

# Content Management System for Enterprises

Shraddha Salve

Department of Science and Technology,

G. H. Raisoni Skill Tech University, Nagpur, Maharashtra, India

## Abstract

Enterprise Content Management (ECM) solutions are commonly used in many areas such as document management, record management, digital asset management, etc. Key features of ECM systems are capturing, indexing, preserving and retrieving of digital information. The state-of-the-art ECM solution can help revolutionize document management and further automated business processes which can lead to better decisions and competitive advantage.

Risk management can reduce project failure and that is why controlling risk in ECM implementation projects is considered to be a major contributor to project success. To manage software risk, the first step is to identify a list of ECM projects' risks. The present paper provides an overview of ECM implementation risks and contains findings from a small survey on experience of ECM implementation and risk in Czech enterprises. Risk of implementation in the public sector is discussed more deeply with case study examples.

**KEYWORDS:** Enterprise Content Management, risk.

## 1. INTRODUCTION

Organizations constantly produce various forms of content, for example text documents, spread sheets, web pages or e-mails. Furthermore, the trend towards working in virtual teams and teleworking requires easy digital access to the content to enable work and collaboration from a distance (Bentley, Yoong, 2000). Enterprise Content Management systems (ECM) offer large potential benefits for organizations to manage their contents. Grahlmann, Helms, Hillhorst, Brinkkemper and Amerongen (2012) propose a consistent and comprehensive definition of ECM. Enterprise Content Management comprises the strategies, processes, methods, systems, and technologies that are necessary for capturing, creating, managing, using, publishing, storing, preserving, and disposing content within and between organizations.

Establishing an Enterprise Content Management (ECM) environment is more than just installing ECM software. There are many aspects related to implementing an ECM solution and establishing an effective ECM environment. Almost any change, good or bad, means some risk. Software projects are high risk activities, generating variable performance outcomes (Charette, 2005). Industry surveys suggest that only about a quarter of software projects succeeded outright (Charette, 2005).

According to the literature (Simister, 2004), risk management can lead to a range of project and organizational benefits including: identification of favorable alternative courses of action, increased confidence in achieving project objectives, reduced surprises and reduced

duplication of effort (through team awareness of risk control actions).

This article presents the findings from a small survey conducted in autumn 2013. The aim was to find out the experience in ECM implementation and ECM implementation risks.

## 2. METHOD AND RESOURCES

The first step is the literature review and the necessary knowledge of the concepts. The information obtained from several surveys and studies is used as the start point of the analysis. All the sources used in this article are listed in the bibliography section at the back of the article. The literature review is focused on software project risk, risk management and Enterprise Content Management.

This paper makes two main contributions. The first one is an empirical study, a small survey in the ECM conference and the second one is the case study.

The conference Ilike SharePoint was held in September 2013 by the nonprofit organization IlikeSharePoint.cz. During the conference the author organized a survey focused on ECM system implementation and risk in Czech enterprises. Each participant of the seminar received a questionnaire and instruction how to fill it. He/she also was informed about the purpose of the survey. There were handed out 39 questionnaires and 30 were returned. The sample size is not large but participants are focused on ECM systems and the survey provides the basis for a further research.

The questionnaire has four parts and 18 questions. The first part includes organization characteristics: organization's industry, number of employees, number of IT employees and the state of the ECM system implementation. The second part is focused on the biggest drivers for ECM implementation and how types of information are managed in the organization. The third part asks about risk management, prioritization of risk during ECM implementation. The fourth part asks about risk probability and risk impact of ECM implementation. There are 46 risks. Risks are divided into 9 categories: General consideration and planning, Cloud computing analyses and Prepare for cloud, Prepare for non-cloud, Prepare content, Design and implementation, Testing, Deployment, Running and improving, Integration.

**The data analysis is performed using Microsoft.**

**Excel. Main results are presented in the form of graphs.**

After the conference there was conducted an interview with the IT manager and employees from one public sector organization "Company X" and the case study is done for the organization. The risk of implementation in the public sector is discussed more deeply with examples. ECM functionalities systems, drivers for implementation and risk of

