
Social Business Documents: An Investigation of their Nature, Structure and Long-term Management

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Glossary

AIIM	Association for Information and Image Management
API	Application Programming Interface
BPM	Business Process Management
CLOB	Character Large Object
CMIS	Content Management Interoperability Service
CSS	Cascading Style Sheets
DfA	Documents for Actions
DM	Document Management
E2.0	Enterprise 2.0
ECM	Enterprise Content Management
ECMS	Enterprise Content Management System(s)
ECS	Enterprise Collaboration System(s)
EDRMS	Electronic Document and Record Management System(s)
EIM	Enterprise Information Management
ER	Entity Relationship
ERP	Enterprise Resource Planning
FRBR	Functional Requirements for Bibliographic Records
GDPdU	Grundsätze zum Datenzugriff und zur Prüfbarkeit digitaler Unterlagen
GRC	Governance, Risks and Compliance
HTML	HyperText Markup Language
ID	Identification
IFLA	International Federation of Library Associations and Institutions
ICS	International Classification for Standards
IS	Information System(s)
ISO	International Organization for Standardization
ITIL	IT Infrastructure Library

REST	Representational State Transfer
SOAP	Simple Object Access Protocol
SBD	Social Business Document(s)
TAHO	Tasmanian Archive and Heritage Office
UDDI	Universal Description, Discovery and Integration
UML	Unified Modelling Language
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
WDSL	Web Service Definition Language
XML	EXtensible Markup Language

Abstract

Business documents contain valuable information. In order to comply with legal requirements, to serve as organisational knowledge and to prevent risks they need to be managed. However, changes in technology with which documents are being produced introduced new kinds of documents and new ways of interacting with documents. Thereby, the web 2.0 led to the development of Enterprise Collaboration Systems (ECS), which enable employees to use wiki, blog or forum applications for conducting their business. Part of the content produced in ECS can be called Social Business Documents (SBD). Compared to traditional digital documents SBD are different in their nature and structure as they are, for example, less well-structured and do not follow a strict lifecycle. These characteristics bring along new management challenges. However, currently research literature lacks investigations on the characteristics of SBD, their peculiarities and management.

This dissertation uses document theory and documentary practice as theoretical lenses to investigate the new challenges of the long-term management of SBD in ECS. By using an interpretative, exploratory, mixed methods approach the study includes two major research parts. First, the nature and structure of Social Business Documents is addressed by analysing them within four different systems using four different modelling techniques each. The findings are used to develop general SBD information models, outlining the basic underlying components, structure, functions and included metadata, as well as a broad range of SBD characteristics. The second phase comprises a focus group, a case study including in-depth interviews and a questionnaire, all conducted with industry representatives. The focus group identified that the kind of SBD used for specific content and the actual place of storage differ between organisations as well as that there are currently nearly no management practices for SBD at hand. The case study provided deep insights into general document management activities and investigated requirements, challenges and actions for managing SBD. Finally, the questionnaire consolidated and deepened the previous findings. It provides insights about the value of SBD, their current management practices as well as management challenges and needs. Despite all participating organisations storing information worth managing in SBD most are not addressing them with management activities and many challenges remain.

Together, the investigations enable a contribution to practice and theory. The progress in practice is summarised through a framework, addressing the long-term management of Social Business Documents. The framework identifies and outlines the requirements and challenges of and the actions for SBD management. It also indicates the dependencies of the different aspects. Furthermore, the findings enable the progress in theory within documentary practice by discussing the extension of document types to include SBD. Existing problems are outlined along the definitions of records and the newly possible characteristics of documents emerging through Social Business Documents are taken into account.

Zusammenfassung

Geschäftsdokumente beinhalten wertvolle Informationen. Sie müssen verwaltet werden, um gesetzlichen Anforderungen zu entsprechen, als organisatorisches Wissen zu dienen und Risiken zu vermeiden. Veränderungen der Technologien haben jedoch zu neuen Dokumententypen und neuen Interaktionsmöglichkeiten mit Dokumenten geführt. So hat das Web 2.0 zur Entwicklung von Enterprise Collaboration Systems (ECS) geführt, die Mitarbeitern die Nutzung von Wiki-, Blog- oder Forum-Anwendungen für ihre Geschäftstätigkeiten ermöglichen. Ein Teil der in ECS erstellten Inhalte können dabei als Social Business Documents (SBD) bezeichnet werden. Im Vergleich zu traditionellen digitalen Dokumenten haben SBD eine andere Beschaffenheit und Struktur. SBD sind beispielsweise unstrukturierter und folgen keinem strikten Lebenszyklus. Diese Charakteristika bringen neue Herausforderungen beim Verwalten von SBD mit sich. Jedoch fehlen in der wissenschaftlichen Literatur derzeit Untersuchungen zu den Charakteristika von SBD, ihren Besonderheiten und ihrem Management.

Als theoretische Linse nutzt diese Arbeit Dokumenten-Theorien und dokumentarische Praktiken mit dem Ziel, die neuen Herausforderungen des Langzeitmanagement von SBD in ECS zu untersuchen. Durch einen interpretativen, explorativen Mixed-Method-Ansatz vereint diese Arbeit zwei Forschungsteile. Erstens werden die Beschaffenheit und Struktur von SBD durch die Analyse von vier Systemen untersucht und SBD-Informationsmodelle entwickelt. Diese zeigen die zugrundeliegenden Komponenten von SBD, die Struktur, die Funktionen, die enthaltenen Metadaten, sowie die große Bandbreite von SBD-Charakteristika auf. Der zweite Teil wurde mit Unternehmensvertretern durchgeführt und besteht aus einer Fokusgruppe, einer Fallstudie mit Tiefeninterviews und einem Fragebogen. Die Fokusgruppe zeigt, dass die genutzte Art von SBD bezogen auf ihren Inhalt und Speicherort unternehmensabhängig ist und es derzeit fast keine SBD-Management-Praktiken gibt. Die Fallstudie ermöglichte tiefe Einblicke in allgemeine Dokumentenmanagement-Aktivitäten und untersuchte die Anforderungen, Herausforderungen und Prozesse des SBD-Managements. Der Fragebogen konsolidierte und vertiefte die vorherigen Erkenntnisse und gibt Einblicke in den Wert von SBD, aktuelle Management-Praktiken sowie Herausforderungen und Bedürfnisse bei deren Management. Auch zeigt er auf, dass zwar alle Unternehmen Informationen im ECS speichern, die verwaltet werden sollten, jedoch kaum SBD-Management-Aktivitäten durchgeführt werden und so noch viele Herausforderungen bestehen.

