvantages of online office suites.

Table 1. Advantages and disadvantages of online office suites

No.	Advantages	Disadvantages
1	The cost is low. In most cases there is no specific charge for using the service for users who already have access to a computer with a web browser and the Internet connection.	Access requires connectivity. If the remote server or network is unavailable, the content will also be unavailable.
2	There is no need to download or install software outside the office suite's web page.	There are speed and accessibility issues. Most of the available online office suites require a high speed (broadband) Internet connection.
3	Online office suites can be run from thin clients with minimal hardware requirements.	The number of features available is an issue. Online office suites lack the more advanced features available on their offline counterparts.
4	Online office suites provide the ability for a group of people to share a document without the need to run their own server.	There may be a subscription charge to use the service. In that case, in the long run, the ongoing subscription cost may be more expensive than purchasing offline software.
5	There is no need to purchase or upgrade a software license. Instead, the online office suite is available as software as a service.	Potential low security level of the data and documents which have to be stored on the remote central servers.
6	Online office suites are portable. Users can access their documents from almost any computer with a connection to the Internet, regardless of which operating system they use.	The lack of trust of small entrepreneurs in big companies. But this is the common problem that affects the whole IT market in the cloud computing era.
7	If the user's computer fails, the documents are still safely stored on the remote server.	

Source: own study based on [http://en.wikipedia.org/wiki/Online_office_suite].

The subject matter of the electronic document management is a very wide area and the author of the article will continue his research on it.

4. Summary

To sum up the described considerations it should be highlighted that modern information technologies, which certainly include systems supporting groupwork and documents management, are becoming present in small and medium companies in a bigger extent. Only until recently in big multinational IT corporations and their Polish branches systems such as Lotus Domino/Notes or MS Sharepoint were used. Currently the situation is changing, and the potential of the IT sector which deals

with creating and implementing ECM and EDMS class solutions will certainly dynamically grow in the nearest future [http://www.gartner.com/technology/media-products/reprints/microsoft/vol10/article3/article3.html].

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WPROWADZENIE DO SYSTEMÓW ZARZĄDZANIA DOKUMENTAMI ELEKTRONICZNYMI W MAŁYCH I ŚREDNICH PROJEKTACH INFORMATYCZNYCH

Streszczenie: Artykuł prezentuje wybrane organizacyjne i techniczne aspekty zastosowania systemów zarządzania dokumentami elektronicznymi w projektach informatycznych, które można zakwalifikować jako projekty małe i średnie. Po krótkim wprowadzeniu, w punkcie drugim artykułu skoncentrowano się na przedstawieniu najważniejszej terminologii dotyczącej omawianego obszaru. W punkcie trzecim zaś opisano najważniejsze aspekty modelowania i implementowania systemów zarządzania dokumentami elektronicznymi.