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Diploma thesis

Analysis and design of processes for Document

Management System (DMS) in the bank

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DIPLOMA THESIS ASSIGNMENT

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Informatics

Thesis title

Analysis and design of processes for Document Management System (DMS) in the bank

Objectives of thesis

This diploma thesis investigates the use of document management system in banks. The main goal of the work described in this thesis is design of process for document management for Bank Eskhata.

Partial goals are:

- to characterize the use of current DMS for bank sector;
- to analysis current processes of document management in Bank Eskhata;
- to design new process for document management in Bank Eskhata to make them prepared for implementation of DMS.

Methodology

Methodology of the thesis is based on research and analysis of relevant information resources. Research will be conducted in two forms, primary and secondary. The primary research will include direct consultation and communication with managers and methodologists in bank. Also it includes studying and analyzing current document management processes of the Bank Eskhata and its lacks. The secondary research will explore texts from scholarly articles, books and journals related to the matter at hand. Practical solution and recommendations for DMS in bank will draw on results of the theoretical knowledge and outcomes of primary research.

The proposed extent of the thesis

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Keywords

Document management system, information system modeling, business process automation, banking system.

Recommended information sources

- DAMELIO, Robert. The Basics of process mapping. 2nd Edition. New York: CRC/Productivity Press, 2011, ix, 173 p. ISBN 978-1563273766.
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Declaration

I declare that I have worked on my diploma thesis titled “Analysis and design of process for document management system (DMS) in the bank” by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any third person.

In Prague, November, 2016

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Analysis and design of processes for document management system (DMS) in the bank

Summary

Nowadays, the development of the banking sector in Tajikistan is in its early stage. Banks have been using and developing new ways in order to improve their efficiency, make decisions based on quality information and attract customers that are more loyal.

This thesis describes Documentation Management Systems in banking sphere and the necessity of their implementation in Tajikistan. The aim of the thesis was to research information on the system for a further implementation in bank of Tajikistan. Analytical part of the thesis describes usage of DMS in banking sector and its main components. This part is also dedicated to cloud solution and reviews of software vendors for Document Management System.

Practical part of the thesis includes the case study on bank in Tajikistan, which describes general information about the bank and its current limitations in the system. This part also includes new designed process, which would make documentation workflow easier and faster for the bank. According to new designed process the document flow of vacation request is described, which is simple example on usage of DMS.

In the end of the practical part, implementation effectiveness of the system in the bank and direct/indirect economic effect from it are described. The aim of the thesis was to present documentation management system in order to improve banking sphere in Tajikistan.

Result and discussion part of the thesis includes recommendations of the author based on primary researches and internships in the banks.

Keywords

Document management system, information system modelling, business process automation, banking system.

Analýza a design procesů pro systém řízení dokumentace v bance

Souhrn

Rozvoj bankovního sektoru ve státě Tádžikistán je v dnešní době ještě v raném stádiu. Banky neustále vyvíjejí a používají nové způsoby jednak pro zvýšení efektivity, také ale pro rozhodování na základě kvalitních informací a přilákání věrnějších zákazníků.

Tato práce popisuje systémy řízení dokumentace (dále SŘD) v bankovní sféře a nezbytnost implementace těchto systémů v Tádžikistánu. Cílem práce je sběr informací o takovýchto systémech za účelem jejich další implementace v tádžické bance. Analytická část práce popisuje použití SŘD v bankovníctví a jeho hlavní komponenty. Tato práce se také věnuje řešení za pomoci „cloudu“ a hodnotí několik prodejců nabízejících SŘD.

Praktická část práce zahrnuje případovou studii věnující se vybrané bance v Tádžikistánu. Studie popisuje podstatné informace o této bance a její současná systémová omezení. Tato část se také zabývá nově navrženým procesem, který má za úkol zjednodušit a zrychlit tok dokumentů v bance. Na základě nově navrženého procesu je popsán jako jednoduchý příklad procesu v praxi požadavek na výběr dovolené.

Na konci praktické části je popsána jak efektivita plynoucí z implementace systému v bance, tak i přímý a nepřímý ekonomický efekt takovéto implementace. Cílem práce je prezentovat SŘD za účelem zlepšení bankovníctví ve státě Tádžikistán.

Část diplomové práce výsledky a diskuze zahrnuje autorova doporučení založená na primárním výzkumu a stížích v bankách.

Klíčova slova

Systém řízení dokumentace, modelování informačního systému, automatizace obchodního procesu, bankovní systém

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1.Introduction

Almost everyone who has a working experience knows that one of the most labour intensive works in companies is document management. Imagine when you want to get working holidays form signed and this document goes through several processes like preparing (or filling) of document, making copies, getting signed and maintaining. You can lose half of your day trying to get your document signed by superior managers and by this lose your time, which you could spend for making a new contract or serving a customer.

Nowadays, with the rapid progress of market relations and high competitive economics, timely and proper solution of strategic tasks determines viability of the company. Currently information is the main source of decision-making process in the companies. It can be surely stated, that the quality of information can set the quality of management. To succeed, companies need to pay sufficient attention to the improvement of managing records, as every management decision is always based on the information, on the service document.

Business information can be presented in various forms, studies show, that 75% of employees' time is spent on organizing documents, like preparing, maintaining, filling, coping and transmission. According to ISO (International Standards Organization) document management becomes one of the major factors in the competitiveness of any businesses. Properly organized records and document management, can decrease time required for searching data, improve the accuracy and timeliness of information, it eliminate redundancy. In the era of new technologies and automatized working places, management of records plays leading role, as it increases productivity of workers.

One of the growing trends in current business world is banking sectors. In Tajikistan, bank is considered as a commercial organization. The aim of banks is to attract more customers and sell loan products. Over the last 5 years, banking sector in Tajikistan has grown and developed with an accelerating pace. As more people and enterprises start to work with banks, it is getting hard to manage document flow, which slows down customer service and decision making process. Only by organizing the process of document flow and by having system properly managed, banks can offer high quality service and increase the level of profitability. Therefore, Document Management system (DMS) will help to solve these problems.

2.Objectives and methodology

2.1.Objectives

The most important thing for banks is having a good management system for documentation flow.

This diploma thesis investigates the use of document management system in banks. The main goal of the thesis is to design new document management process for the “Bank Eshkata”.

Partial goals are:

1. to characterize the use of current DMS for bank sector;
2. to make analysis of current processes of document management in “Bank Eshkata”;
3. to prepare document flow of “Bank Eshkata” for implementation of DMS;

2.2.Methodology

Methodology of the thesis is based on researches and analysis of relevant information. Researches during the work were performed in two forms: primary and secondary. The primary research consists of consultations and communication with managers and methodologists in the bank. It also includes studying and analysing current document management processes of the “Bank Eshkata” and its limitations. Texts from scholarly articles, books and journals related to the issue were studied during the secondary research and cited in this thesis. Solution and recommendations for the implementation of DMS in the bank will be based on the researches and theoretical knowledge of the author gained during the work on this thesis.

3.Literature review

This chapter includes review of literature and resources, which are connected to the subject of the work. It includes six subchapters, which describe difference between record management and document management and their key aspects.

3.1.Specification of Records management

In this subchapter is described definition of record, records lifecycle and specifications of record management. Author has identified the definition of record according to the researches made during this diploma work.

3.1.1.Definition of a record

There are many definitions given in the literature to describe record.

Records were identified by many researches, but there are also standards, which identify record and records management.

According to the international standard a ‘record’ is defined as “information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business” (ISO 15489-1, 2001)

The International Council on Archives (ICA) defines a record as “recorded information produced or received in the initiation, conduct or completion of an institutional or individual activity and that comprises content, context and structure sufficient to provide evidence of the activity. While the definition of a record is often identified strongly with a document, a record can be either a tangible object or digital information which has value to an organization.”

Records are such a group of documents, which contain information about the actions, decisions, and operations that have occurred in the organization. Any document that can be suitable answer for the questions below should be classified or declared as a record:

- Does it support or document a transaction?
- Does it provide information used in making a business decision?
- Does it document actions taken in response to an inquiry?
- Does it document the reasoning for creating or changing a policy?

- Does it document your business process?

It is useful to note that some things are generally not considered to be records. This include such a things as copies of records made for someone’s reference, document drafts that have not been published, notes that have not been shared with colleagues, and envelopes used for routing. The specific records maintained by any one organization will differ based on the nature of the organization. (Weisinger, 2011)

Records lifecycle contains five stages, which is active and inactive phases like: Create/receive, capture, close, retire, transfer/destroy. Retire is an optional stage. The idea that each record has a life cycle is the fundamental concept behind records management.

Author Wayman Thomas in his book Document Management Overview defines: “Life cycle refers to the stages that every official business record must go through. After a record is created, it must be filed according to a defined, logical scheme into a managed repository where it will be available for retrieval. When the information contained in records no longer has any immediate value, the record is removed from active accessibility. Depending on the nature of the record, it is either retained, transferred, archived or destroyed. ” (Wayman, 2004)

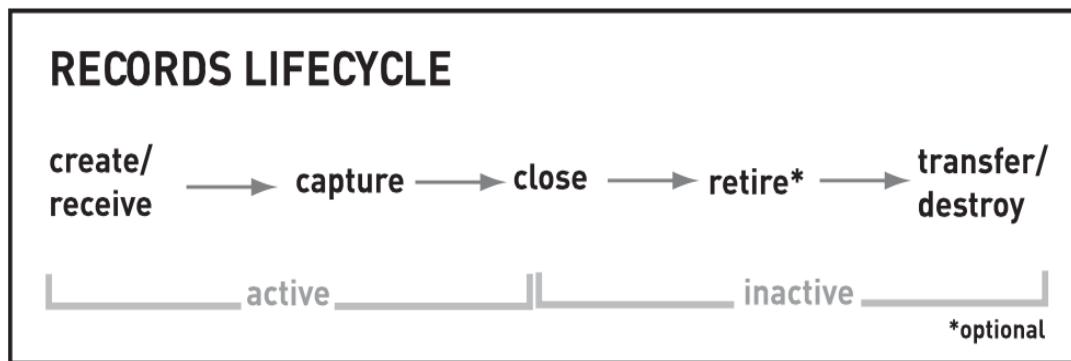


Figure 1 Records Lifecycle (Wayman, 2004)

Author’s definition of “record”:

Record is an evidence of some action, which shows some measurement and identifies some information, which can be seen or used later.

Records can be electronic or paper based: e-mails, electronic documents, database, audiotapes as well as pictures, which can be records too. Even the messages and content posted in Social media tools and microblogs can be found as records.

Records are often separated to categories like: electronic and non-electronic or physical. Electronic records are those, which are saved directly in repository of Records Management system and easy to find, use and store. Non-electronic records are those, which are stored in papers and must be tracked by their physical location.

3.1.2. Definition of records management

(ISO, 2015) ISO gives a brief description of records management requirements. “Records established to provide evidence of conformity to requirements and of the effective operation of the quality management system shall be controlled. The organization shall establish a documented procedure to define the controls needed for the identification, storage, protection, retrieval, retention and disposition of records. Records shall remain legible, readily identifiable and retrievable. “

While Records Management is a vital tool for companies to address governance, compliance, and retention requirements, the benefits of Records Management go beyond government regulations. For example, the use of Records Management improves a company's overall data management processes, particularly in the areas of data security and data access. (Weisinger, 2011)

Author’s definition of Records management - organizing records the way, it is comfortable to manipulate with data, whenever needed. Keeping records clear, simple and accessible are the main goals of for record management.

3.2. Document management system (DMS)

Current subchapter describes definition, types and value of document and components of Document management system. Materials gathered in this chapter have been researched by the author during literature review. In conclusion of this subchapter, author brings his own definition of document and Document management system.

3.2.1. Definition of document

Among many definitions of documents, the right one for this thesis was found in the book of Denise Robitaille “Document Control: A Simple Guide for Managing Documentation”.

“Documents are one of the many resources you use to implement a process. Regardless of the nature of your organization, documents are the fundamental tool of your trade” (Robitaille, 2005)

Definition of the documents described in ISO 9001:2008 and other quality management system models, to which Robitaille has also linked. “ISO 9000:2005 Quality management systems – Fundamentals and vocabulary, defines a document as “information and its supporting medium,” and further notes that, “The medium can be paper, magnetic, electronic or optical computer disc, photograph or master sample, or a combination thereof.” When considered as a whole, explains the guide, “A set of documents... is frequently called ‘documentation.’”