Zusammenfassend erlauben die Ergebnisse einen Beitrag zu Praxis und Theorie. Die Praxis ist mittels eines Frameworks adressiert, welches die Anforderungen, Herausforderungen und Aktivitäten des SBD-Managements, die Unternehmen beim Langzeitmanagement beachten müssen, aufzeigt. Des Weiteren erlauben die Erkenntnisse den theoretischen Fortschritt der dokumentenbezogenen Praktiken durch die Erweiterung der Dokumententypen um SBD. Auch werden die bestehenden Probleme der Definition von Records in Bezug auf SBD erläutert sowie die Charakteristika von Dokumenten um jene von Social Business Documents erweitert.

Chapter 1.

The Research Problem

This first chapter outlines the research problem investigated in this study. Thereby section 1.1 provides a short introduction to this dissertation's topic of Social Business Document management. By providing an overview of the current state of research about documents and the challenges emerging in the area of Social Business Document management the problem situation is summarised and forms the foundation for the overall research aim of this dissertation, which is presented in section 1.2. Based on the aim, section 1.2 further outlines the research objectives and questions which are explored throughout this work. Finally, this chapter concludes with a brief outline of this dissertation in section 1.3.

1.1. Introduction to the Research Problem

Groupware and collaboration technologies, which enable activities such as collaborative work and knowledge sharing, have been the focus of significant research in the field of Computer Supported Collaborative Work (CSCW) for more than 25 years (Schmidt and Bannon, 2013). Following earlier developments in collaboration technologies such as e-mail (Turban et al., 2011) and groupware such as Lotus Notes (Orlikowski, 1995, 1992), CSCW can be seen as the root of what is known as Social Software today (Koch and Richter, 2007, p. 13).

Established and used within social life, Social Software is now increasingly used in organisations as both open social media platforms for communication outside organisational boundaries (e.g. Facebook) and Enterprise Collaboration Systems (ECS) such as IBM Connections for closed use behind a firewall within organisations (Schubert and Williams, 2013, p. 225).

Until recently the usage of Social Software by organisations was considered to be in an early stage and many Enterprise Collaboration Systems implementations were pilot projects. However, ECS are now being integrated into the day-to-day business of organisations, becoming significant business systems in their own right (Williams et al., 2013b). It is even argued, that over time, Social Software will become as intrinsic and business critical as Enterprise Resource Planning systems (Jones, 2012, p. 11; Miles, 2011a, pp. 10–11) and build "*a necessary condition of doing business*" (Moore, 2011).

However, the emergence of Web 2.0 as the basic technology for new software types such as Social Software, has led to new possibilities for collaboration and interaction (Kugler et al., 2013). Web 2.0 and Social Software have affected and changed the way businesses engage with customers and with each other (Buscemi, 2011), how they consume and create information (Aral et al., 2013) and thus, the way they communicate (Aral et al., 2013; Miles, 2011a; vom Brocke

et al., 2011a). Consequently, Social Software has led to a new wave of change to the ways that organisations and individuals create, store, and use information and documents to communicate and collaborate. Thus, businesses are forced to rethink the way they act and how they organise and manage their technology and information resources in terms of ECS and Social Software.

Examples of new kinds of digital content and business documents are social profiles, forum and blog posts or interlinked wiki entries. These digital objects have been defined as 'Social Business Content' and 'Social Business Documents' (SBD) (Hausmann and Williams, 2015, 2016) and form the key phenomenon of interest examined in this dissertation.

The study of documents in general and also of business documents has a long and well-established history (Briet, 1951; Buckland, 1997; Otlet, 1914) and documents are an important artefact in the conduct of business (Sprague, 1995). Vast amounts of organisational knowledge is stored in documents (Salminen et al., 1997, p. 644) and the intelligent usage of those documents can contribute to business success (Götzer et al., 2014, p. 1; Moore, 2011). Meier and Sprague (1996, p. 53) argue, that "*documents are central to the functioning of organizations*". They can function as significant corporate artefacts as holders of evidence and proof of something (Lund, 2010, p. 740) and play an important role in most business processes, being the driver or the outcome of a business process (Meyer and Zack, 1996). Documents further serve as organisational memory and knowledge recording an organisation's history (Sprague, 1995, p. 33) and therefore documents should be managed like any other business resource (Basden and Burke, 2004, p. 360).

Both, the growing use and importance of ECS within the day-to-day business of organisations and consequently, the growing amount of Social Business Documents produced within these systems raise interesting questions about the nature and value of Social Business Documents in ECS. However, to date limited research attention has been given to the value of social content in general as well as the management of Social Business Documents. A study conducted by Williams et al. (2014) for example identified, that more than 80% of organisations are formally managing traditional content such as data within ERP systems, confidential content and content with compliance requirements. However, fewer than half of the surveyed organisations are formally managing the more unstructured content types including Social Media content and collaborative content. Furthermore, explicitly addressing social content management in German organisations, Williams and Schubert (2015) revealed that around 60% of respondents do not have policies or guidelines for social content management in place. However, whilst the academic literature currently is largely addressing Social Software introduction and usage, social content management is already a significant concern for practitioners (Williams et al., 2013b).

One reason why more academic investigations of social content management are needed and why practitioners are facing challenges with the management of social content is the number of aspects that make social content materially and practically different to earlier documentary forms. One very striking example is the technology dependency of social documents. While

paper documents are seen as bounded physical objects, which are independent of the technology with which they were produced, a digital document needs a suitable set of hardware and software for its creation as well as to maintain its visibility and existence (Levy, 2001, p. 152). The hardware and software cannot be separated from the digital document anymore.