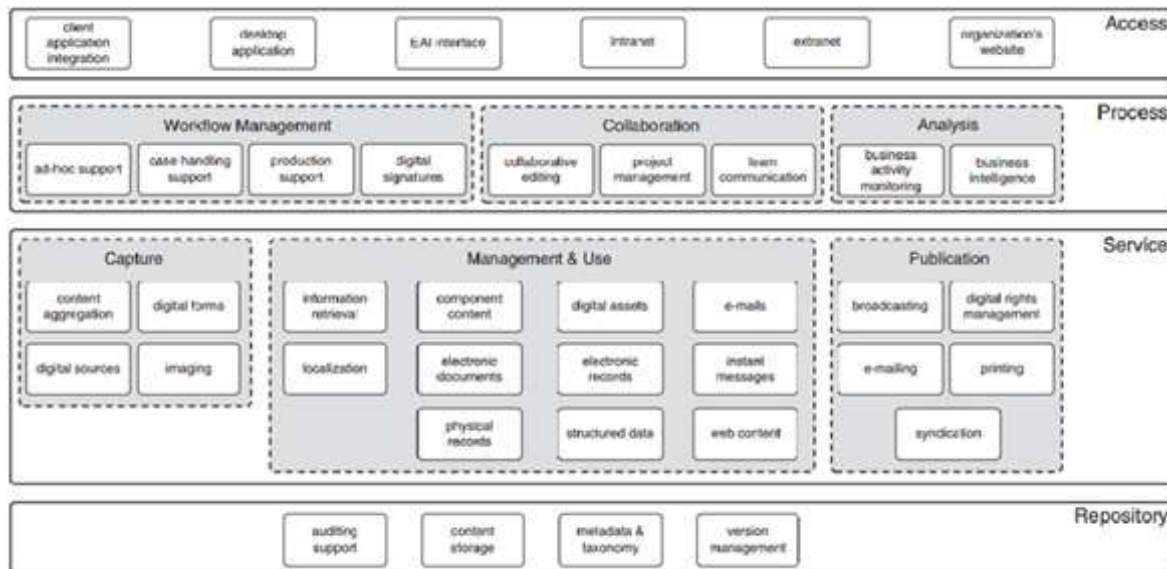
implementation are discussed. In the case study there is used Functional ECM Framework (Grahmann *et al.*, 2012) to capture the functional scopes of ECM. The framework is in the Fig. 1. There are four main categories which Grahmann *et al.* (2012) describe as follows. Access – functionalities for users and information systems to interface with the ECM system in order to retrieve content, use and invoke other functionalities. Process – functionalities related to control and coordination. Service – functionalities related to capturing, manipulating, using and publishing content. Repository – functionalities related to the storage and preservation of content.

### ECM Implementation and Risk

Since ECM is a relatively new concept within the field of information systems, little research has been conducted on

this subject. Grahmann *et al.* (2011) present the position of ECM as an information system research field and create a functional ECM framework. Grahmann, Hilhorst, Sander, Helms and Sjaak (2010) present the potential impact of ECM implementation. Kunstová (2010) conducted a survey on the barriers and benefits of the adoption of ECM systems.

Dilnutt and Bethwey (2005) observed the marketplace, examined the literature and provided the list of candidate ECM components. The components are for example Document Management, Record Management, Collaboration, Workflow and Imaging. Kunstová (2009) presents that center of the ECM is Document Management System (DMS), because DMS system provides a central repository of documents and other types of data to other components within the ECM and other enterprise applications.



1: Functional ECM Framework (Grahmann *et al.*, 2012)

There is much academic literature related to project risk management (Taylor, 2006) and many practice-based methods (e.g., CMMI and PRINCE2), and standards (e.g., PMBOK). There are also many studies about software risk. While many papers have looked at the risks associated with software implementation, ECM systems entail an additional set of risks. ECM systems manage unstructured data. The activities associated with managing unstructured data are not standardized and are not subject of transaction processing. Another problem is that ECM covers a wide range of components and thus applications and technologies. The organization can have only one application (software) to cover all components or may have many applications which need to be integrated.

Wallace, Keil and Rai (2004) defined 27 software risks which are classified into six dimensions. Keil, Cule, Lyytinen, Schmidt, (1998) tapped the experience of more than 40 software project managers from around the globe to identify a universal set of risk factors. Vohradsky (2012) is focused on Cloud risk.

Basl and Blažíček (2008) discuss lack of training. ECM system is very complex and has a lot of functionalities. Staff experience and technical proficiencies may limit the functionality of the new ECM solution and due to the complexity of ECM implementation and development stages, IT staff may not be able to do everything. After all, it is they who are responsible to keep it all running for us. IT staff need also training for example for user set-up, backup and recovery, troubleshooting and escalation procedures.

IT managers mention migration risk, there is wrong or no migrations strategy. Content migration from an unmanaged, unstructured environment should not be underestimated. Every user sorts and structures documents his or her way. All of that information has to be brought into the ECM environment under a new classification scheme using common taxonomies and employees have to change their way of working with the content.

The Agimo (2004) points out that the content audit is not conducted and content lifecycle is not monitored. It has to be carefully looked at the content process – identifying the information flow and what happens to this information along the process. Where does it come from? Who works with it? Why and how does he/she work with it?