The definition and supporting notes provide three attributes that typify documents. They:

- Provide information
- Are assembled in a medium
- Usually occur simultaneously or in conjunction with other related documents, constituting a set or sets of documentation” (Robitaille, 2005)

Value of documentation

Documentation enables communication of intent and consistency of action. Its use contributes to

- achievement of conformity to customer requirements and quality improvement,
- provision of appropriate training,
- repeatability and traceability,
- provision of objective evidence and,

- evaluation of the effectiveness and continuing suitability of the quality management system.

Generation of documentation should not be an end in itself but should be a value-adding activity. (ISO, 2000)

Types of document used in quality management systems

The following types of documents are used in quality management systems:

- documents that provide consistent information, both internally and externally, about the organization's quality management system; such documents are referred to as quality manuals;
- documents that describe how the quality management system is applied to a specific product, project or contract;
- documents stating requirements; such documents are referred to as specifications;
- documents stating recommendations or suggestions; such documents are referred to as guidelines;
- documents that provide information about how to perform activities and processes consistently; such documents can include documented procedures, work instructions and drawings;
- documents that provide objective evidence of activities performed or result achieved; such documents are referred to as records.

Each organization determines the extent of documentation required and the media to be used. This depends on factors such as the type and size of the organization, the complexity and interaction of processes, the complexity of products, customer requirements, the applicable regulatory requirements, the demonstrated ability of personnel, and the extent to which it is necessary to demonstrate fulfilment of quality management system requirements. (ISO, 2000)

3.2.2. Document management system (DMS)

Document management system began development in 1980's, when paper-based documents wanted to be managed. The paper documents were not the only purpose of the

software, but prints and photographs as well. Conversion of documents or papers into digitized images creates the digital document management process. Easy organization and quick retrieve, indexing and archiving can be done with these images. After files are electronically converted or scanned, a copy is stored in a high-resolution on hard drive or optical disc. Information such as author, date created, reference number or key words can be associated with a document and templates created. The files still can be printed, viewed, stored and shared. From the level of security that was assigned to the user by the system administrator depends what actions users can perform and which documents they can read.

Wayman in his book describes DMS by following: “Digital document management represents a significant advance over storing information on paper. No longer just ink on a page, the document becomes active content after processing by Optical Character Recognition (OCR) technology. A document management system should offer effective search tools for document retrieval, including full-text search, template field searches and a visual filing scheme that permits users to browse for documents. The best systems will allow you to find documents using a combination of all three methods.

Document management maximizes the value of paper documents. Files can still be viewed, printed, shared and stored, but have the enormous advantage of having active content. You can easily search files with active content, and you can create workflow rules to automatically route files from one user to another.” (Wayman, 2004)

Author’s definition:

DMS - Document management system is software for companies designed to automate the management of digital document. The main purpose of the system is to track, manage and store documents electronically and reduce paper. Capability of record keeping and history tracking (who, when, what modified) is the important features of the system.

DMS is model of interaction considering that documentation management is one of the aspects of decision-making process, which effects on business processes and customer service. To support these business objectives DMS gives opportunity of collection, storage and analyse information about consumers, suppliers, partners, and internal processes of company.

Nowadays, DMS is need of all organization no matter what sphere of business it is. Therefore, yearly big corporates invest big amount of money to organize document

management in their companies. For them it is the only way to organization, improvement of business processes and increasing decision making process speed.

3.2.3.Components of a Document Management System

Components of DMS fully described by (Wayman, 2004) and will be provided in shortcut in this document. There are 10 main components that by author's opinion are important for the document management system.

Usability

Easy use of the document management system is one of the most important factors of success. For the staff acceptance of the system usability is critical. A simple capture of documents, organization and search will make system widely used. Rather than forcing people to change their preferred way of working, the best systems are user-friendly and flexible enough to adapt to the way people already work within an organization,.

Capture

To improve business operations, document management system must suit all the document types: paper, fax, electronic, audio and video that are part of an organization's procedures and processes. It should also enable batch processing of documents and forms. It could be as a part of business operations for organizations that rely on high volume processing.

Wayman defines three types of transferring paper documents and files into a document management system:

- Scanning (for paper files).
- Importing (for archiving electronic documents such as Microsoft Office files, spread sheets, faxes, audio and video).
- Conversion (for creating unalterable images of electronic documents, to secure changes in documents). (Wayman, 2004)

Indexing and Retrieval

From the internet-survey that was made by research companies, three fourths of executives said that organization's most important asset is information.

The document management system should make it easy to find what you want and when you want. A full-featured system should enable fast, easy and efficient retrieval of relevant documents, with multiple methods of indexing (categorizing) information.

In order to quick sort the large volumes of data users should use indexing to find the right document. People who retrieve the documents should be able easily use indexing methodologies. Search methods need to be understood by creators, as well as those who file them.

Wayman defines three main ways of indexing files in a document management system:

- Indexing every word in a document or full text indexing.
- Indexing through the keywords used for categories of documents.
- Indexing by associated groups of documents or folder/file structure.
- If quality of the indexing system is evident, retrieval should be used.

Annotations

Wayman in his book gives following definition: “Annotations permit users to append or remove information about a document with- out permanently changing the original image. Highlighting, stamps, redactions (blackouts or whiteouts) and sticky notes are among the most common annotations. A document management system’s security should give the system administrator control over who can view annotations and see through redactions.” (Wayman, 2004)

Storage and Archiving

When documents are transferred into the document management system, they must be stored reliably. Document management systems storage must be able to reconcile development of technologies and future growth in organization. Document management system should be compatible with different storage devices that are currently available, as well as newly developing systems, in order to provide long-term document storage and archiving.

Distribution

Putting the right information in the right people's hands should be provided by document management system. Quality system provides access to one file at the same time to multiple users and aids in distributing documents to authorized individuals both inside and outside of organization over an intranet. A document management system should protect an unchangeable copy of the original document while allowing to enrich collaboration that best serves business needs.

Workflow

The workflow component Wayman defines this way: "Workflow modules can increase the benefits of a document management system by automating the routing of documents to various people, eliminating bottlenecks and streamlining business processes. Workflow should automatically notify specific users of certain document management related system events, based on rules created by the system administrator. Workflow should generate return receipts and timed responses. If a recipient does not act within a specific period, the program should send either a reminder message or a second message to an alternate recipient." (Wayman, 2004)

Security

Security is a complete necessity for any document management system. A strict security system should allow authorized user to perform required duties. It can be whether from desktop, laptop, remote location or over the Web without compromising the integrity of the database, system or network.

Integration

New software and databases is often a big challenge for an organization's IT support. Document management system should offer packaged integration tools for simple image enabling, to minimize the load on IT support.

Technical considerations

Wayman in his work also bring technical consideration as a component of document management system. He describes it following way: "The goal of digital document management is not solely to eliminate and organize paper, but to manage all organizational documents, both computer-generated and paper-based, and all files, including digital audio

and video files. This is the most important reason to implement a digital document management system. There are many technical components to a digital document management system and a wide variety of options, like: System Compatibility, Networked systems, Scalability, Hardware requirements, Server requirements, Workstation requirements, Software requirements and etc.” (Wayman, 2004)

3.3. Difference between RM and DMS

The two types of systems are very closely related, but distinctly different. Document Management systems are typically deployed to enable departmental sharing of documents and to manage document revisions. With records management the main emphasis is on the organization and safeguarding of recorded information throughout its life cycle; there are thus strong administrative overtones in the application of this discipline.

Document management is more dynamic and transactional in nature, and is more readily comprehended by users. On this basis, it is possible to have a ‘document management system’ without a ‘records management system’, but the reverse is not feasible. Where the organization has no formal records management processes in place the captured information will be stored directly without any concept of a ‘declaration’ decision being made. (Wiggins, 2012)

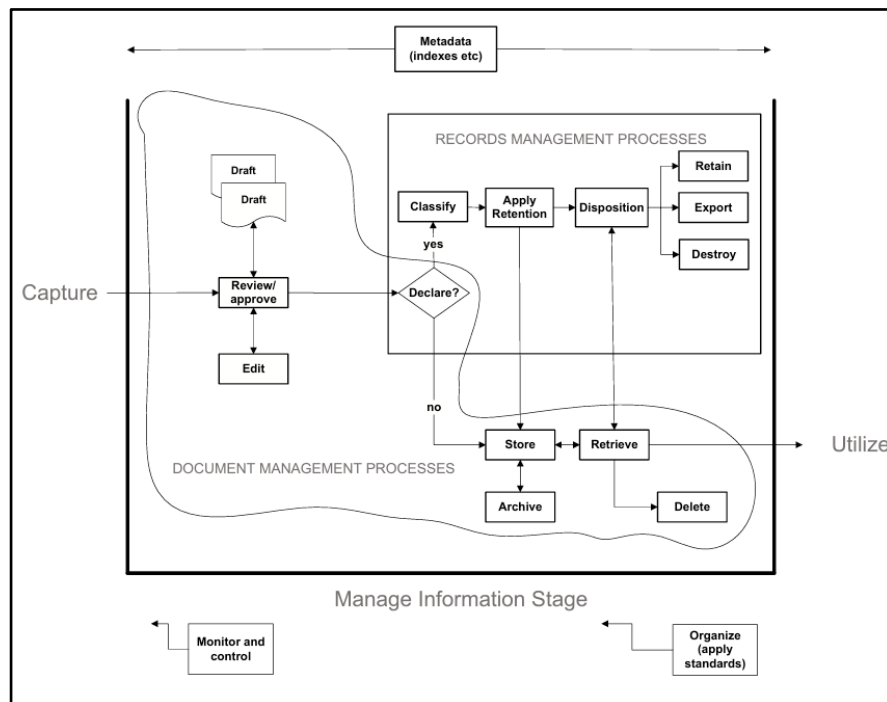


Figure 2 Manage Information stage (Wiggins, 2012)

Records management and document management are complementary approaches, which must be applied, in a coherent fashion. They are not alternative ways to manage information. It is important to ensure that all the management elements are addressed so that an organization can capitalize on its available information.

The relationships and differences between documents and records are summarized in the following table:

	Document management	Records management
Stored objects	A Document is stored information that contains structured and unstructured data. Documents are often associated with metadata; a set of properties or attributes that further describe or summarize document content.	Records are a special kind of document. Like documents, records can be structured or unstructured data. Records can also have metadata. Records contain information that is used for making business decisions.
Static versus Dynamic	Documents can be very dynamic and support frequent revisions and updates.	Records are generally static and are not intended to be altered unless and until the lifecycle of the record indicates that they need to be superseded.
Object security	Most Document Management systems have capabilities for security and privileges, but it isn't strictly required.	Records Management is very strict in specifying the security of records— who can declare and access records, and who can approve final record disposition.
Auditability	Document Management Systems provide audit capability to show the complete history of changes made by the authors of a document.	This involves being able to see where records are in their lifecycle and who has accessed and modified them.
Management software	Document Management software focuses on searching and retrieving document content. Document Management systems control the creation of document versions and support the locking of documents checked-out for revisions.	Record Management software is complementary to Document Management. Once a document is declared a record, the RM system will ensure that the record is not altered. Records are filed or categorized based on a file plan.

Table 1 Comparison of RM and DM systems (Weisinger, 2011)

	Document management	Records management
Workflows	Workflows direct how documents flow through the organization and how users within the organization act on the data contained in the document.	The record disposition schedules are the instructions for a record lifecycle and are a special kind of workflow that is associated with a record. Compared to document workflow, record workflow is typically much simpler, usually involving just a few steps.
Object Disposal	Document Management systems don't have strict requirements about when documents should be deleted and often no documents are ever deleted.	The destruction of records is usually regulated by laws. Federal agencies often transfer records to be permanently archived to the National Archives.

Table 2 Comparison of RM and DM systems continuation (Weisinger, 2011)

3.4.Key aspects of DMS

To ensure that implementation of DMS will be successful for the organization, some key aspects of the system, should be taken into consideration. First of all:

3.4.1.Project planning

Organization's current business processes and how documents and electronic files flow through those processes should be clearly determined. What happens next, after document or electronic file was created or sent to the organization? What is movement of the document until it reaches its final destination?