Additionally, Social Business Documents are qualitatively different from traditional digital documents stored in databases, office documents or e-mails. For example, Hausmann and Williams (2015) identified and summarised the fact that Social Business Documents are *less well-structured*, but often have a range of *metadata* associated with the document. A status message, for example, is often not addressed to a specific person and it does not have a heading or anything explaining its content and is therefore somewhat unstructured. However, metadata such as the name of the author or the time when the message was created is automatically stored within the system. Furthermore, the *storage* of Social Business Documents is different. While traditional digital documents are stored in file structures, one cannot access a status message created in an ECS by browsing through a file browser such as Windows Explorer. If stored as files or within the database, the content is embedded within the software program. In the case of Social Media, content is often stored *outside the control* of the organisation. Additionally, social content can comprise many different *components* such as comments or likes, thus not consisting of a single file but of a collection of parts.

Moreover, not only is the structure different, but also the way people create and use social content. Social Business Documents are often *authored and edited by multiple people*, leading to different *versions* of documents and/or the overwriting of content.

As these characteristics show, Social Business Documents have a social, interactive and changing nature. They further raise questions such as: What is the original document? Which version is the latest document? Who owns and is responsible for the content? Or: Which documents have evidentiary or business value and should be preserved? In order to be able to manage and control Social Business Documents for aspects such as maximising long term value and minimising risks (Miles, 2011a) the nature and structure of Social Business Documents as well as the currently largely unexplored questions around SBD ownership, authority, management, etc. need to be investigated and accounted for.

However, many companies do not know what information or documents they have in general and in which formats they exist (Williams and Hardy, 2011). Enterprise Content Management Systems (ECMS) are being used to support the management of digital documents throughout the documents' lifecycle. However, Social Business Documents created in Enterprise Collaboration Systems have largely not yet been incorporated into organisations' information management procedures (Hausmann and Williams, 2015). Furthermore, past years have witnessed an explosion in the quantity and nature of digital documents being produced, stored and communicated (Igarria and Sprague, 1998, p. 2) and social content is the fastest growing new content type within organisations (Gilbert et al., 2011).

Thus, Social Business Documents on the one hand add to the already existing problems of document management through the further creation of large volumes of documents and on the other hand also create new problems, because of their changing nature (Liu, 2004, p. 284). Whilst document theory has begun to see the need to account for new concepts such as social objects (Ferraris, 2007) and Documents for Action (Zacklad, 2004) and for addressing new digital document types this work is largely fragmented. It has not yet examined in any depth the recent wave of digital documents produced by integrated ECS. Further, as outlined above, the academic literature is not fully aligned with the current challenges of adequately managing Social Business Documents as faced by practitioners (Hausmann et al., 2014; Williams et al., 2013b). The characteristics, requirements and challenges for managing SBD are not clear.

Consequently, Social Business Documents are not being managed systematically in the way other business information is. However, left unmanaged, Social Business Document can become *“a liability instead of an asset”* (Blair, 2004, p. 66) for an organisation and may lead to problems in meeting legal and regulatory requirements, satisfying e-discovery requests and capturing business value.

These considerations raise both theoretical as well as practical research imperatives. The theoretical imperative concerns the understanding of the changing nature and structure of documents evidenced through the emergence of Social Business Documents leading to a deeper understanding of new document characteristics, lifecycles and definitions. Furthermore, the theoretical findings lead to practical questions about how these changes impact and influence the way social content is managed.

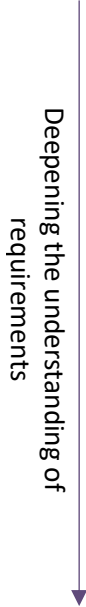
1.2. Scope of this Thesis

In order to address the previously outlined research problem of Social Business Document management it is essential that we understand all aspects of Social Business Documents: the nature and structure of the document itself, the tools through which Social Business Documents are created and the contexts in which they are created. By drawing on concepts from Enterprise Information Management and documentary practice this dissertation **aims to identify current requirements, challenges and processes for the long-term management of Social Business Documents**. To achieve this aim, first an understanding of the nature and structure of Social Business Documents must be developed and the associated challenges for their management identified. Building on these findings, a further **aim is to then investigate and understand how these challenges shape documentary practices** in order to extend the theoretical understanding about the effective management of Social Business Document.

1.2.1. Research Objectives

The research aims are addressed through five separate research objectives (see Table 1).

Table 1: Research Objectives

Deepening the understanding of requirements 	Social Business Documents	
	O1	Describe the nature and structure of Social Business Documents and examine how these change throughout their lifecycle.
	Challenges of long-term Management of Social Business Documents	
	O2	Identify current requirements and challenges associated with the creation, use and disposition for the long-term management of Social Business Documents.
	O3	Investigate current strategies, policies and practices for managing Social Business Documents.
O4	Establish a framework addressing the challenges of the long-term management of Social Business Documents.	
Theorisation of Social Business Documents		
O5	Progress the theory in the field of documentary practice and information management.	

Objective 1 examines the artefact, the Social Business Document, itself. It establishes collaboration scenarios in which Social Business Documents occur and thereby develops examples of Social Business Documents. It further provides different modelling approaches for Social Business Documents and outlines different information models of the Social Business Documents investigated also leading to an overview of SBD characteristics.

Objective 2 seeks to gather the requirements organisations face with the long-term management of Social Business Documents which in turn can lead to challenges. These challenges can emerge from the Social Business Documents characteristics and tool implementation, but also on legal and organisational grounds.

Objective 3 examines the procedures of managing Social Business Documents in practice. It therefore investigates and analyses current practices for managing Social Business Documents as well as current strategies and policies. A synthesis of procedures provides an overview of the current state how the long-term management of Social Business Documents is currently addressed.

Objective 4 compares and maps the research findings from objectives one to three in order to develop a framework for addressing the challenges of Social Business Documents that can assist organisations in better understanding and managing their Social Business Documents over a long time.

Objective 5 leads to the theoretical contribution of this work by mapping the findings from objectives one to four to established theories in documentary practice which are then further developed.