## 3. RESULTS

### Organization Size and Profile of Respondents

The survey involved 30 respondents who represented organizations from different business sectors in the Czech Republic. The largest group of respondents was from IT sector (48.65%). Another respondent group was from the government sector.

The largest portion of the survey respondents (40%) came from large-sized organizations (250 and more employees). 26.67% respondents came from medium-sized organizations (50–249 employees). 40% respondents came from companies that have 10–25 IT employees and 40% respondents came from companies that have 1–9 IT employees.

26.67% companies have finalized the implementation of ECM across the company, 26.67% companies are in the middle of the ECM implementation in some departments and 23.33% companies are working on the integration of ECM with other systems.

**Drivers for ECM Implementation and Management of Different Types of Information**

Business drivers for ECM implementation are different. The most significant business drivers for respondents are improving collaboration and effective knowledge management (20.79%), managing chaotic content (18.81%) and optimizing business process (17.82%). See Fig. 2.

The next question asks how well types of information are managed in an organization. There are studied 18 types: scanned documents, electronic documents, records, faxes, e-mails, e-mail attachments, pictures, current web content, archive web content, audio files, video files, call records, internal blogs posts and wiki, instant messages, external blog posts and wiki, tweets, marketing materials, internal messages.

The ECM system is used for electronic documents, internal messages and marketing materials. The File share is used for pictures, video files and scanned documents. Looking in more detail at different content types, we can see that the “chaotic” type of content is e-mails, e-mail attachments and faxes.

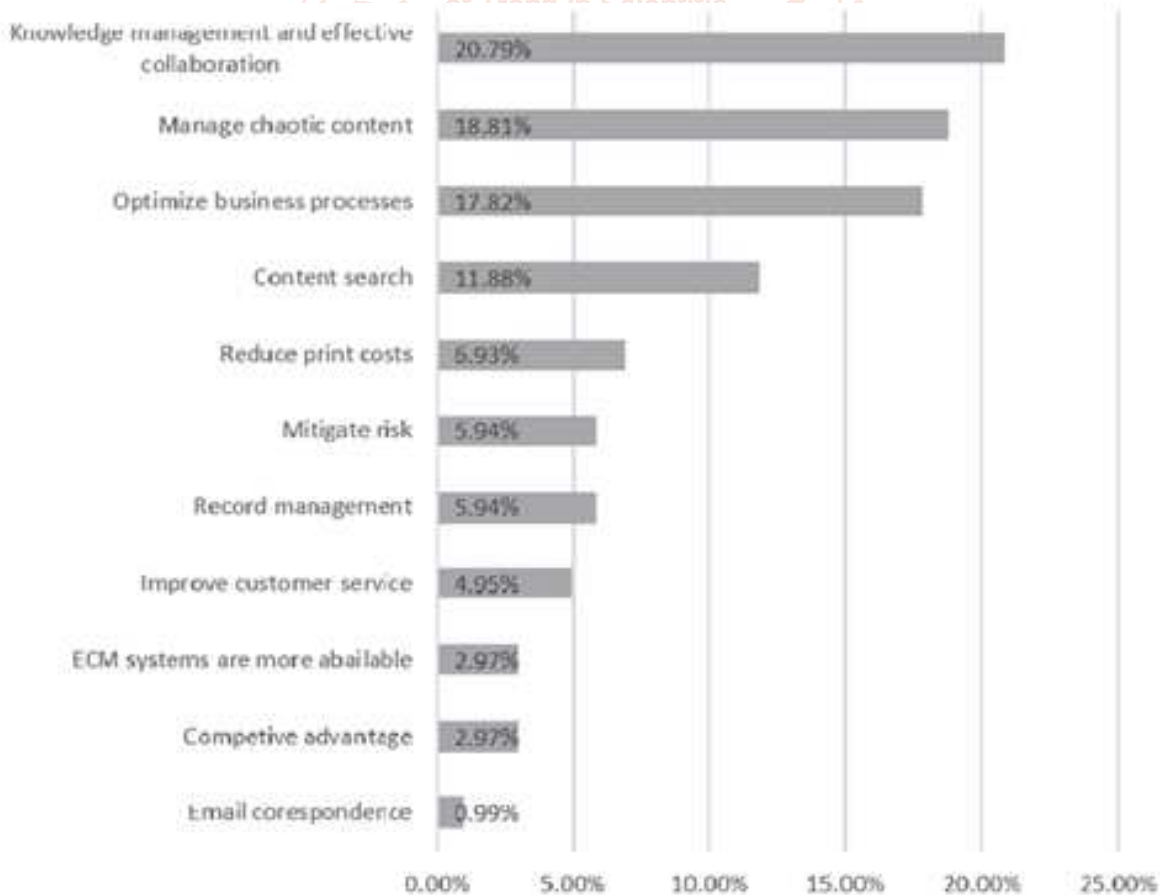
**Risk Management and ECM Implementation**

The respondents answered to what degree they identified risks in the beginning of the ECM implementation, to what degree they managed risk and to what degree they prioritized risks. Each question was rated on a five-point scale (1 – Not at all, 5 – To a High Degree). Only 4% of respondents identified risks to a high degree (Fig. 4). 4% managed risk to a high degree (Fig. 5) and 7% prioritized risks to a high degree (Fig. 6).