The deployment of the system should address areas that are currently causing the most problems and where there is the greatest opportunity for improved efficiency. While

working with individual department, their interaction with other departments should be taken into consideration.

What information is going to be captured and entered into the system? Electronic files, paper documents, e-forms, email, faxes and attachments are common contents. The ability to easily capture and upload described above content into the system from different departments, branches, different devices is key the creating a comprehensive system.

After information is captured, it must be logically filed and stored for easy and secure retrieval. Each branch, department, unit of the organization should have different index values that will allow for rapid retrieval of the files in the future. Who will need to access those files and will be there an access for someone outside of the organization?

Solving specific problem of the company, not with the most features, should choose system. The solution of the system should be addressed to the requirements of the business and organization.

3.4.2. Standard features of the system

Each system should contain basic or standard features, which are also, discussed as components of the DMS in part 3.2.3 Components of DMS of this work.

Components	Features	Components	Features
Searching	Top-level search Cabinet index search Document type filter	Scalability	Multiple users Unlimited storage Unlimited filing cabinets
Workflow	Simple user interface To Do item searches Fixed workflow Detailed workflow report	Usability	Screen mode Store any file format Document storage design

Table 3 Standard features of the system (Lingenheld, 2016)

Components	Features	Components	Features
Security	Detailed audit trail User/group/system security Three-tiered administration	Integration	Integration with other applications ODBC integration Active directory integration Web Services API
Document management functionality	File converting Import/Export “Sticky notes” User inbox Document delegation System use reports	Plug – Ins	Outlook check-in Ms Office check-in/check-out Print To

Table 4 Standard features of the system continuation (Lingenheld, 2016)

3.5.DMS in banking industry

Document management system is used in many sectors of business and banking industry is one of them. This chapter describes benefits of implementation and usage of system in banking sphere.

3.5.1.The main benefits of DMS for the banking industry

Research conducted by Forbes shows that the banking industry is one of the main vertical markets with a strong growth potential on IT. Taking into consideration the huge amount of transactions carried out by the banks on a daily basis and the efforts they put to optimize their processes.

Nevertheless, contempt the breakthroughs in data management, main internal or external communications with customers or different banks are still based on paper. These documents are usually stored using confidentiality by no longer used document management software with limited accessibility options.

For this reason, document management has become one the main problems across the banks. Whether because of the companies need, to run more effective core processes

(like granting loans or opening accounts) or to meet specific requirements of the organization, implementing document management system is important for the flat running of any bank. (Klein, 2014)

Andre Klein in his article for DocPath (Klein, 2014) well describes benefits from implementing DMS “Implementation of document management solution is a safe decision, for both banks and their customers. The key benefits of implementation are:

Financial benefits: Managing and sending of documents such as statements and notifications refer to a high cost for the banks. With right document management system, they will be able to reduce this cost in a big amounts.

Banks save time: Handling paper documents include using resources for a great number of manual tasks like printing, making copy before sending them. Good document management system helps to save a big amount of paper and, therefore, allows removing many manual tasks. This way, the bank will be able to use better advantage of resources and assign them to tasks that are more important.

Customers save time: With smart document management system, banks will be able to provide their customers with all their account information in a fast and efficient way.

Regulations: All banks must adapt with legal regulations and keep up with the continuous changes that occur in this field. However, this may turn out to be hard when regulations are monitored manually and documents are in paper. Secure document management system should meet all the requirements of efficient protection of customer data.

Electronic audit trails: Banks have internal and external audits to ensure that they fulfil the relevant regulations and keep precise record of all financial transactions. These audits are conducted in a more efficient and correct way when accurate document management system is used, which makes it possible to monitor all transactions conducted with a certain type of data.

Optimized workflow: When documents are managed electronically, it is more quick and efficient to assign each workflow, since employees can easily find the documents and information they need, while fulfilling working rules and procedures.

Environmental benefits: Changing to an electronic document management system also involves obvious benefits for the environment. Paper consumption is exceptionally reduced, which means less trees are cut, waste and chemical pinch are produced.” (Klein, 2014)

3.6.Main components of DMS for banking

Earlier in chapter, 3.2.3 Components of DMS was already mentioned all fundamentals of DMS. In the following chapter, author would like to emphasize components which are considered to be important in banking industry. In the Graph 1 author presents six components. Characteristics of those components were discussed previously.



Components of a Document Management System

Figure 3 Components of DMS (Klein, 2014)

3.6.1.Capture

In the banking industry there are mainly used paper files and electronic documents. The purpose of DMS is to bring both this types of document to one unalterable image or electronic document. Importance of DMS will be to capture documents from the beginning in the electronic format and decrease use of paper documents.

3.6.2.Storage

Storage is the most important component of DMS in banking industry. After capturing documents and having them in electronic format it is very important to have them stored. In banks most of the documents have their own specific storage policy, therefore the storage requirements have to be met and data have to be easily portable.

3.6.3.Indexing

All documents should be indexed, because most of them have versions and expiration date. Indexing will make versioning and documents search easy, sorting more comfortable.

3.6.4.Locating

Locating should assist in giving right access to the right people. It is another important component for banks. Each employee has access to the work system assigned and DMS should take it into consideration. Some documentation might be strictly under the bank secrecy, which should be provided by DMS component.

3.6.5.Retrieval

This is second part of Indexing. When indexing is done correctly retrieval should be very easy. Retrieval is needed in banking sphere in case of returning to older version of some legislations, retrieval of commands or of decision making documents made in past.

3.6.6.Auditing

It is an indivisible part of the DMS in banking. Regulation and controlling of the system will be done in certain timeframe by audit department in bank. DMS should make it possible to investigate and report changes in the document management.

Described components bring us to important hierarchy of the DMS in banking industry, which is drawn in Figure 4. Top of the pyramid is Indexing, which is first step DMS should take care of. Capturing, Indexing and Retrieval are part of this block. Second block consists of storage and document location. Finally, last block of pyramid is metadata, which includes auditing, documentation lifecycle tracking and reporting.

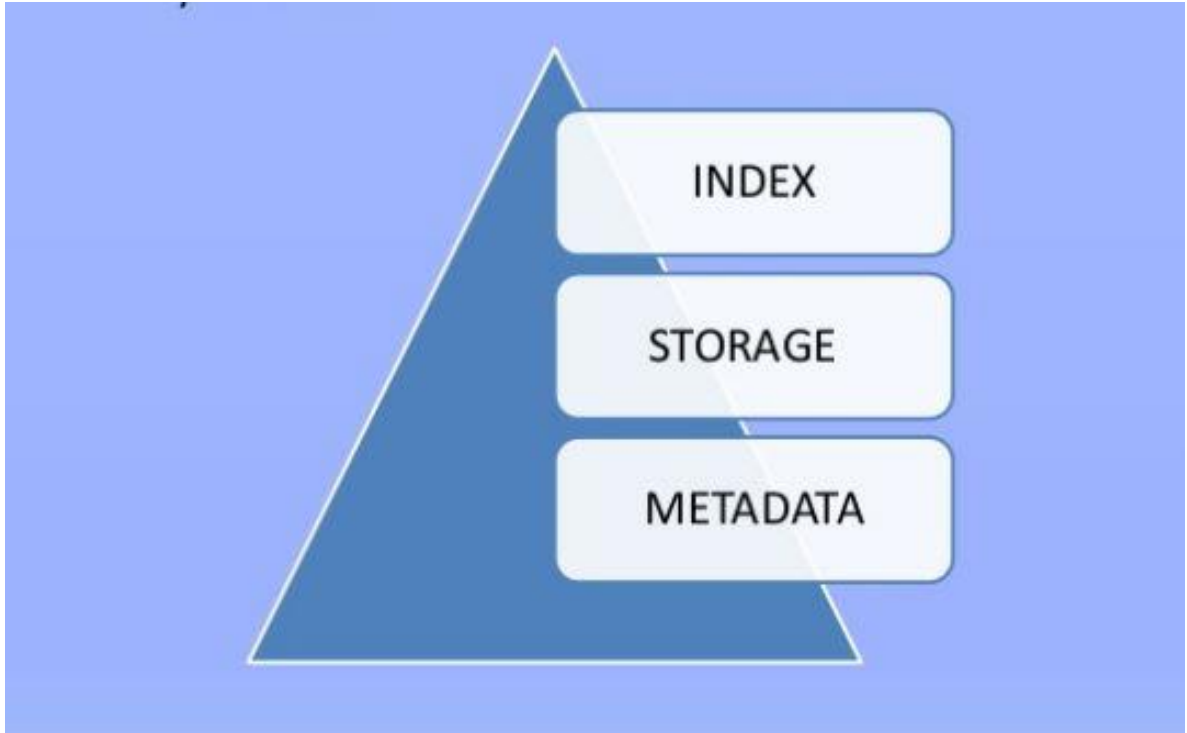


Figure 4 Hierarchy of components for DMS in banking (Velte, 2010)

Author's vision of components defined above in banking industry is to include necessary components while building new process for case study and implement these components in DMS. This idea will be further developed in case study in following chapters.

3.7.Cloud solutions

Document management system is the system through which businesses sort, archive, and manage documents. There are different DMS solutions available from various suppliers that can be adapted to the needs of a small or middle business or an enterprise organization.

Allowing the enterprise to manipulate, store, audit and analyse documents to reach better productivity of employees, DMS systems applied to only be stored in main databases consisting of hardware and network infrastructure. (Velte, 2010)

Nowadays, with the progress of cloud technologies, many software vendors are leaving the hard locations of data and moving to cloud-based solutions. Available only through desktop PC, cloud-based technology means that it does not exist in an IT-based environment such as a hard database.

There are also DMS software vendors in cloud systems based on web. There is no need for users to install an additional interface and the activities can be updated in real time. Now employees, managers and executives can all access the same information in real time, which means that cloud-based DMS can now be supplied over the Internet.

Nevertheless, users that have a connection to Internet may access the cloud-based DMS applications and software, making interactions timelier and less costly. For businesses, DMS cloud solution means that they do not have to purchase expensive hardware or software, and the solutions are much less time-consuming to maintain. Retrieving support is easy, since providers of cloud-based DMS have the same access to the software from their headquarters location.

After all, the cloud is a growing trend amongst companies hoping to take advantage of the ability to host technology without having to maintain the inconvenient database, and the DMS industry is firmly coming into play in the cloud-based arena. (Velte, 2010)

3.8. Usage of DMS in Czech Republics' banking sphere

In this subchapter, it is described an example of using DMS in bank in the Czech Republic. During the research and internship, author worked with a local bank in the Czech Republic, which can be used as an example of solution in European banking sphere.

The "Local Bank" – was very good example of well-maintained solution for DMS. In this bank there are used a few software to manage documentation. For the purpose of human resource management there were used ESS (Employee Self Service) tool from SAP. For sharing documents in stage of development were used Google disk and Google docs. For solving issues with such as infrastructure, working place, IT Helpdesk Portal was used, which is supported by the bank itself.

From author's observations, company used few tools and applications for management of data, which was not the advantage when compared to software that offers single solution for document management, but it was well maintained and supported by IT department. All the tools and applications were functional and used daily by the employees. Another author's observation was that there were no uses of paper in the office. Most of the paper requests were made through the applications and DMS, which fully applies to the purpose of electronic DMS solution in the banks.

This report on document collaboration issues quantified by a Harris Interactive online survey of 1,004 employees conducted in the United States and the United Kingdom during August 2012. The survey results make it clear that organizations should provide their employees with better document collaboration systems—ones that fit the way business teams work and that accommodate simple, everyday tasks.