1.2.2. Research Questions

To address the research objectives and achieve the outcomes of this dissertation the research objectives are operationalised and guided by different research questions shown in Table 2.

Table 2: Research Question

Research Objectives	Research Questions
RO 1: Nature and structure	<p>RQ1: How can Social Business Documents be described?</p> <p>RQ1 (a): Which types of Social Business Documents are currently available and in use in Enterprise Collaboration Systems?</p> <p>RQ1 (b): How are Social Business Documents constructed and what is an appropriate model for describing and representing their construction?</p> <p>RQ1 (c): How do Social Business Documents change over their lifecycle?</p> <p>RQ1 (d): What are the characteristics of Social Business Documents?</p>
RO 2: Challenges	<p>RQ2: What are the current requirements and challenges associated with the long-term management of Social Business Documents in the academic literature and currently experienced by practitioners?</p>
RO3: Practices	<p>RQ3: How, if at all, are organisations currently managing Social Business Documents?</p> <p>RQ3 (a): Do organisations have strategies and policies for the management of Social Business Documents in place and, if yes, what do they contain and what is their scope?</p> <p>RQ3 (b): What processes exist for Social Business Document management and how do they address the challenges identified?</p>
RO 4: Framework	<p>RQ4: How can the research findings be consolidated to provide a framework to guide organisations in addressing their challenges for the long- term management of Social Business Documents?</p>
RO5: Theorisation	<p>RQ5: How can the research findings extend current theorisation in the field of documentary practice?</p>

Each research question aims at providing a specific outcome which contributes to the final understanding of requirements for Social Business Documents and their long-term management.

1.3. Outline of this Thesis

This dissertation consists of eleven chapters, describing the whole research study, from its motivation over related work through to the findings. Within the following, the content of all chapters is shortly described.

Chapter 1 introduces the research study. This first chapter thereby presents the research problem including the research scope.

Chapter 2 and 3 review and analyse the related work and thereby build up on literature in the areas of documents, documentary practice, Enterprise Collaboration and Enterprise Information Management. At the end, the current state of knowledge in the area of Social Business Document management is presented.

Chapter 4 introduces the research design by outlining the phenomenon of interest and the research design. It further addresses the data sources and outlines the research steps.

Chapter 5 investigates the nature and structure of Social Business Documents. It thereby outlines different modelling approaches used to analyse Social Business Documents and presents the analysis of SBD within four different systems.

Chapter 6 builds up on the modelling of chapter 5 by synthesising the findings into four SBD information models as well as the characteristics of SBD derived through the modelling.

Chapter 7 outlines the finding of the modelling investigations in terms of management challenges of SBD. It furthermore addresses the concept of records in regards to SBD.

Chapter 8 presents the empirical investigations to SBD which have been conducted through a focus group, a case study and a questionnaire.

Chapter 9 discusses the value, management challenges and needs of Social Business Documents. Therefore, the different findings are brought together and a framework addressing the long-term management of SBD is presented.

Chapter 10 maps the findings from the previous chapters to the various theoretical concepts of documents, showing problem areas as well as supporting and confirming the assertion that Social Business Documents are a valid documentary form.

Chapter 11 concludes this study by summarising the research contribution and providing thoughts for future research.

Chapter 2.

Social Business Documents: Theoretical Foundation, Origin and Definition

The long-term management of Social Business Documents is the phenomenon of interest of this dissertation. A pre-study conducted by Williams et al. (Williams et al., 2013a) aimed at identifying the current status of Enterprise Information Management in organisations and revealed a growing use of social business content and social business systems. However, the survey also revealed that social content is currently not being managed systematically, which can lead to significant information risks and long-term management concerns.

This chapter provides a first introduction to Social Business Document in order to understand their theoretical foundation and origin.

2.1. Theoretical Foundation: Documentary Practice

Documentary practice is used as the theoretical lens for this dissertation as will be discussed in chapter 4. While much research can be found from before the 1950s, the documentation view and therefore also the documentation research declined until three reasons led to a renewed interest in the 1990s. First, an emerging interest in documentation from the library and information science (Lund, 2009); second, the movement to digital documents and the examination of their difference to paper documents; and third, new legislation (Buckland, 2013, p. 230). Within the following, both documents themselves (section 2.1.1) as well as the relevant document theory (section 2.1.2) are presented.

2.1.1. Documents

Looking at the term 'document' from a linguistic standpoint the Latin word *docere* can be found. This can be translated as 'to teach' (Levy, 2001, p. 6) or 'to inform' (Hjørland, 2000, p. 28). In the past documents were seen as something valuable and was associated with an artifact that had an official character such as a passport or identity card. Subsequently the specificity of the word document diminished. Just about everything, such as a word document or a website, was seen as a document (Levy, 2001, p. 21; Weinberger, 1996). Definitions and explanations about what documents are, have changed over time. Especially within recent decades, as the widespread of computer usage brought new technologies, such as ECS, which again pose the questions and confusions between the medium, message and meaning of documents (Buckland, 1998, 1997, p. 804).

2.1.1.1. History and Definition of Documents

Even though the term document is often associated with some form of text today, this association is not given from the original linguistic translation of the term. Also a specific experience or a class lesson can be a document (Hjørland, 2000, p. 28). As Buckland (1998, 1997, p. 805) describes, documents can even be seen in a broader sense. Sometimes a document is defined as *“any expression of human thought”*. What it is or what this expression looks like has thereby not been defined. A document can be everything that keeps a thought or idea which otherwise would be lost over time (Levy, 2001, p. 20). Therefore, documents can be seen as talking things (Levy, 2001, p. 23), which help us to extend our knowledge (Schürmeyer, 1935, p. 537). They are standing for something, reporting or representing a story.