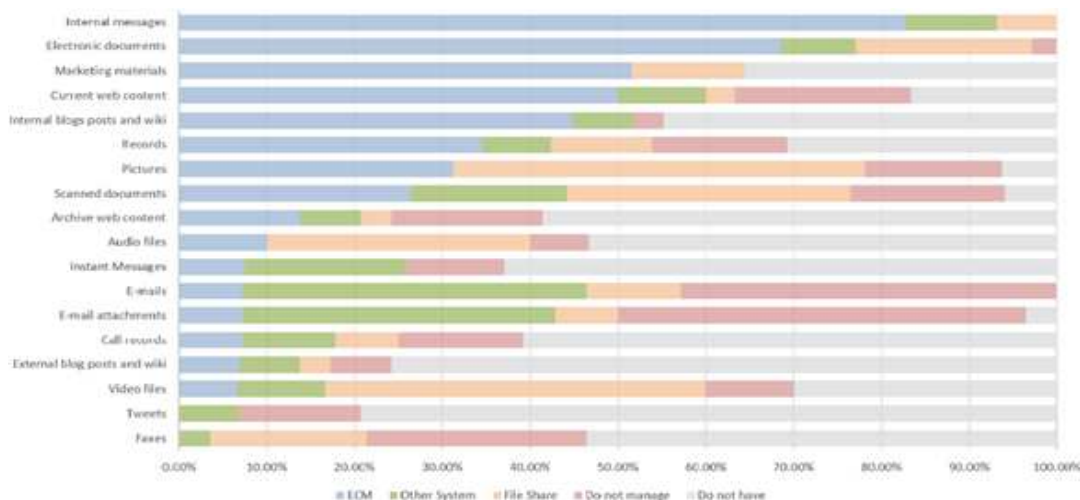
**Risk Probability and Risk Impact of ECM Implementation**

The respondents assigned probability and impact to ECM implementation risks. They assigned probability and impact to 46 risks. The risks are divided into 9 categories: General consideration and planning, Cloud computing analyses and Prepare for cloud, Prepare for non-cloud, Prepare content, Design and implementation, Testing, Deployment, Running and improving, Integration.

The respondents assigned probability of risk 1–4 (Very Unlikely, Unlikely, Likely, Very Likely). Average is 2.38. The most risky categories are General consideration, Prepare content, Cloud computing analysis and prepare of cloud.



**2: Drivers for ECM implementation**



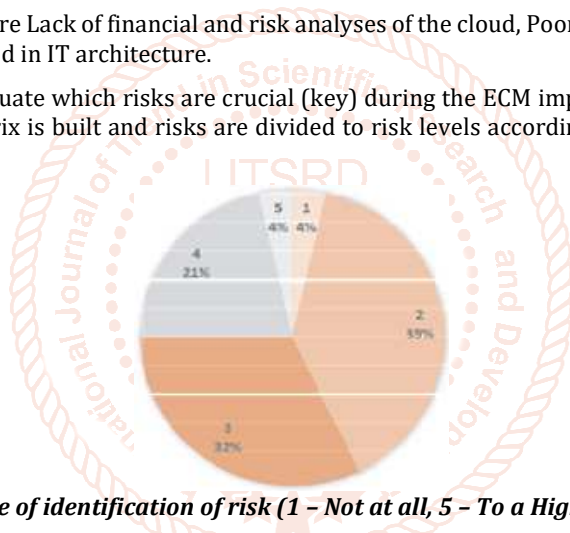
**3: How well managed there are the types of information**

Top 3 risks according probability are Development without top management, Not considering all of the cloud and outsourcing possibilities, Unclear, continually changing requirements, no priority.

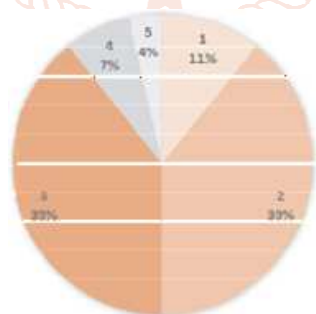
The respondents assigned the risk impact 1-5 (Negligible, Marginal, Significant, Critical, and Crisis). Average is 3.04. The most critical categories are General consideration and planning, Cloud computing analyses and prepare of cloud, Deployment.