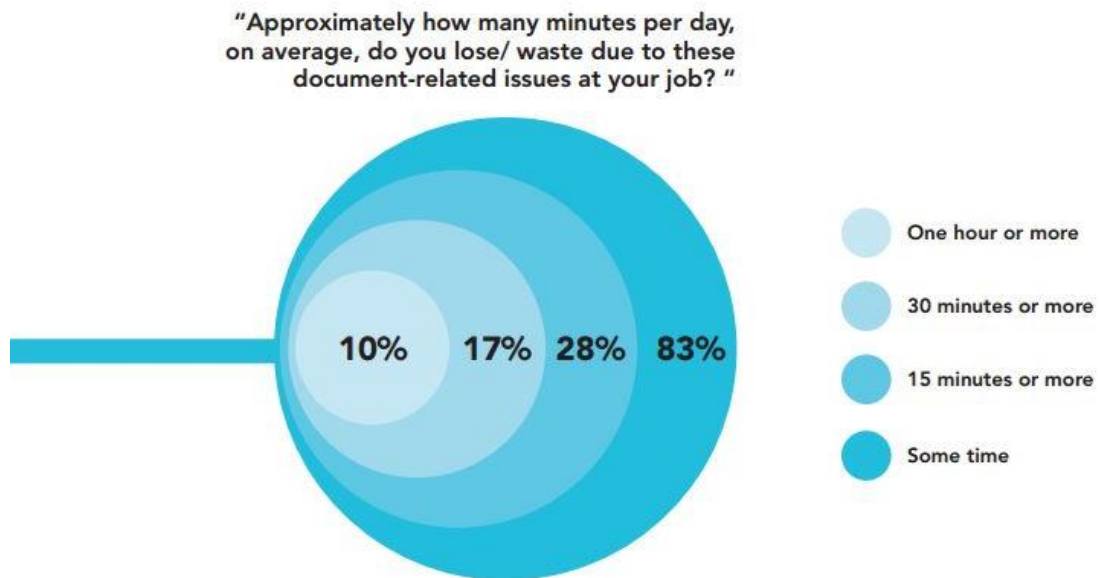


Figure 5 The result of survey (Harris Interactive, 2012)

Experience gained in this bank gave to author vision of how it should work in practice in Bank Eskhata and how DMS is implemented and used in modern European banks nowadays. Author have had personal interview with managers and employees of the bank in order to understand how important was for them to implement this solutions and how it improved their team performance. Results of this interview will be brought up in Results and Discussion chapter of this diploma thesis.

4. Analytical part

In this chapter, there is description of characteristics of the banking industry in Tajikistan and operation of Document management system in banks of Tajikistan. Primary and secondary data has been collected.

4.1. Banking sphere in Tajikistan

Banking sphere in Tajikistan is one of the sectors that have been developing for past 10 years very rapidly. According to statistics of National Bank of Tajikistan from 2009 until 2015, there were 5 new banks opened in Tajikistan. That is quite good indicator for the developing country. Economy of Tajikistan is strongly connected with situation in neighbouring countries. In 2015 - 28.8 % of GDP was made from received personal remittances. This statistics can show us how much banking sphere is used in the country. In the end of 2015, there were 123 credit organizations registered by National bank in Tajikistan, from which 106 were micro financial organizations, which offered micro loans and money transfer services. (2016)

Another aspect of growth in banking sphere was a support of small and medium size entrepreneurs by government, which gave people opportunity to use loans for developing their business.

With the rise of banking industry, it also raises banking operations, transfers, and manipulations of resources in the bank. All operations are processed mainly manually which requires very responsible approach from workers in order to keep documents and records clear and ordered.

Another important element is growth of each bank or micro financial organization internally. Newly opened branches and banking service centres contribute to growth of communication and document flow within the company.

Banking sphere can be considered as one of the most paper using offices, which brings up ecological and economic problems. In the 5th biggest bank in Tajikistan nearly 127 100 USD is spent for buying papers yearly. As the country is in developing stage, manual data manipulation and documents remain unchanged. Using paper does all documentation flow, orders and operations. This kind of data manipulation can lead to

issues in company regarding archiving, documentation security, place and conditions for physical storage, searching and reusing documentation in future.

In order to be compatible with new technologies and have fast process of data and records, banks need to maintain their information electronically.

However, security and accessibility of documents are also important components for electronic documentation management. Most relevant for this solution is internal document flow of the company as it is usually the most complicated part to manipulate. As most of operational documentations are monotonous they are not hard to separate and archive compared to internal document flow. Internal document flow can be very various, have various state of importance; can concern different departments and even different branches. Therefore, implementing the documentation management should begin from internal document flow of organization.

4.2.Operation of DMS in Tajikistan's banking industry

DMS within banking industry is only in initial stage of implementation in Tajikistan. Country is still developing; therefore, new systems are adopted systematically. For banks there, DMS requires big investment; therefore, they are still not ready to fully change from paper base work to electronic one. First, as competition within the banking industry rises, banks need to follow up new technologies in order to stay competitive. Secondly, banks have realized the importance of customers.

Nowadays, prime focus is to make banks services faster, to control documentation flow better in order to be able to solve problems. Therefore, most of these banks have their internal policies of handling document flow in their main offices. They use Excel sheets to keep records of documents and scan the copy of documents in order to send it to colleagues from different branches by email.

So far, the term of DMS as a system is not used in banks in Tajikistan. Different departments look at this system differently and it is not centralized in any of the banks. During the research the author discovered following problems and questions:

- Each branch has its internal policy for dealing with document flow;
- Some banks have Intranet, but it is not widely used (which brings to the idea, if DMS would be efficient or not?)

- Internet connectivity or electricity could be limited or cut off in the country (How would the access to the electronic document work?)
- How to make managers to check the DMS system for new enquires? Will it not be even longer process than personal signing of document?

For that reason, one of the main reasons for the current research is to investigate these problems and find the optimal solution for the banks regarding using DMS modules and components.

4.3. Case study – DMS in Bank Eskhata

This chapter describes subject of the study and defines main problems of a case study. As the case study for the thesis was chosen OJSC “Bank Eskhata”. All data was collected by the author from the bank during 3 weeks of internship and research. As a result of the case study author designed new process of Documentation management system in order to solve limitation of the existing process.

4.3.1. General description of OJSC Bank Eskhata

OJSC “Bank Eskhata” (the Bank) is an Open Joint Stock Company, which was founded as a legal corporation in the Republic of Tajikistan in 1993. The Bank was reorganized as “Bank Eskhata”, joint commercial company, by the act of the founders on May 28, 1999. The Bank was re-registered as OJSC “Bank Eskhata” in September, 12, 2002. The Bank is regulated by the legislation of RT and conducts its business under the License №16, issued by the National Bank of Tajikistan (the “NBT”) in November 29, 1994.

Today Bank Eskhata is one of the biggest participants in the banking sphere of Tajikistan, carrying out all major banking operations. Network of the Bank Eskhata form 22 branch offices, 255 banking centres and more than 137 money transfer points all over the country. Since its foundation, OJSC "Bank Eskhata" shows position of perspective progressing bank for small and medium business enterprises, and for individuals, too. Bank Eskhata offers to its customers a wide range of services accepted in the international financial practice.

The list of the services offered by bank are:

- Different types of loans;
- Different types of saving products;
- Products for corporate clients;
- Products for privates;
- Money transfer;
- Deposit boxes;
- Credit cards, etc.;

4.3.2.Organization structure

In order to have effective management, bank departments should be divided into: internal and external. That will create essential elements of organizational structure of the bank. This division will ensure proper functionality and development of the bank. The bank can work better as a whole when it consists of executive departments and teams included in internal divisions. External divisions include banking branches, additional offices, operations offices and representative offices.

As a pilot version the implementation of DMS will begin at headquarter of the bank. At headquarter there are six departments, which are shown in Figure 4. Functionality of these departments tightly depends on each other and they often communicate decision making processes. Each department has its own documentation management system and person responsible for managing incoming and outgoing documents.

Most of the time it is employee, who combines his/her main responsibilities with managing departments' documentation. There is also team, which is responsible for document management and document flow of upper level of management board, which reports directly to supervisory board. On the score of big data flow, this team is only responsible for a highly important documentation management, but documentation of lower importance is left as a responsibility of each department.



Figure 6 Organizational structure of OJSC “Bank Eskhata” (Source: Bank Eskhata)

4.3.3.SWOT analysis

SWOT stands for strengths, weaknesses, opportunities, and threats and is a tool for analysing an organization and its environment. As the first stage of planning it helps company to focus on key issues. Strengths and weaknesses are internal factors. Opportunities and threats are external factors.

As strength of the Bank Eskhata were defined following:

For past five years the bank was implementing Quality Management System in the money transfer system. Therefore, the bank started documenting all the processes connected with the money transfer service. Nowadays, the bank is in a right direction on implementing DMS.

As weaknesses of the bank were defined:

In the bank, documentation are maintained manually which brings to slow decision-making process. As a third country technology developments are usually slower. Therefore, new systems like DMS or CRM are not implemented yet.

Internal services of the bank like HR, financial calculations are done manually without usage of any software. This solution brings to un-satisfaction of internal customers.

The opportunities of the bank could be development of decision- making processes. Innovations in management based on new solutions and quality management systems.

Threats of the company can be new legislation about document management that could change usage of DMS. Collapse of the system could be a big threat and potential information loss. The other threats could be security. As banks keep sensitive information and documents, security of DMS is very important aspect.

In order to have better overview of the described strengths, weaknesses, opportunities and threats they are brought in the matrix view and clearly points out to important facts of each matrix block.

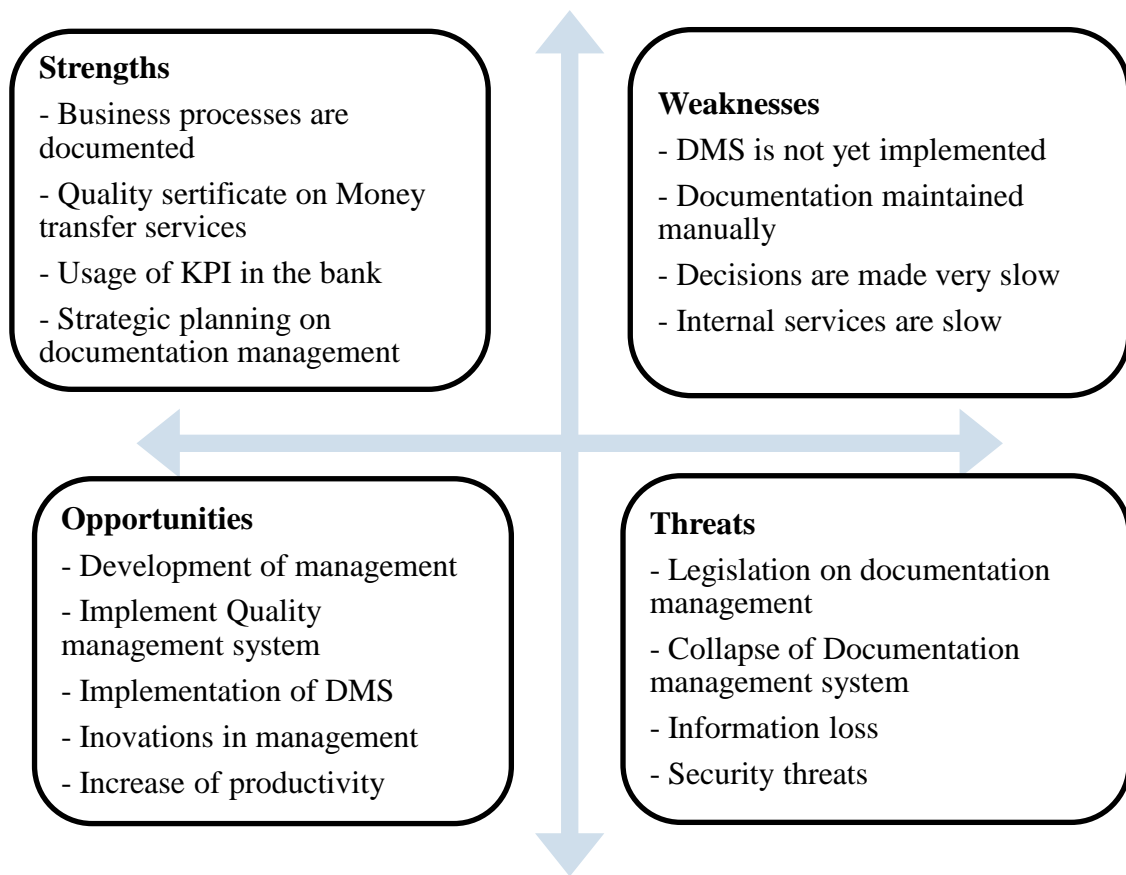


Figure 7 SWOT analysis of OJSC Bank Eskhata (Source: Author)

4.3.4.Strategy map of the bank

During conducting research, author got familiar with the bank's strategy and aims, which are shown, in Figure 8. Author found "Internal prospective" strategic point that was connected tightly to this project. Especially development of HR management and optimizing administrative processes would include aim of this work, which is the design of processes for implementation of DMS in the Bank. Bank has focused on five main

strategies, which are tightly dependent on each other. Factors, which help to achieve one strategy is a step for achieving next strategy.