As one of the early information scientists who thought about documents the Belgian Paul Otlet (1868-1944) discusses whether sculptured or museum objects and thus three-dimensional objects, can be documents (Otlet, 1914). Following, in 1951 Suzanne Briet, a 20th century French librarian, documentalist and philosopher describes the words document and documentation within information science (Briet, 1951, 2006). She outlines that the word document is a synonym for organised physical evidence which supports a fact (Buckland, 1998) and is *“any physical or symbolic sign, preserved or recorded, intended to represent, to reconstruct, or to demonstrate a physical or conceptual phenomenon”* (Briet, 1951, p. 7). She outlined different examples of things that become documents depending on the perspective from which one looks at them. Her best known example is that of an antelope. According to her definition an antelope in the wild is no document. However, if we catch the antelope and put it into a zoo, it becomes a document. The argumentation is that the antelope in the zoo becomes the subject of study and is the physical evidence of the existence of antelopes.

Going along with Briet’s definition many other similar definitions can be found in the literature (see for example Capurro and Hjørland, 2003 or ; Levien 1989 as reported in Meier and Sprague, 1996). However, Levy (2001) goes even further. Within his description of the word document he adds another layer to the definition: the recognition or identification. He gives an example with a cash receipt. The words ‘cash receipt’ are usually not to be found on the receipt itself. However, this is not needed. We will recognize it as a cash receipt because of the symbolic and representational power (Levy, 2001, p. 11). Within our culture we have acquired the skills which are needed to identify and use it as such. Without having this cultural background and the skills to recognise such things the system in which we live would not work (Levy, 2001, p. 19). A cash receipt is only a piece of paper, but we all accept it as evidence of a purchase.

In spite of the fact that documents are theoretical constructs, they can only be defined within the scenario they appear in (Mahler (1996, p.117) as reported in Capurro and Hjørland, 2003). Thus, you always need to ask for what purpose a document was created. Did it have an aesthetic background, an economic or a social one (Basden and Burke, 2004, p. 365; Scifleet, 2010, p. 92)? Therefore, documents need to be interpreted each time they are used individually by the people

using them. Depending on this a document might have more or less importance and explanatory power for people (Olsen et al., 2012).

Thereby, the medium or format should not be important for the value of the document. A document includes a minimum of different aspectual structures such as the medium, the shape, the raw symbols, the structure of symbols and the content itself, which is carried by the symbols (Basden and Burke, 2004, p. 368). However, Völkel (2007) argues, that it is not about the physical format of documents, but that documents should be defined by their function. This means that *“everything that behaves like a document [extending our knowledge or a report about something] is a document”*.

Following the technological developments in terms of computer dissemination and network connections within the last decades and the thinking about documents being independent of the medium, new technologies broadened the possibilities of what documents could look like and the role they have in everyday life, leading to digital documents.

Along with their creation and usage possibilities, as well as their characteristics and their management, digital documents underwent a complete revision compared to traditional documents (Liu, 2004, p. 279). In order to be able to understand these differences, the concept of documents needed to be redefined (Hjørland, 2000, p. 28). Murphy (2001, p. 1) added two aspects to the generally used definitions of documents, in order to come from documents to digital documents. He defines digital documents as *“electronically recorded information flexibly structured for human consumption”*. Therefore the existence of digital documents in an electronic form is one difference while their flexible structure is another. Flexible structure refers to the difference to so-called structured information in the digital area. Structured data is a known quantity which are organised in data tables for computer processing (Scifleet, 2010, p. 37). We can for example find them in transactional systems such as ERP Systems. Digital documents in contrast might have some kind of structure like headings or page numbers. However, they are not broken down to individual pieces of information, which can directly be used for computer processing and which are outside the control of the data management of an organisation. Therefore they are often described as unstructured (Grimes, 2008; Scifleet, 2010; Sprague, 1995) or less structured data even though this might be misleading.

In the past only text files have been thought of when thinking of documents that could be kept electronically. However, now that computers are used for electronic communication, the spectrum of digital documents has been widened. In addition to text files also presentations, voice mails, video clips, images, photographs, animations and many more are named documents today (Meier and Sprague, 1996, p. 53; Sprague, 1995, p. 30). Today digital documents are more than just paper transferred into an electronic format. Therefore, it becomes even harder to specifically define what digital documents are. Just like documents a clear overall definition for digital documents remains elusive. People sometimes use pragmatic, ad hoc definitions such as: *“anything that can be given a file name and stored on electronic media”* (Buckland, 1998) in order to work with the term. Nevertheless, a definition based on the format or the medium

seems to be less helpful than going back to the thinking of Briet and her antelope. The question to ask is about the path of reasoning (Buckland, 1998). Why and from which perspective might something be a document and something else not? It thereby should be important to keep in mind the original concept of the term document and not just call something a document because it is easy and known (Weinberger, 1998).

Hausmann and Williams summarised the commonalities of the different definition for digital documents that exists and further took into account the business view on documents. They define digital business documents as *“electronically stored semi-structured information which extends our knowledge by supporting business communication, informing stakeholders and/or showing evidence of business activities. Independent of their format, but dependent on their purpose, digital business documents pass through different phases during their lifecycle (creation, use and disposition) and have different lifetimes in which they need to be managed”* (Hausmann and Williams, 2015, p. 362). The definition thereby encompasses the different aims of digital documents for organisations and draws attention to two important aspects: that digital documents are not restricted to some kind of format or medium except for being electronically stored and second, the need for their management after initial creation.

Thus, while in the past a document mostly stood for a textual record (Buckland, 1998, p. 804), which was connected with writing and paper (Levy, 2001, p. 22) digital documents expand the boundaries of what should be seen as records today.

2.1.1.2. The Aims of Documents

As Buckland (1998) already pointed out, *“one should consider documentation to be concerned with access to evidence rather than with access to texts”*. He thereby focusses on the aim of documents. The aim of information is quite important in order to define it as a document at all. However, as the aim is highly related to the content, the aim is also important in order to classify a document and to be able to decide for the needed management practices of a specific documents.