Top 3 risks according the impact are Lack of financial and risk analyses of the cloud, Poor Backup and Disaster Plan, No ECM strategy, ECM strategy not included in IT architecture.

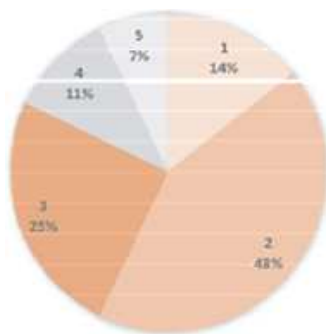
Furthermore, it is possible to evaluate which risks are crucial (key) during the ECM implementation according impact and probability. Risk assessment matrix is built and risks are divided to risk levels according average probability and average impact.



**4: Degree of identification of risk (1 - Not at all, 5 - To a High Degree)**



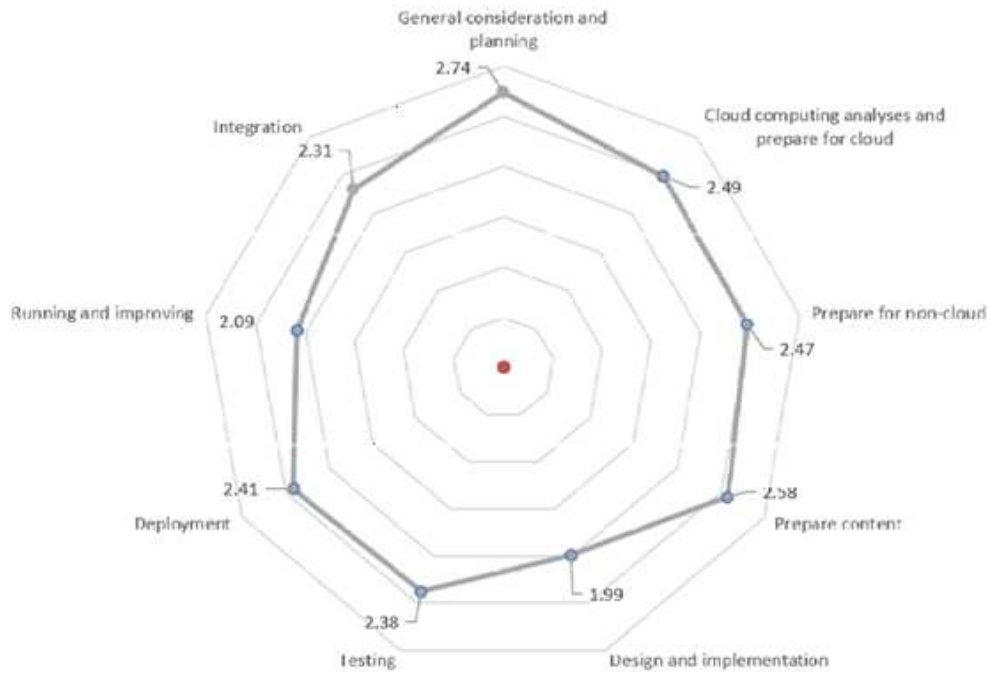
**5: Degree of managing risk (1 - Not at all, 5 - To a High Degree)**



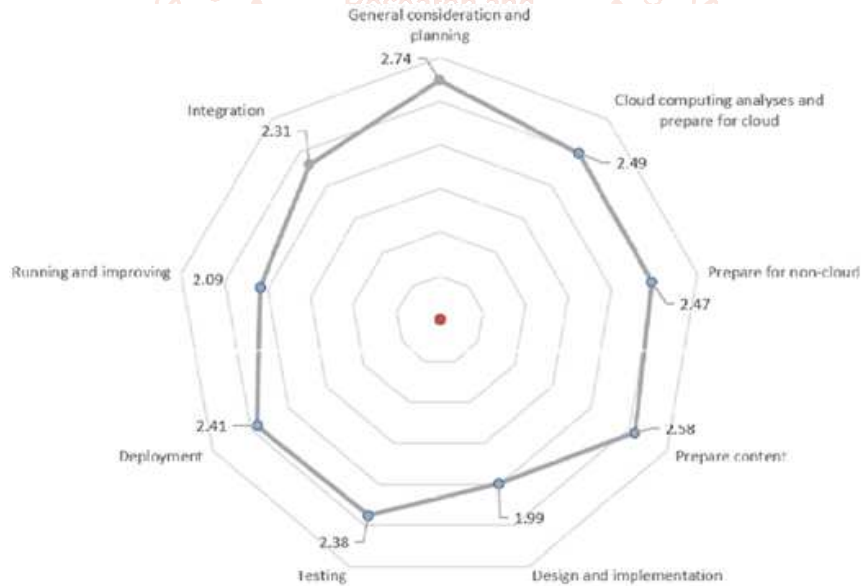
**6: Degree of prioritizing risk (1 - Not at all, 5 - To a High Degree)**

Top 3 risks are: Not considering all of the possibilities of cloud and outsourcing, No ECM strategy, ECM strategy not included in IT architecture, Unclear, incorrect and continually changing requirements without prioritization. It is shown in Fig. 9. The vertical axis of the graph expresses the average probability of the risk. The horizontal axis in the chart expresses the average impact of the risk.