Implementation of Quality Management System (QMS) is a strategy, which will help to the bank to be standardized. International standards help the bank to be recognized out of the Tajikistan. In order to achieve this strategy bank should be innovative, offer high quality services and develop its management. Implementation of DMS in the bank can be one step in order to achieve this strategy. As it is described in chapter 3. Literature review of this thesis, records and documentation management is one of the important components of QMS.

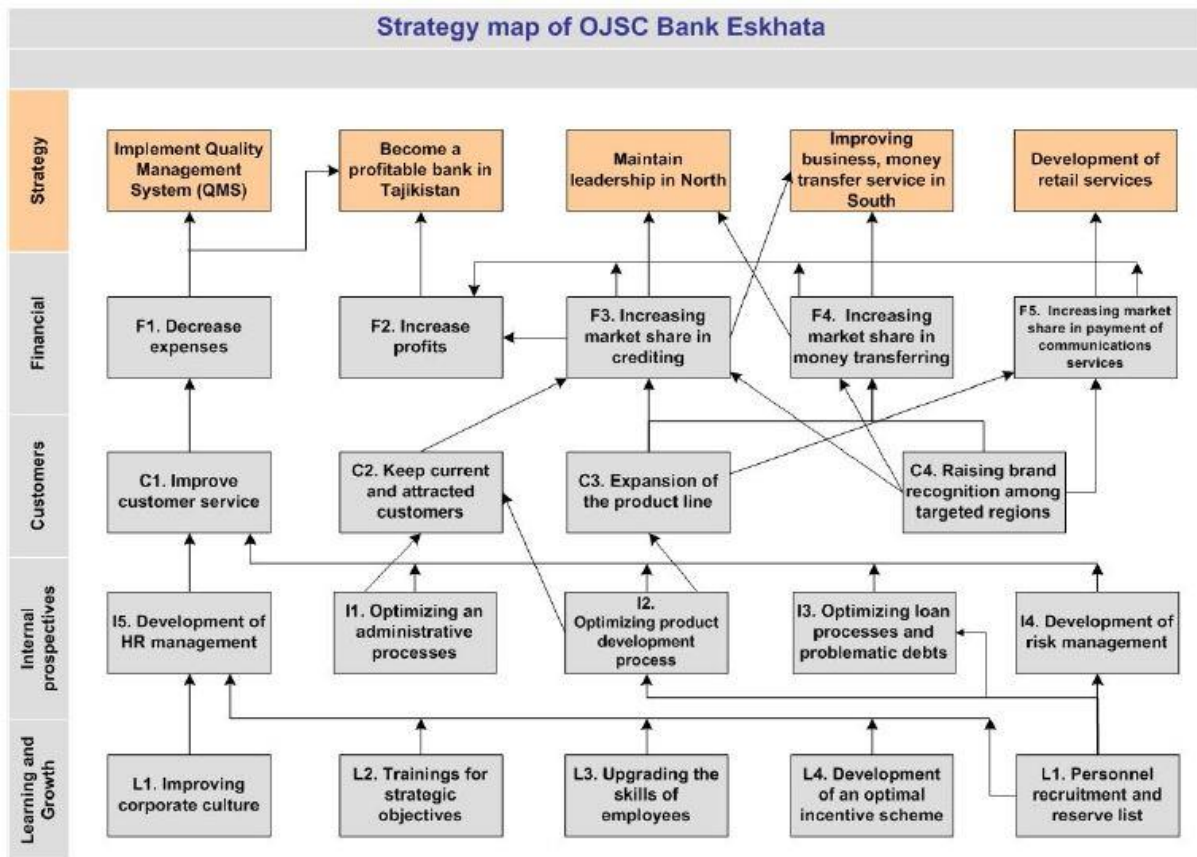


Figure 8 Strategy map of the Bank (OJSC “Bank Eskhata”)

4.3.5. Current system limitations

In order to analyse current situation author visited company and held a research in form of speaking to managers of departments, document management specialists and employee, who handle document workflow on daily basis. During the research, current process of document management and process of dealing with document workflow were

defined. According to the results of interviews author gathered a process description, which is shown in Figure 8. Following workflow describes general picture of document flow. Further, process of request for vacation is described as a single process. Workflow of the process drawn based on general workflow.

First employee who initiates document creates a request/document in paper format. As a second step, he passes his document/request to his manager for approval. If the manager agrees with the content and does not have anything to add, he approves it. In a third step, if needed manager reconsolidates document with top manager. If top manager does not have any addition or correction, he approves it. When the document is signed by both managers it can be registered in book of outgoing documents and send (either personally or by email, if the location is different) to the department/s who maintains the current problem/request. After receiving it, concerned department should also register it in the book of incoming documents and define executor of the task. This way the document is passed to the performer and after completion of the task added to the archive book. If it is requested, executor creates report on the result of request, registers it in the book of outgoing documents and sends it to the initiator of document. A simple task that could be done in a computer by few clicks takes in average 30-60 min of working time per employee.

Description	Measurement
Amount of documents/requests received per day	10 documents/requests
Amount of time spent to process one document	45 min
Amount of time spent per day on documentation management	7,5 hours

Table 5 Time measurement on document management (Source: Author)

While researching in the company, author measured how many documents are received this way per day/per department. During 14 days of research, each department was in average receiving/sending around 10 documents/requests per day, which means in average eight working hours per day.

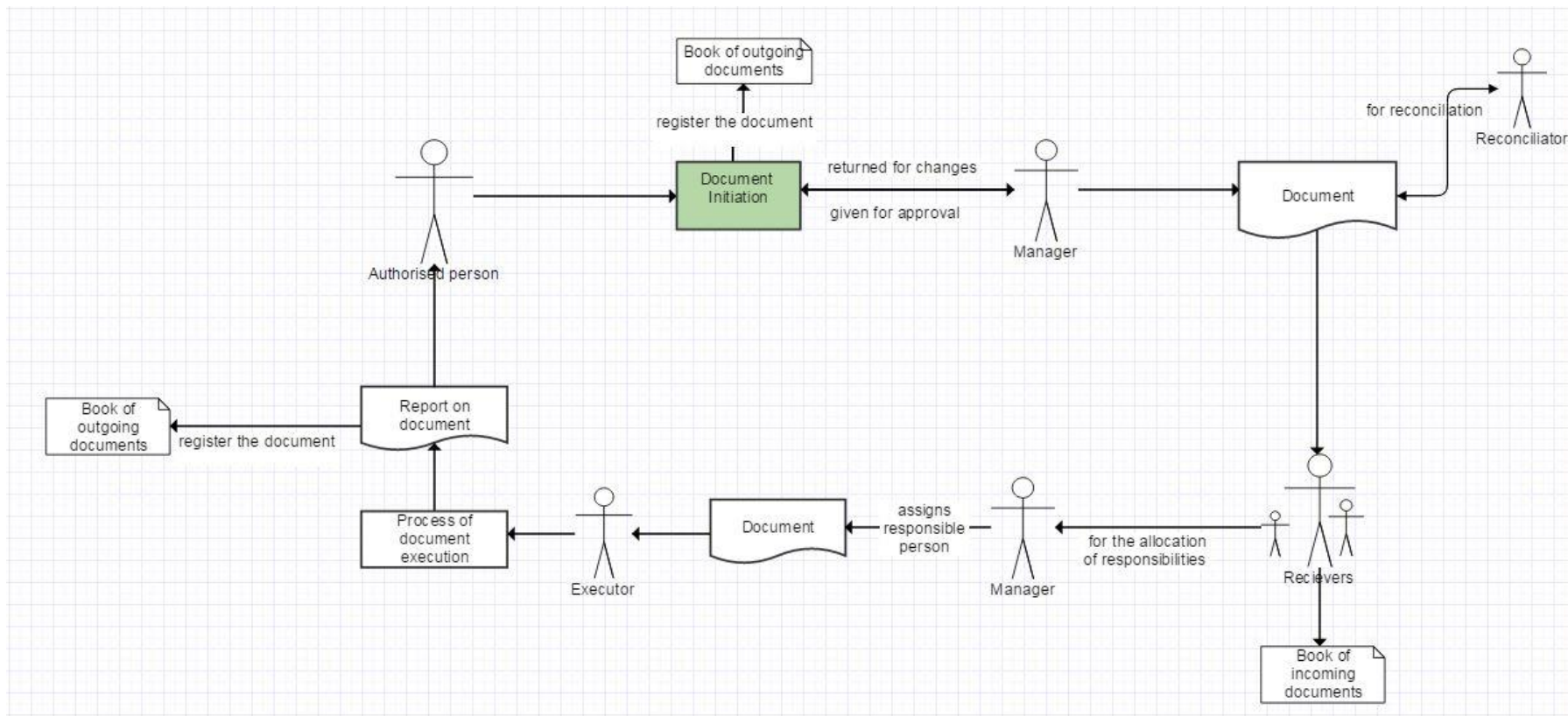


Figure 9 Current process of document management in the Bank (Author)

This measurement shows that each department should hire one or two persons (depending on size of department) for taking care of document management within the department. Currently, this work is divided between the employees in disorganized way. Whoever is in the office manages the documents.

Problems regarding indexing, activation, storing and auditing of documents were also discussed during the research. So far indexing is done in the incoming/outgoing books which have each department. However, usual problems occur when someone needs a document, which was created few years ago. If the person who is requesting document does not know exact information, he needs to go through all pages of the book.

The figure below describes process of requesting a vacation. This process includes three different departments. Everything is carried out by using paper and besides physical presence of the employees is needed. Even though it is simpler process compared to other processes it is time consuming and takes effort of several employees at once. Another important fact is risk of losing paper document. During four-step approval process, chance of losing document gets higher.

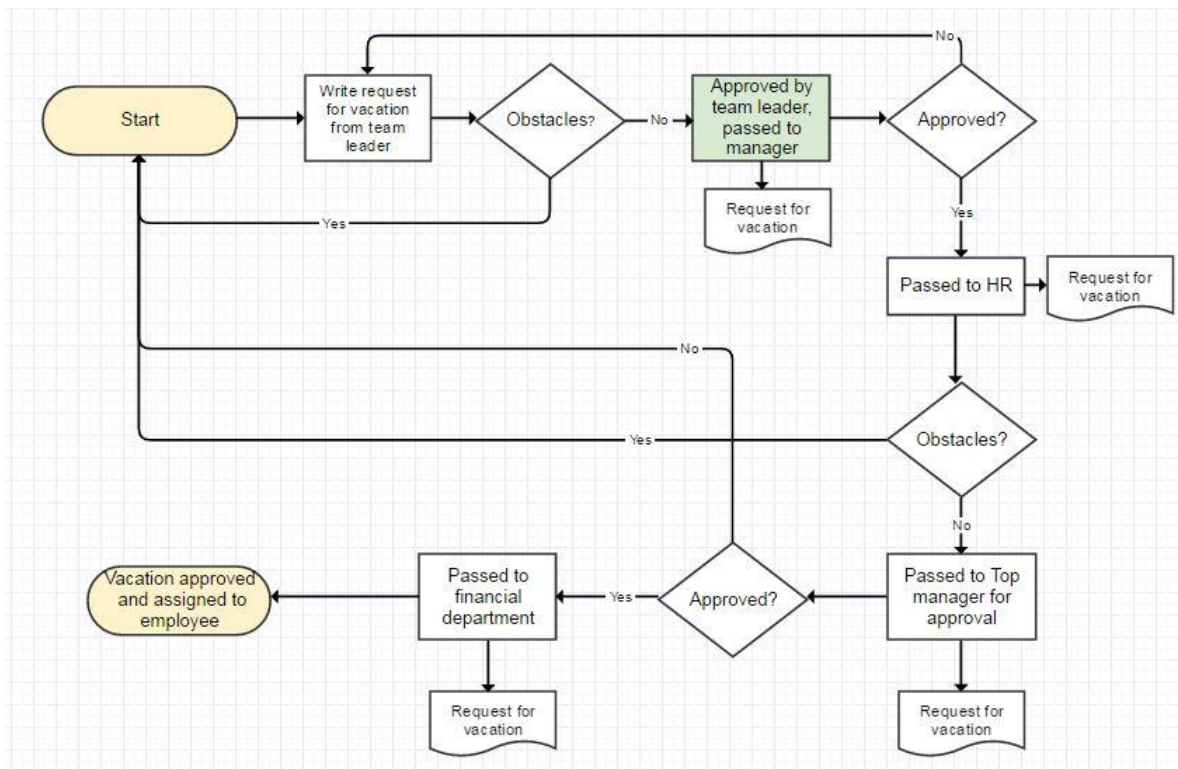


Figure 10 Process of requesting for vacation (Source: Bank Eshkata)

Another issue presented by the Bank was presence of managers in their working place. Without physical presence of managers, it is not possible to solve the request. In cases, when employee needs to have urgent vacation, this process simply does not work properly.