Documents can be used to validate if a statement is correct (Lund, 2010, p. 740). It aims to inform people, to extend our knowledge and/or at being proof and evidence of something, independent of how this knowledge is stored. When looking at business documents, i.e. documents which are created or used within the conduction of business within an organisation, more precise aims and roles of documents can be found. For organisations, *“documents are central to the functioning”* (Meier and Sprague, 1996, p. 53) and one of the main activities of large organisations is creating documents such as reports or procedures (Raynes, 2002, p. 304). Documents include communication aspects and enable us to keep communication fixed, to store it and to share it with others which is a basic building block of human culture (Levy, 2001, p. 37). Documents have the ability to be a business process vehicle. Thereby, the document flow not only supports the business processes and drives them (Scifleet, 2010, p. 34) as well as it serves as a decision tool (Choksy, 2006, p. 112), but they can also be the main outcome of business

activities, when seeing documents as information products (Meyer and Zack, 1996). Furthermore, documents preserve a history and document what happens. Thus, documents also function as an organisational memory (Sprague, 1995, p. 33). They prove that the organisation exists and show what was done in the past.

Depending on their lifecycle state, documents can aim at purposes (Meier and Sprague, 1996, p. 54). From being part of a communication they become an integral part of a business process and later in time might be used as a historic proof of something. They can be seen as an intermediate on the one hand and a mechanism of control on the other hand (Trace, 2011). Therefore, documents can be seen as the most valuable information of an organisation (Sprague, 1995).

As the following discussions will show, most of the information created in Enterprise Collaboration Systems shares the same aims as outlined above and therefore should be looked at as documents.

2.1.1.3. Characteristics of Documents

Following Buckland (1997, p. 806) documents are similar to art. Something becomes a document when you treat it as such. However, documents can have quite different characteristics. If we compare digital and paper documents, for example, it gets obvious, that paper documents were independent of their technology with which they were produced. Once they came into existence they were bounded physical objects. Digital documents are different. A suitable set of hardware and software is not only needed for the production of a digital document, but it is also needed to keep its visibility and existence (Levy, 2001, p. 152). With digital documents the production and preservation are not separable anymore (Levy, 2001, p. 155; Lund, 2010, p. 742).

However, just like physical documents digital documents consist of a variety of symbols, which are stored together as a unit and provide the user with information about a specific topic (Sprague, 1995, p. 32). They are static on the one hand, but can also be changed. They are fixed, but also fluid (Levy, 2001, p. 36). These two characteristics, to name only two, are the same. However, the way they are worked with and how these characteristics are used in conjunction with others is different. If we had a traditional handwritten text document and we wanted to change it, we would write within the text or created a complete new text document. The changes would be visible however as the older version would not be overwritten completely. A digital text document in contrast can also be fixed with saving it to a drive. However, if we want to make changes here we can do this directly within the text, deleting passages and including new ones. If we do not save it with a different name or use some kind of version control, we will overwrite the old content, which is then not retrievable any more.

Furthermore, digital documents have quite many characteristics which do not apply to physical documents, for example:

- *Editable*: digital document can be modified and updated continuously (Kallinikos et al., 2013)
- *Duplicability*: they can be quite easily duplicated/replicable (Liu, 2004, p. 280; Schamber, 1996, p. 669)
- *Originality*: it is not always possible to identify the difference between an original and a copy (Liu, 2004, p. 281)
- *Interactive*: they offer different ways how functions can be activated (Kallinikos et al., 2013)
- *Mobility/Distribution*: using telecommunication connections they can be used from anywhere and by anyone (Kallinikos et al., 2013; Liu, 2004, p. 283; Phelps and Wilensky, 1998)
- *Multiple authors*: multiple people can work with them at the same time (Liu, 2004, p. 283)
- *Connectivity*: documents can be linked to each other (Liu, 2004, p. 284; Phelps and Wilensky, 1998; Schamber, 1996, p. 669)
- *Manipulability*: they can be easily manipulated (Schamber, 1996, p. 669)
- *Searchable*: many of them are searchable (Schamber, 1996, p. 669)
- *Open*: they can not only be accessed by different people, but also by other digital objects (Kallinikos et al., 2010)
- *Transportability*: they can be easily transported (Schamber, 1996, p. 669)
- *Structure*: a status message, for example, is less well-structured as it is not addressed to a specific person, has a heading or anything that explains its content (Williams and Hardy, 2011)
- *Borderless*: they lack clear borders (Kallinikos et al., 2013)

Metadata of Documents

Additionally, digital documents often have some attributes that describe themselves or their content (Götzer et al., 2014, p. 18) such as a name and or a timestamp, which are called metadata. The primary function of metadata includes the organisation, description, utilization, preservation and disposition of information (Gilliland, 2008, p. 13f). However, different professions understand metadata in different ways (Gilliland, 2008, p. 1) and include different information in metadata (see for example Gilliland, 2008; NSW Government, 2015). In terms of document management, metadata can be crucial, as it can document an objects behaviour, “*its function and use, its relationship to other information objects, and how it should be and has been managed over time*” (Gilliland, 2008, p. 7).

While different classifications of metadata can be found in the literature (see for example Duff and McKemmis, 2000 as reported in Gilliland-Swetland, 2005; Rockley, 2003), Gilliland (2008, p. 9) distinguishes the following types of metadata:

- *Administrative*: used for the management of documents
- *Descriptive*: used for identification and descriptions of documents
- *Preservation*: related to the conservation and protection of documents
- *Technical*: related to the system the document and its metadata is created and captures with
- *Use*: related to the process of use of the document

The way this metadata is created can be automated by a system vs. manually by humans, static (not changing) or dynamic and structured vs. unstructured, for example (Gilliland, 2008, p. 10; NSW Government, 2015). Over time, different metadata standards have been established, which guide the creation and use of metadata. Examples are the Dublin Core Metadata Element Set (DCMES), the Australian Recordkeeping Metadata Schema, CDWA Lite, EAD, MARC XML, MODS or TEI. Even though the term metadata is less familiar among web content creators and users, they more and more adapt the idea of metadata by establishing tags, folksonomies or bookmarks (Gilliland, 2008, p. 1). These are often less structured, but also provide information about the documents they are assigned to.