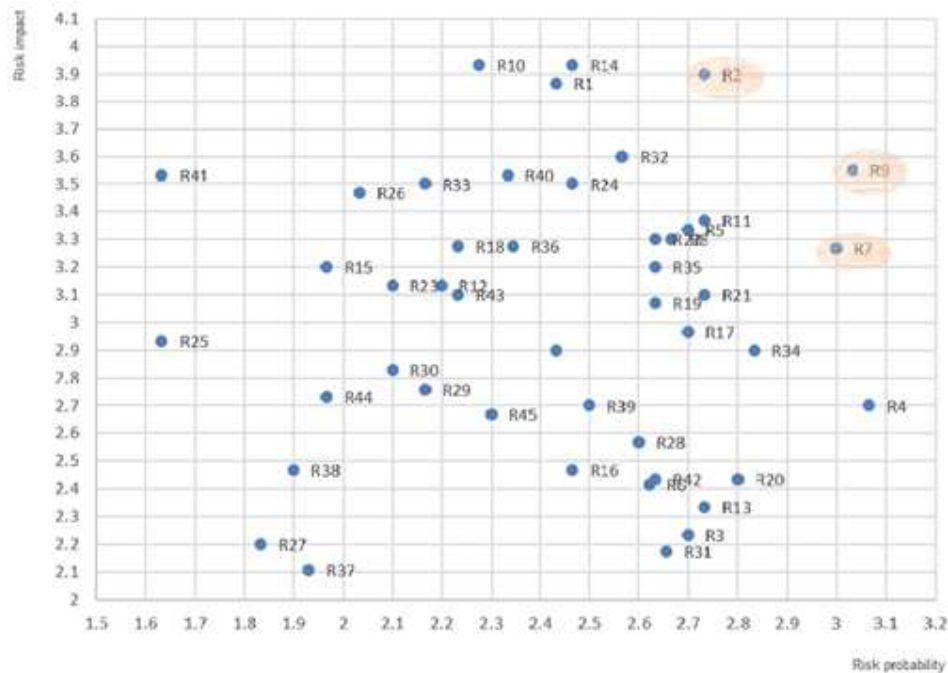
*Explanatory notes to the chart: Management do not decide about ECM need (R1), No ECM strategy, ECM strategy not included in IT architecture (R2), Lack of ECM integration strategy (R3), Development without top management commitment (R4), Lack of user Involvement (R5), Unclear business objectives (R6), Unclear, incorrect and continually changing requirements without prioritization*



**7: Risk Probability radar chart**



**8: Risk Impact radar chart**



9: Risk Matrix

(R7), User department conflicts (R8), Not considering all of the possibilities of cloud and outsourcing (R9), Lack of financial and risk analyses of the cloud (R10), IT processes not evaluated, consolidated (R11), Security (R12), Legal problem (R13), Poor Backup and Disaster Plan (R14), Problem with Internet access, bandwidth (R15), Lack of knowledge ECM systems of internal IT employees (R16), Problem with internal employees capacity (R17), External partner not suitable (R18), Content Owners not defined (R19), Content Audit not conducted (R20), Unclear or not defined structure, taxonomy, classification (R21), Process and ECM lifecycle not monitored (R22), Content Team not defined (R23), Poor planning and control (R24), Incorrect technology, no customization (R25), Service Level Agreement not clearly defined (R26), Developing wrong user interface (R27), Lack of cooperation from users (R28), Wrong Test Cases (R29), Testers lack specialized skills (R30), Lack of time for testing (R31), Lack of training (R32), Multiple content repositories and chaos (R33), Defined Processes are not respected (R34), Change in initial conditions (R35), Wrong or no migrations strategy (R36), Developing the wrong so ware functions (R37), Help desk processes are not defined (R38), Change desk processes are not defined (R39), Content approver is not defined (R40), Cloud Vendor finished (R41), Owners of integrated systems have different requirements (R42), Lack of training for administrators of integrated systems (R43), License and security problems of integrated systems (R44), Technological barriers (R45), Problem with integration process (R46).