Author's conclusion about current state of the bank and research:

Amount of employees and branches increase every year in described bank. There is going to be even more document flow inside of the company and DMS should be implemented as soon as possible, in order to go through the implementation process smoothly. The need of the bank regarding DMS was defined already after interviews with managers. After conducting measurements and gathering data from employees author's opinion on the need of implementation of DMS in the bank became even stronger.

Steps of implementation as well as strategy of the Bank and newly proposed process will be identified in the following chapters.

4.3.6.Design of new process for the Bank Eskhata

Taking into consideration all the information, research, interviews and case study analysis, a new process was designed. The aim of the new process is to implement DMS. Described process contains all necessary steps to improve quality of documentation flow and documentation management in the company. The process is in generic form and any document flow process can be applied according to this process.

According to new designed process (Figure 10) Authorized person will create new document/request in the DMS system. Document will be created according to templates, so all necessary fields should be filled. After successful creation, document will be initiated and employee will receive a report about creating new document in the system. System will automatically give index number to document and identify type of document. This will give easy access to the search of document in the future.

Afterwards, document will appear in the system of manager (team leader, junior manager). Manager will get email notification about new document in the system. In case document is no relevant or needs to be corrected, manager has option of returning of document with his comments. Manager also has other options like changing status and type, rejecting and getting report on this particular document.

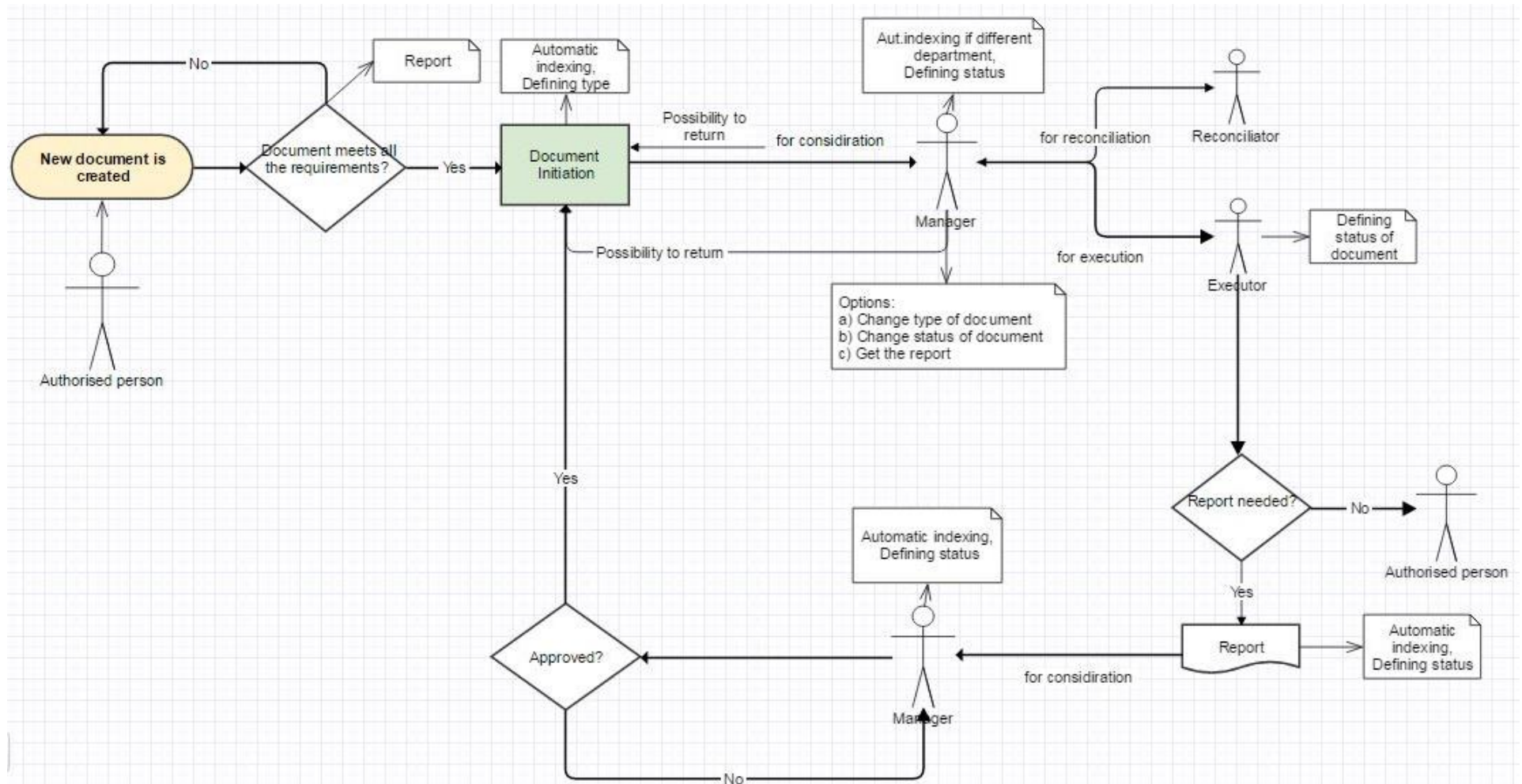


Figure 11 New designed process for the Bank Eshkata (Source: Author)

After approval of document by the Manager, if needed so document can be sent to Reconciliatory. If there is no need for reconciliation, document is sent to Executor. Executor defines the status of the document and has two options. He either sends the solution to the Initiator or if needed, creates a report. Report is also created automatically and saved under the index. Report is sent to the Manager for approval. If report is approved, it is sent to the Initiator. Each user of the system has an opportunity to create report, search for the document and change the status according to their responsibility.

In Figure 11, described example of requesting for vacation, according to the new designed process. This process is described in the subchapter **5.5. Current system limitations**. In order to make this process automatized and fast DMS can be used. All the steps in the process that were described in previous subchapter are done electronically and do not include physical involvement of the employee.

In order to request for the vacation, employee needs to create electronic request. As the result employee and team leader receives email notification, that request was created. Team leader can approve or reject the request. Afterwards, request is sent to the system of the manager. He has the same functions available as team leader.

Each step of the request's change is recorded and status update sent to the employee, who requested the vacation. After approval of the managers, request is automatically sent to the HR department. If there are no obstacles on obtaining vacation for the employee, HR department approves the request. Request automatically sent to the further process to the financial department.

Most important part of the systems functionality is emailing status of the request to the initiator and indexing. Status update will give the initiator to track the request changes and indexing will keep all the requests in the order for further reporting and auditing. Another important function is to have automated movement of the document. After each approval document will be sent to the next stage of the process.

Process of the electronic request submission for a vacation is real example of effectivity of DMS. This example shows how DMS shortens the process and saves time for three separate departments. This solution also gives opportunity to solve these management tasks distantly from home office or while being on business trip. Overall, division of one simple process shows us the successful result of DMS in banking sphere.

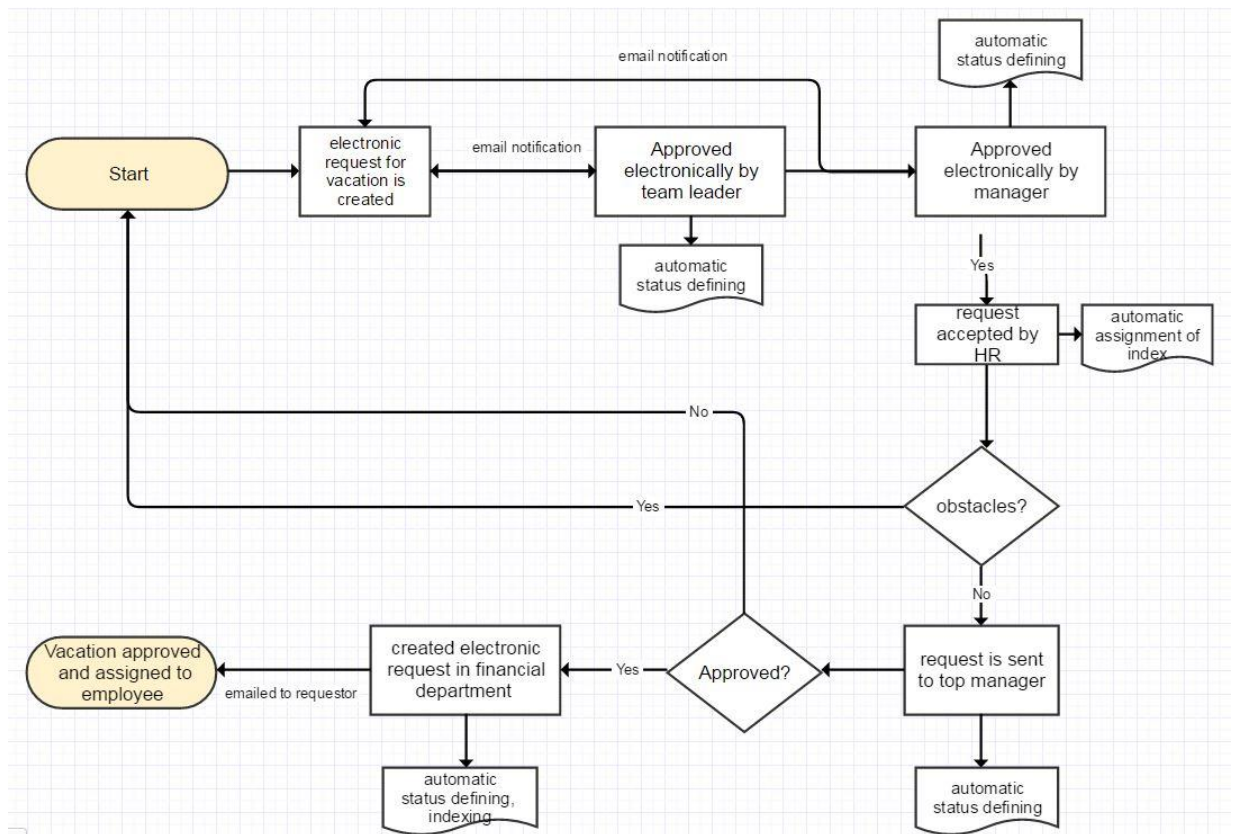


Figure 12 Process of electronic request for vacation (Source: Author)

4.3.7. Major software vendors for DMS for banking industry

In order to implement DMS bank should choose software, which would fulfil all the requirements of the company. Author has chosen four software vendors, which could be potential company who would provide the bank with DMS software.



Treeno Software is privately owned company located in United States and founded in 2002. Main software products are Document management, Workflow automation and Application integration. Document management is based on cloud and software is licensed as SaaS (Software as a service). Benefits from DMS SaaS of Treeno software are (Treeno Software, 2016):

- A full-featured Enterprise Document Management system
- Low cost of entry
- Zero infrastructure

- Reduced overhead
- Cost-effective scalability
- Increased productivity
- Maximum security

Software meets the requirements of designed process and does not require any infrastructure, which will be cost saving for the company.



According to web sources (SAP, 2016) SAP was founded in 1972 and known as world's largest provider of business software. In banking sphere, SAP offers quite a big range of software including SAP ESS (Employee Self Service) and SAP Media. These two components of banking software can provide partial electronic document management for HR (human resources) and employees. SAP Media helps to keep hierarchy of business documents in business objects. This tools can be very good addition if company is already using SAP software. If company didn't implement any of SAP software so far, having this tools will not help to manage documentation fully and can bring to even bigger problems on keeping track of documentation.



“ЭОС” is Russian based software developing company, which was established in 1994. Main products of the company are Document management system, mobile applications and implementation of EOS Share Point from Microsoft in Russia. Regarding DMS company has his own software product “DELO”, which is implemented in more than 1000 companies in Russian and Commonwealth of Independent States around. Company offers DMS solution in cloud base as well as in local servers. Cloud solution will cost for company less expensive and approximate price for user will cost 120 EUR.