The Life of a Document

Another prominent specification of a document's characteristic is its lifecycle, today also often referred to as information lifecycle (Wilson, 2002). Documents are created at some point in time. From the creation stage, different documents have different requirements, actions and expectations of life. Some documents might only be relevant until the end of a meeting or for a few hours and others for centuries (Götzer et al., 2014, p. 1; Murphy, 2001, p. 2). Furthermore, at different times one document might serve different purposes (Meier and Sprague, 1996, p. 54). While it is input for a business process when it is created it might serve as a historic document 10 years later.

Looking at different tools and the literature many different descriptions of lifecycles can be found today. There is no consensus about how many phases the lifecycle has or how the phases are named (Choksy, 2006, p. 112). Different examples can thus be found at Sprague (1995), Ginsburg (1999, p. 237ff) and IBM (2011). The problem with the different descriptions is that often the stages are getting mixed with the activities that are performed within the specific stage. Therefore Williams (2015) created an information lifecycle, which separates the stages and the activities (Figure 1). As reported by Short (2007, p. 11) information and documents can be described according to their frequency of data access. First comes the active phase, when the document is created and used. After this comes a phase of less active or semi-active usage. At the end of the lifecycle a document then becomes inactive and should be deleted. Williams also included these considerations in her lifecycle with the concept of the information status.

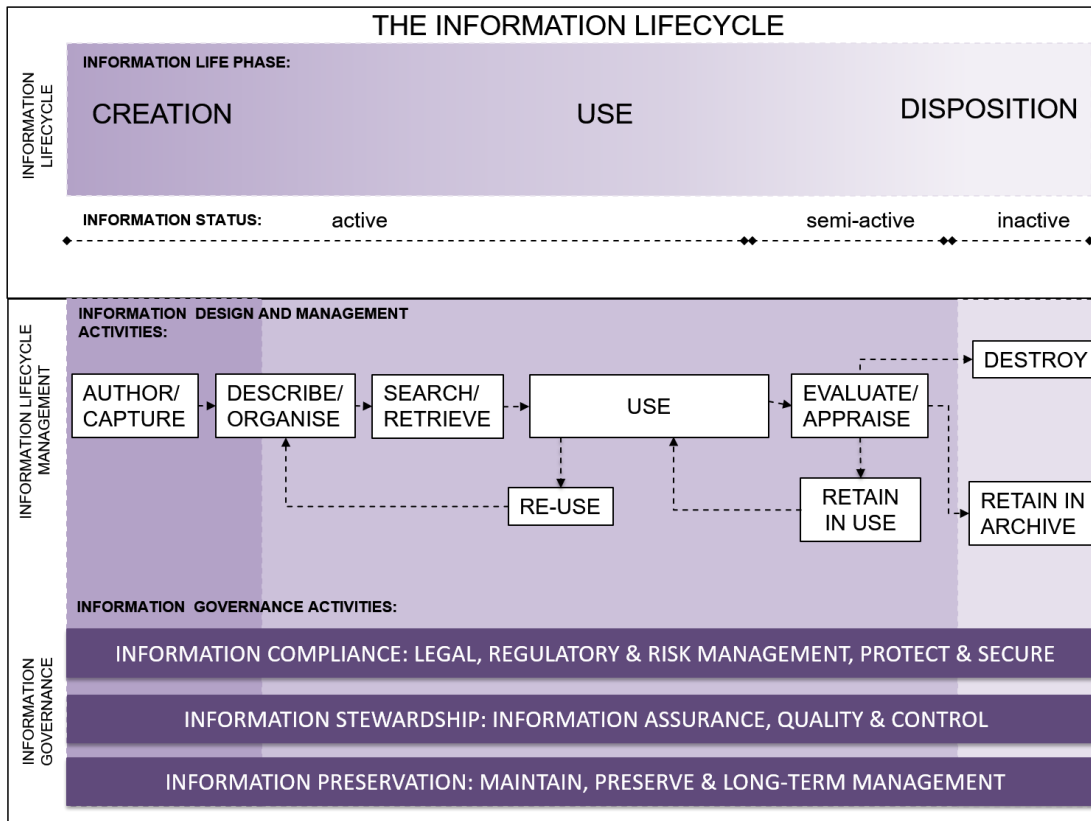


Figure 1 Information Lifecycle
(Williams, 2015)

Raynes (2002, p. 304) outlines that up to 90% of saved documents are only retrieved once. And this is to destroy them. However, as documents change in their value and usefulness over time (Schamber, 1996, p. 669) it is important to know in which stage of the lifecycle a documents is.

Documents as Records

“All records are documents, but not all documents are records” (Peterson, 1991, p. 193). Thus, records can be defined as being a subclass of documents with special characteristics (Asprey and Middleton, 2003, p. 89). They can be distinguished from documents through their characteristic of being of economic or legal value (Kampffmeyer, 2012, p. 10) and serve as legal and historic evidence (Gilliland-Swetland, 2005, p. 219). Records are the output of a business activity. ISO 30300 defines a record as “*information created, received, and maintained as evidence and/or as an asset by an organisation or person, in pursuance of legal obligations or in the transaction of business or for its purpose, regardless of medium, form or format*”. This definition includes aspects which are not addressed in other definitions such as in ISO 154891: Part 1 and therefore is quite comprehensive. One of these aspects is the medium, form and format, which account for the shift of paper documents/records stored in file cabins to records in an electronic form (Miles, 2013). Thus, also digital documents can be records.

Furthermore, the International Council on Archives (ICA) defines records as comprising three properties: content, including some kind of information or data; context, meaning a relationship of the record to other records and the business in general; and structure, which includes the

physical structure of hard- and software as well as the logical structure which ensures that the records stays the same, each time it is shown on a screen (ICA, 2005, 1997). These all can be seen as characteristics of records.

Additional characteristics – sometimes also called qualities – of records mentioned by different authors (ICA, 2005; Jisc, 2012) are:

- *Authenticity*: The persistence of a record and its characteristics over time, meaning that the record is what it purports to be respectively, the proof of the creation of the records and the chain of custody.
- *Completeness*: All contextual and relevant information which acts as evidence of the documented transaction as well as for the value the record is documenting need to be contained.
- *Reliability*: Refers to the trustworthiness of a record and is highly related to the degree authenticity and completeness are given. The correctness of the content itself is an added requirement.
- *Integrity*: A record needs to be complete and unaltered.
- *Usability*: Refers to the ability to locate, retrieve, present and work with a record.
- *Fixity*: The content, structure and metadata of a record are fixed and not changeable anymore in any way after declaring a document a record.