#### Government Agency and ECM Implementation Risks

The risk of implementation in the public sector is discussed more deeply. The case study is done for a public sector organization "Company X", in January 2014. Company X is a public organization. It has 800 employees and 2500 students. There are 10 employees in the IT department. They finished the implementation of an initiative to create a common platform for collaboration and information sharing in October 2011. The ECM system is based on Microsoft technology SharePoint. There are other ECM initiatives. File

shares are also used and the custom intranet portal is used. SharePoint is integrated with Active Directory, Microsoft Outlook and Microsoft Office. All communication by Lync and e-mail is stored on Exchange. Currently there is no integration with Outlook to capture business-critical content from personal mailboxes in an efficient manner.

Besides what content they are bound by laws and regulations to manage, there are no specific policies on what content should be managed and how it should be managed. There is no workflow set up.

One of the major objectives with ECM is to manage chaotic content to create a common platform for information and knowledge sharing and collaboration across the organization and optimize business processes. There are efforts to reduce the use of file shares and replace the use with more structural approaches and systems, in most cases try to get them to use SharePoint instead of the file shares: "...ECM system SharePoint provides familiar interface such as Microsoft Office system and users can collaborate easily" (employees).

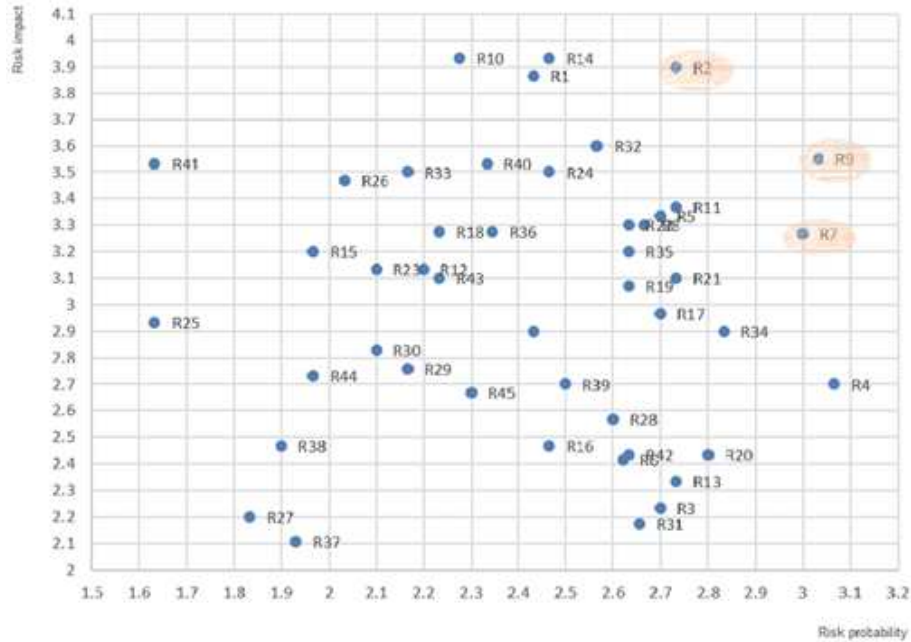
A future objective is to have a global solution for records management and to improve rights management and content search cross the company: "...enhanced rights management and document routing make it easy to manage document permissions and it is easy to search documents and content" (IT manager).

Fig. 10 systemizes the identified functionalities of ECM systems in the Company X. This company uses layers Access, Process, Service and Repository. Specifically functionalities desktop application, intranet (Access layer), collaboration (Process layer), capture, electronic documents, web content (Service layer), content storage and version management (layer Repository).

There are many risks during the implementation of ECM in the Company X. For example Development without top management and Lack of ECM strategy. These risks have impact to the users and whole company: "...users still use other systems such as emails, file shares, desktops, USB. And

we have no power to force them use SharePoint" (IT manager).

Another risk is lack of training. Company X had only basic training when the implementation started and employees could not realize the potential of



10: Functional ECM Framework for Company X

ECM products: "...users are not able to use all functions of ECM system SharePoint. They cannot use metadata, versioning, or publishing function. Maybe the problem is with user training. We do not have training for new employees and continues training" (IT manager).

The employees and IT managers point to the risks of selecting inappropriate technology and non-compliance, disregard defined processes: "...we have crucial legislative problem. We can create ECM solution, workflow to eliminate paper documents. But we have to keep paper form due to the legal claim. Users have to use electronic form and also paper form of documents. They are confused and disappointed. They have to do it twice and they usually choose just paper form" (IT manager).

The problem also occurred during analyses. Employees were not sufficiently involved in the planning: "... we try to predict behavior of employees based on the experience. We guess user's needs. Unfortunately, the response from users is minimal or negative" (IT manager).