Elar Saperion Documentation management system designed by Saperion company, which is well known software in Russia. Company offers single system for receiving, storing, archiving documentation, with easy migration of

documents from other system to Saperion. Company promises easy IT architecture and policy of archiving documentation. From experience of company, software can handle storage of 1 million files at a time. Price for software could be estimated after agreement on all requirements of the company.

4.3.7.1. Comparison of DMS systems

In order to make decision on which software vendor the bank should choose, detailed characteristics of the software are listed below. Characteristics are compared according to general description, documentation management, technical implementation and costs.

The table below is divided into two parts. First one includes first two characteristics and next table the rest of the characteristics.

Name	TreenoSoftware	SAP	EOS	Saperion
General Description				
Vendor	Treeno	SAP	EOC	Lexmark
Year of first version	2002	2004	1994	1998
Possibility to rent a system	Yes	Yes	Yes	Yes
Documentation management				
Storage	Yes	Yes	Yes	Yes
Indexing	Yes	No	Yes	Yes
Auditing	Yes	Yes	No	No
Notification capability	No	Yes	Yes	No
Template generator	Yes	Yes	Yes	Yes
Template designer	Yes	Yes	No	No
Contact list	Yes	Yes	Yes	Yes

Table 6 Comparison of the DM systems (Source: Author)

Name	TreenoSoftware	SAP	EOS	Saperion
Technical implementation				
Server Software			Windows Server 2008 / 2012	Windows Server 2000/2003
Database platform	Cloud	MySQL Server	Oracle	Windows Server
Mobile access	Yes	No	Yes	Yes
Costs				
The license price (per work station)	>1000 EUR	>1000 EUR	200 - 500 EUR	500-1000 EUR
The license price (server)	Not required	>1000 EUR	>1000 EUR	>1000EUR
Support costs (12 month)	10-25%	10-25%	10-25%	10-25%

Table 7 Comparison of the DM systems continuation (Source: Author)

Author's conclusion:

After comparison of all four vendors, author concluded that Treeno software offers very well described software, which fulfils requirements of the company, but price for product is expensive for the bank.

SAP tools are also good alternative, but they are not single solution and in order to get full benefit from these tools, bank should use also other products of SAP.

Therefore, SAP ESS cannot be the best solution. EOS and Saperion are companies that are geographically closest to the Tajikistan, which makes the price of their products cheaper. Both companies offer software with big set of functionalities. In author's opinion, these two software vendors are the best options for the Bank Eshkata.

4.4.Economic effectiveness of implementing DMS

DMS is a strategic process that improves internal management and helps to organize decision-making process better. Three elements of successful DMS implementation are:

- People – employees, from top-management to ordinary employee should have access to DMS in order to use all the functionalities of the system
- Processes – company, needs to reengineer internal processes in order to make it easy, fast and comfortable to use DMS
- Technology – company should choose right technology in order to implement described processes and make it user friendly.

In order to reach full return on investment all three elements should be covered. If any of the core elements will fail, the entire system can be useless and no improvement will be noticed.

Therefore, performance is measured before the system is implemented. Then performance results can be subsequently compared with post-implementation performance test, which will show the effectiveness of the implementation and objectives that were achieved.

Table 8 provides examples of Key Performance Indicator (KPI) which is a measurable value that demonstrates how effectively company is achieving business objectives.

KPIs used for DMS	
Percentage metrics	Time metrics
Percentage of processed documents	Average time to process incoming document
Percentage of email traffic reduction	Average time to respond to queries
Percentage of solved request	Average time for request status change

Table 8 Example of DMS metrics (Source: Author)

Following indicators were defined by the author as a result of KPI literature reviews and investigation from the bank. They are used to identify measurements in percentage and time. (Parmenter, 2010)

KPI can help to calculate effectiveness of employees before and after implementation of the system. Therefore, it is important for the top management to include these measurements into their calculation of effectiveness.

It should be mentioned that the calculation of the implementation of DMS is very complex process. Expenses for implementation of the system usually include: software licenses cost, hardware cost, implementation cost, training cost. All of this can be expressed in monetary terms. These expenses could be considered as investment of the company to information technology, which would be paid off in the future by minimizing administrative costs.

The biggest challenge lies in counting economical effectiveness of the system. For example, after submission of implementation, the results and decision-making speed have increased by 15%. How to identify whether it was result of DMS implementation or some other factors?

In evaluation of effectiveness for each company should be considered its strategic objectives, critical success factors and KPI's. These factors will make it possible to predict changes in performance due to the implementation of the new system. (Parmenter, 2010)

In spite of that, it is assumed that the effect from implementation of DMS in Bank Eshkhat will be reasonable and high. It is expected that percentage of solved requests will increase, email traffic will be reduced and average time for managers to make a decision will be decreased.

Following categories of effects from the implementation were defined:

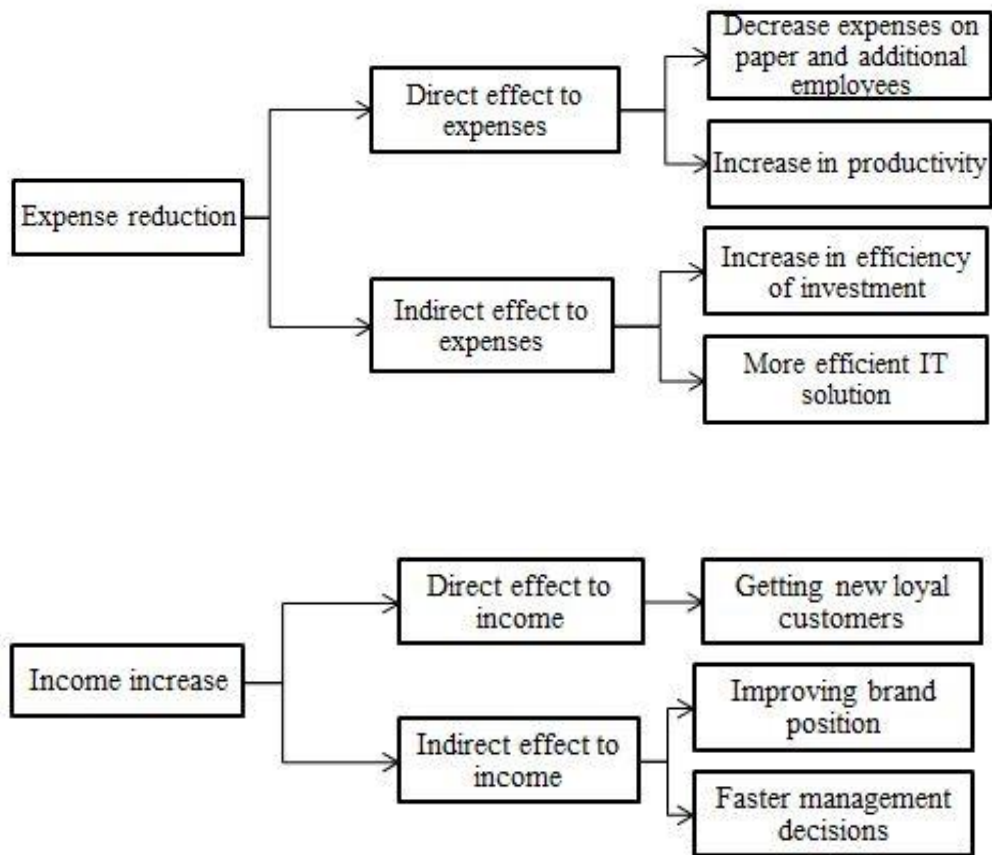


Figure 13 Main categories of effects of DMS (McDavid, 2013)

This categorization was made intuitively and shows resulting effects only. However, it does not take into consideration risk reduction.

The economic effects can be divided into three categories:

- Direct economic effects;
- Indirect economic effects;
- The effects of risk reduction;

4.4.1. The direct economic effects

In order to show more clearly direct economic effect, the table below shows the situation before the implementation, changes that implementation would bring and short/long-term effects from those changes. Effects divided to income increase and cost reduction.

Current system limitation before implementation	Changes	Short-term effects after implementation	Long-term effects after implementation
<i>The category of effects to income increase</i>			
Documentation management is done by usage of paper books for registration, to search for document takes long time	Electronic search	Time consumption on documentation search will give employees more time to focus on their main tasks	Increase profit of company by focusing more on customers and solving their problems faster
Archiving of internal requests are done only for one year	Electronic archiving	Fast access to all requests and documents will make time of employees more productive	Analysis of older requests and documentation will give clear understanding of improvement of the management.
Internal documents are brought to departments physically, which is time consuming and takes long time for solution of the request.	Electronic requests	Improving information support and customer service	Improving customer satisfaction and increasing employee productivity
There is no track of status for requests and versioning of documents.	Creating electronic list all documents in the company	Easy access to up to date documents	Decreasing of errors of using wrong documentation
There are no tools for managing requests and documents in electronic way.	Automatization of documentation management	Increase of employee productivity. Increase of customer service and time management	Easy access to information, fast track of status of documents. More time spent on solving important problems
There is no security of internal documentation maintained	Authorized access to the documentation	Increase of safety and privacy	Increase of trust of customers to the bank

Table 9 Direct economic effects on income increase (Source: Author)

<i>The category of effects to reduce costs</i>			
All the internal and external requests are done manually and printed on the paper.	Transfer all documents and requests to electronic form	Usage of papers and ink will decrease	Cost reduction of administrative expenses
Each department has responsible person for managing incoming and outgoing requests and documents.	Relevant electronic access to each employee	No need to hire administrator for document management	Saving in additional employees

Table 10 Direct economic effect on cost reduction (Source: Author)

4.4.2. Indirect economic effects

This category includes wide range of effects on company, which are more difficult to calculate and identify. For example, growth of share prices on the stock exchange as a result of improvement of manageability; decision making solutions, which is important for attracting the interest of new shareholders. These kinds of possible effects are shown in the figure below.

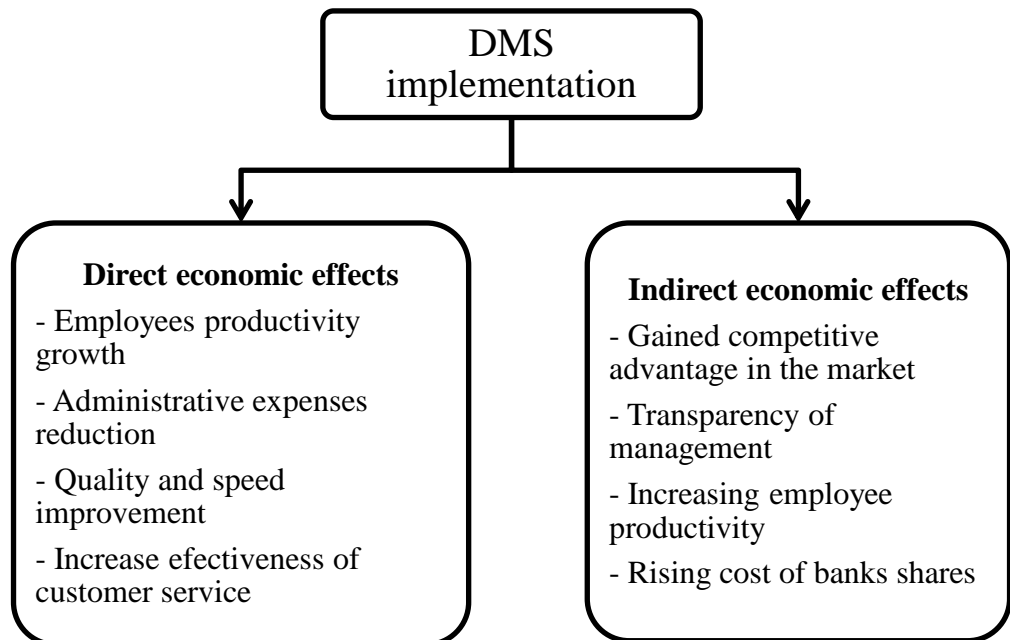


Figure 14 Indirect economic effects (Source: Author)

4.4.3.Risk reduction

The table below shows changes of the implementation that reduces some risks in the company. The table shows which risks can occur without implementation of the document management system.