#### 4. DISCUSSION

We analyze and survey several information resources. Most of the problems cited were not technological but organizational and change management related. It is important to have a strong team and solid focus to keep the ECM project aligned to the corporate vision and maintain the levels of support needed to succeed.

The paper is structured as follows: in the first section, the literature is reviewed and reassessed. Following this, the empirical study is described, the main findings are presented and the case study is discussed. Finally, limitations of the study and implications for research and practice are discussed and conclusions are drawn on directions for any future research and practice.

The undertaken survey was aiming at identifying drivers the ECM implementation, finding how different types of information are managed and ECM risk probability and

impact. This empirical survey was based on a structured questionnaire that was distributed in ECM conference. Research findings led to some important conclusions.

- The most significant business driver for respondents is improving collaboration and effective knowledge management.
- Only 4% of respondents identified risks to a high degree and 21% somewhat in ECM implementation.
- Top 3 risks according probability are Development without top management, Not considering all of the possibilities of the cloud and outsourcing, Unclear, continually changing requirements, no priority.
- Top 3 risks according impact are Lack of financial and risk analyses of the cloud, Poor Backup and Disaster Plan, There is no ECM strategy and ECM strategy is not included in IT architecture.

The main strength of this survey is that respondents were ECM specialists. Its weakness is a small number of respondents. The recommendations for the future research are to create an online questionnaire and send it to more Czech companies where the ECM system is in place, or is implemented.

The case study for a public company is focused on drivers for ECM implementation and ECM risks.

#### 5. CONCLUSION

Enterprise Content Management provides a platform for secure management of all structured and unstructured content across the enterprise. There is a long tradition of risk assessment in the IS literature. This paper contributes to the IS risk literature, describes common risk focused on ECM and mapping the specific risk factors associated with ECM systems.

ECM software has become increasingly easy to implement from a technical perspective. However, such software is

usually similar to an empty shell. It is through usage and user effort that the content is added, constructed, and reused. The risks associated with ECM might not be managed as actively, or with the same level of attention than more traditional risks. However, for an organization, not reaping the benefits associated with an asset should be viewed as the same thing as a loss. Therefore, better understanding of ECM risks may entice managers to devote more time to these initiatives.

A small survey about ECM implementation and risk in a Czech enterprise was conducted and the case study is done for a public company and is focused on ECM drivers and implementation risks.

#### REFERENCES

- [1] BASL, J. and BLAŽÍŮEK, R. 2008. *Podnikové informační systémy: podnik v informační společnosti*. 2<sup>nd</sup> edition. Praha: Grada Publishing.
- [2] BENTLY, K. and YOONG, P. 2000. Knowledge work and telework: an exploratory study. Internet Research. *Electronic Networking applications and Policy*, 10(4): 346–356.
- [3] DILNUTT, R. and BETHWEY, W. 2005. Enterprise Content Management: Supporting Knowledge
- [4] CHARETTE, R. N. 2005. Why software fails? *IEEE Spectrum*, 42(9): 42–49.
- [5] KEIL, M., CULE, E. P., LYYTINEN, K. et al. 1998. A framework for identifying software project risks. *Communications of the ACM*, 41(11): 765–783.
- [6] [7] [8] KUNSTOVÁ, R. 2009. *Efektivní správa dokumentů: Co nabízí Enterprise Content Management*. 1<sup>st</sup> edition. Praha: Grada Publishing.
- [9] KUNSTOVÁ, R. 2010. Barriers and benefits of investments into enterprise content management systems. *Journal of Management, Informatics and Human Resources*, 43(5): 205–213.
- [10] SIMISTER, S. J. 2004. *Qualitative and quantitative risk management*. [Online]. The Wiley Guide to Managing Projects. Available at: <http://onlinelibrary.wiley.com/doi/10.1002/9780470172391.ch2/summary>. [Accessed: 2014, August 1].
- [11] TAYLOR, B. J. 2006. Risk management paradigms in health and social services for professional decision making on the long-term care of older people. *British Journal of Social Work*, 36(8): 1411–29.
- [12] THE AGIMO. 2008. *Implementing a content management system*. [Online]. Available at: <http://agimo.gov.au/>. [Accessed: 2014, August 1].
- [13] VOHRADSKY, D. 2012. Cloud Risk: 10 Principles and a Framework. *ISACA Journal* 5(11). [Online]. Available at: <https://www.isaca.org>. [Accessed: 2014, August 1].
- [14] WALLACE, L., KEIL, M. and RAIL, A. 2004. How software project risk affects project performance: An investigation of the dimensions of risk and an exploratory model. *Decision Sciences*, 35(2): 33.
- [15]