Changes	Risks, the occurrence of which is decreased
Electronic search	The risk of missing a last version of a document
Electronic archiving	The risk of losing important documents
Electronic requests	Risk of loss a request or not solving it
Automatization of documentation management	Risk of loss of productivity, process efficiency
Authorized access to the documentation	Risk of non-authorized access to specific documents

Table 11 Main risks reduced by the implementation of DMS (Source: Author)

4.4.4.Profit gained by bank with implementation of DMS

In order to calculate profit gained by the implementation of DMS goals and objectives of the bank were identified. Following calculations were made according to the literature review, performance measurement, monitoring and improvement (McDavid, 2013).

Rank	Objectives	Weight
1	Increasing profit	0,3
2	Increase employee productivity	0,2
3	Increase speed of management decision	0,18
4	Reduce expenses	0,17
5	Reduce time spent on documentation management	0,15

Table 12 Defined indicators weight (Source: Bank Eshkata)

The weight of each objective was given by the manager of marketing department in Bank Eskhata during interview with author.

In table 13, there are calculations which are given for the period from September 2016 to September 2017. Data for the year 2016 is provided by the bank and year 2017 is calculated according to banks parameters in previous 5 years. The author and manager of the bank with the assumption of implementation of DMS in the bank have done calculation of the year 2017.

Objectives	September 2016	September 2017 (based on parameters of previous 5 years)
Increasing profit	26 238 060, TJS	32 692 332, TJS
Increase of employees' productivity	16 requests per day	32 requests per day
Increase of speed of management decision	5 working days	3 working days
Reduction of expenses	188 122 625, TJS	174 252 724, TJS
Reduction of time spent on documentation management	30 min per document	15 min per document

Table 13 expected and reporting parameters (Source: Bank Eskhata)

Increase of employees' productivity and increase on speed of management decisions in the table 13 is calculated per one employee as well as reduce time spent on documentation management. Increase profit and reduce expenses are calculated for the whole bank.

Final table includes all the data in order to calculate efficiency coefficient. Efficiency will be calculated by the bank after implementation is finished. Following calculation formula is given as an option for the bank to estimate efficiency ratio. The results of Index, September 2017 can be replaced by the real results of the bank on the time of estimation.

$$k_{eff} = (k_1 + k_2 + \dots + k_n) * 100\%;$$

Where, keff – coefficient of efficiency from DMS implementation

While calculating efficiency of DMS implementation in the Bank Eskhata, following indicators should be used: goals, weight, achieved results, expected results and efficiency ratio.

Parameter	Weight (c)	Index, September 2016 (P _b)	Index, September 2017 (P _t)	Achieved result (n)	Coeff. achieved result (l)	Efficiency ratio (k _n)
Increasing profit	0,3	26 238 060, TJS	32 692 332, TJS	n ₁	l ₁	$k_1 = \frac{n_1 * c_1 * l_1}{Pt_1}$
Increase employee productivity	0,2	16 requests per day	32 requests per day	n ₂	l ₂	$k_2 = \frac{n_2 * c_2 * l_2}{Pt_2}$
Increase speed of management decision	0,18	5 working days	3 working days	n ₃	l ₃	$k_3 = \frac{n_3 * c_3 * l_3}{Pt_3}$
Reduce expenses	0,17	188 122 625, TJS	174 252 724, TJS	n ₄	l ₄	$k_4 = \frac{Pb_4 * c_4 * l_4}{n_4}$
Reduce time spent on documentation management	0,15	30 min per document	15 min per document	n ₅	l ₅	$k_5 = \frac{Pb_5 * c_5 * l_5}{n_5}$

Table 14 Efficiency coefficient calculation (Source: Bank Eskhata)

Indicators are explained in following form:

- Weight (c) - defined by a team of experts in relation to the importance of each goal. In total, all weights must be equal to 1.
- Index at 2016 (P_b) - the result achieved by the bank in the previous reporting period;
- Expected rate 2017 (P_t) - the desired result to be achieved by the bank for the next reporting period through the use of DMS
- The results achieved 2017 (n) - real results achieved for the next reporting period;

- Rate the goal (l) - indicator determined by managers. Denotes the degree of goal achievement. $l = 1$ if the goal is reached, or the result higher than the result for the previous reporting period; $l = 0$ if the result is equal to result of last year; $l = -1$, if the result achieved less than what had been achieved in the last reporting period.
- Efficiency ratio (k_n) - measure of the degree of an achievement in numeric form, which calculated by the formula specified above. (McDavid, 2013)

4.4.5. Cost calculation of implementation

One-time costs for implementation of DMS are calculated following way:

$C = C_{eq} + C_{mat} + C_w + C_{ex}$ where, C_{eq} – costs for equipment (EUR);

C_{mat} – costs for additional materials, components (EUR);

C_w – costs for employees wages (EUR);

C_{ex} – extra costs;

Calculation of costs for equipment

The bank is already using ORACLE based servers and database. Therefore, for the purpose of this project will be added extra memory and hard disk from ORACLE components.

	<i>Name of the equipment</i>	<i>Price of the equipment</i>
1.	One 32 GB DDR4-2133 registered DIMM	1 150 EUR
2.	One 1.2 TB 10000 rpm 2.5-inch SAS-3 HDD with marlin bracket	720 EUR
	Total	1 870 EUR

Table 15 Cost for equipment (Source: Author)

Calculation of costs for materials, components

The main cost for this project is purchasing software for DMS. The bank has a necessary database infrastructure for it. For the software author recommends to choose EOS company and their software “Delo”.

	<i>Name of the components</i>	<i>Price of the component</i>	<i>Amount</i>	<i>Total price</i>
1.	ABBYY FineReader 12	299 EUR	1 license	299 EUR
2.	DELO software for DMS	128,65 EUR	100 work stations	12 865 EUR
3.	License for subsystem “DeloWeb”	186 EUR	1 license	186 EUR
4.	License for Intranet	90,09 EUR	100 work stations	9 009 EUR
	<i>Total cost</i>			22 359 EUR

Table 16 Cost for components (Source: Author)

Costs for employees wages

The bank has its IT department, which is paid monthly. Therefore, there is no need to hire extra people for implementation of new software. This part will be equal to zero.

Extra costs

The extra cost for the implementation will be counted as 10% from total cost of one time expenses.

$$C_{ex} = (C_{eq} + C_{mat} + C_w) * 0,1 = (1870 + 22359 + 0) * 0,1 = 2422,9 \text{ EUR}$$

Total cost of one time expenses are shown in the table

Expenses	C_{eq}	C_{mat}	C_w	C_{ex}	Total
Price, EUR	1870	22359	0	2422,9	26651,9

Table 17 Total cost for one time expenses (Source: Author)

Calculation of economic efficiency from implementation

Savings from implementation of DMS is calculated according following formula:

$$S=S1+S2+S3,$$

where S1, S2, S3 – savings by factors.

Factors of savings:

1. While using DMS employee will have more time to work on profitable tasks. Currently, employee spends 30 mins for processing one document. Usage of DMS will decrease this time to 50%. In average there is 2 documents per employee to manage. DMS will be accessible for 100 working places. Average salary of employees is 300 EUR/per month.

Time saved per day on documentation management= $(15*2)/60=0,5$ hours/per day

Time saved per month = $(0,5*22) = 11$ hours

Average employee wage per hour= $300/176=1,7$ EUR

$S1=((11*1,7)*12)*100=22\ 500$ EUR

For 100 employees, using DMS system, yearly company will save 22 500 EUR, which is expressed by calculating the value S1.

2.Implementing DMS company will also decrease usage of paper. From the information provided by the Bank Eskhata, 5 991, 9 EUR is spent in banks headquarter for papers yearly. Author assumes usage of paper would decrease at headquarter by 70% after implementation of DMS. Value S2 calculates savings on paper per year.

$S2= 5\ 991, 9 *0,7=4\ 194,33$ EUR;

3.By the words of managers of the Bank Eskhata, company spends early 5 538 EUR for maintenance of 30 printers. Author assumes that the implementation of DMS will decrease this amount for 50%. S3 calculates this fact.

$S3= 5538 * 0,5=2769$ EUR

Taking into account all the economic factors, total yearly saving (S) is equal to 33 657,66 EUR.

$S=22500+ 4194,33 +2769= 29\ 463, 33$ EUR/per year.

Economic effectiveness of expenses on implementation of DMS is defined by **T**,

where **T** – payback period on one-time expenses for implementation, year.

$$T = C/S = 26651,9/29463,33 = 0,904 \approx 9 \text{ months}$$

Economical indicators of the implementation are brought together in table 18.

№	Indicators	Currency	Amount
1	One-time costs for implementation	EUR	26 651,9
1.1	Costs for equipment	EUR	1 870
1.2	Cost for materials and components	EUR	22 359
1.3	Cost for employees wage	EUR	0
1.4	Extra costs	EUR	2 422,9
2	Saving from implementation	EUR	29463,33
2.1	Saving on employees time	EUR	22 500
2.2	Saving on paper	EUR	4 194,33
2.3	Saving on maintenance of printer	EUR	2 769
	Payback period of investment	Month	9

Table 18 Calculation of payback period of investment (Source: Author)

Author's conclusion on this subchapter:

Calculation of economical effectiveness of DMS implementation were made. The result of the calculation showed that the implementation of DMS will not only simplify management of documentation, but will also help to decrease costs. Investment into the implementation will be paid back in 9 months and yearly saving will make 29 463,33 EUR. In author's opinion, in order to have proper decisions according to quality documents and transparent process, this system needs to be implemented in banking sphere. For the Bank Eshkata this implementation can be big change in management process, but with no doubt it will bring its own advantages.

5.Results and discussion

In the thesis, current system limitations were identified and time measurements of the document management were proposed. As a part of the literature review, the case study regarding usage of DMS in local bank in Czech Republic was discussed. During the interview with the manager of a local Czech bank the following conclusions were made:

- for successful development of DMS in banks it is necessary to implement single software solution in order to have better cooperation between the departments;
- in order to implement DMS successfully, a well described process of documentation management should be designed ;
- it is better to implement the DMS in the main office (back office) rather than in branches;
- it is appropriate to select cloud based vendor with large storage capacity;

This use-case was a real example for/of the “Bank Eshkaha” in order to make right decision: to implement a single solution or partly automatize human resources documentation management and internal document exchange.

According to the request of the “Bank Eshkaha” vendor must not be expensive and offering reasonable solution. Author has analysed four software vendors - comparison of these vendors is shown in chapter **4.5 Major software vendors.**

Example of the document management process was designed by author as required by “Bank Eshkaha”. The proposal is expected to be implemented by the software vendor. The process of document management was designed to make reengineering of the current process smooth and in order to solve all the issues that were described by the author in the chapter **5.3. Current system limitations.**

Finally, yet importantly, implementation of the new system will effect on the decrease of expenses. Decreasing expenses will include administrative costs, costs on salary fund for additional document administrator and cost of losing documents or audit.

6. Conclusion

Nowadays information is the main resource almost in all business spheres. Therefore, it is important for banks to have relevant, fresh, up-to-date information and documentation in order to make decisions based on actual facts and figures.

In order to decrease amount of paper work and automate daily tasks as much as possible, an implementation of Document Management System is right solution. Most of the employees have a big potential to solve important problems and develop new ideas, but daily tasks and documentations/requests consume working time.

DMS is designed to solve problems related to efficiency of business processes and participants of the processes. The most important role of DMS lies in having all necessary documents in one place. Key components that DMS should have are usability, capture, indexing and retrieval, storage and archiving, distribution, security and integration. With these futures, DMS will fulfil all necessary requirements.

As part of this research, specific document management processes were studied and some DMS software vendors were analysed. In the analytical part of the thesis, DMS operations in banking sphere were described and main components of such operations were described. Following chapter was dedicated to the case study – Bank Eskhata and its current system limitations and design of new processes for implementation of DMS.

Based on primary research, author conducted interviews with bank employees in Czech Republic as well as in Bank Eskhata in Tajikistan. During the internship in Bank Eskhata author had opportunity to get familiar with organizational structure and strategy of bank, which were helpful to understand needs of bank.

Based on defined goals and objectives current process of documentation management was analysed and new process designed in order to implement DMS in Bank Eskhata. Thus, the implementation of DMS will increase effectiveness of the bank and in general will bring competitive advantage to the bank, improve decision-making processes and raise quality of provided services.

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