All these characteristics and qualities should be present regardless of the record's properties. Thus, whether it is a paper document or a digital document of any kind, the content, context and structure need to have the above outlined characteristics. However, in order to become a record and to ensure these characteristics, a document explicitly needs to be declared a record at some point in time. Then the record becomes fixed content which should no longer be edited. It represents work completed (Goodman, 1994, p. 134). At this point at the latest, a retention period should be added (see section 3.1.2) and other activities need to be processed.

The different characteristics and qualities of records described can also be seen as fundamental requirements of records, which must be fulfilled. However, as will be shown in the later course of this study (see for example section 3.1.2 and section 7.2), the definition, characteristics and management of records can lead to several challenges.

2.1.2. Document Theory

The term document can be seen as a verb and thus the act of keeping something fixed or making something evident or as a noun, which then represents the physical object such as a text (Buckland, 2013, p. 223). The closely related term documentation is the practice of transforming the act/process into a source for its users (Vickery, 1978, p. 279).

As outlined before many different research areas are looking at documents and documentation from different perspectives. For example, palaeographers analyse the handwriting on documents, bibliographers deal with the description of the content of documents and archivists are concerned with the origin and authenticity of documents. Document theory overlaps with all these areas as it takes a document-centric view, which *“starts with the notion of a document*

as its point of departure" (Buckland, 2013, p. 223). Therefore, Lund established a complementary theory of documents containing three aspects of documents, which each document should have and which should always be seen together for a description: physical, social and mental aspects (Buckland, 2013; Lund, 2009). The physical aspect outlines that a document consists in a physical form. Even though often argued differently, electronic documents ultimately are physical also as the electronic systems in which the documents are stored are physical. Physical therefore means existing in space and time. The social aspect should capture what has been done with a document including its collaborative actions. Even though documents are often concerned with evidence and evidence in turn implies facts, the mental aspect reminds us of the fact that each human being has a different knowledge base and thus might perceive a document in a different way. Thus the value examination is subjective. However, as long as only someone views the information as potentially signifying, it should be looked at (Buckland, 2016).

Buckland (2013, p. 232f, 2014, p. 179f) also describes three views of documents which can be related to the complementary theory:

1. the conventional, material view: made as documents.
Documents are somehow material objects which can be transported. This goes along with the physical aspect of the complementary theory.
2. the instrumental, functional view: serve as documents.
Nearly everything can be a document if it signifies something and helps in keeping evidence, which goes along with the mental aspect.
3. the semiotic view: consider as documents.
Anything can be considered a document if it is regarded as evidence, which also maps the mental aspect.

These views are more inclusive and should help in defining documents in the future. Furthermore, Buckland (2013, p. 233) also defines eight conditions that need to be given in order to be able to use a document as a document:

- "0. Creation: It must exist;
1. Discovery: We need to know of its existence;
 2. Location: We need to find a copy;
 3. Permission: We may need permission to use it. There may be legal constraints.
 4. Condition: Is it in a fit state to use? Is it too deteriorated and/or too obsolete to be worth using?
 5. Interoperable: Is it standardized enough to be usable? Digital or microform materials may require unavailable equipment.
 6. Description: It is clear enough what it represents?
 7. Trust: Are we confident enough of the origin, lineage, version, and error rate?"

These conditions partly overlap with the characteristics of documents described in the previous section.

2.1.2.1. Documentality and Social Objects

Documentality can be seen as the theory of documents which deals with the social environment of documents and the creation of social objects developed by Ferraris (2014, 2012, 2007). Thereby social objects represent an inscribed social act, involving at least two persons. Social objects are *“characterized by being recorded, on a piece of paper, on a computer file, or even only in the minds of the people involved in the act”* (Ferraris, 2014, p. 114). Documentality further can be seen from three different points of view. First, from an ontology point of view, asking *“What is a document?”*. Second, from a technological view, which aims to explain the distribution of documents in a complex society. And third, from a pragmatic view guaranteeing the efficient distribution and management of documents (Ferraris, 2007, p. 399f).

A normative social practice thereby plays a significant role with documents. Banknotes are just pieces of paper, for example, if there is no normative institutional background supporting their value as a medium for paying (Ferraris, 2014, p. 114). Buckland gives another example with a passport, which has also already been used above. The passport itself is only a document consisting of paper and some electronic elements. Its power does not arise from being a document, *“but from more-or-less well enforced social regulations within which passports are used as an evidentiary device within a system of controls”* (Buckland, 2014, p. 182).

Besides documentality John Searle (2008) proposed another theory regarding the construction of social objects. Within his theory of intentionality he outlines the rule *“x counts as y in c”* where x represents the physical object, y the social object and c the content. To stay with the same example as outlined above, a piece of paper x counts as a bank note y at a certain point in time, for example in June 2016 (Ferraris, 2012, p. 43). However, documentality focusses on the social *“act of recording which finds its eminent manifestation in documents”* (Ferraris, 2012, p. 45) and thus fits better for this dissertation.

2.1.2.2. Neo-Documentalist

The change in theory around documents gets visible through the recently upcoming term of neo-documentalist used by Börjesson et al. (2016), who asked a number of questions related to the new types of documents which are being created:

- “What counts as documentation and documents today?
- What is seen as the most important type of document in this area of activity?
- What are these documents for?
- Who are they for?
- How is this different from previous times?
- How are the (albeit changing) conceptions of documentation and document intertwined with the (albeit changing) practices of informing, knowing, and producing knowledge?
- How do the current practices of documentation affect the professional practice?”

With new types of documents, Börjesson et al. refer to the resulting documents through digitisation. Their concept of neo-documentalists thereby builds on and develops the earlier

documentation traditions by enabling the analysis of how the different forms of documentation are connected to technical affordances, social structures and intellectual processes (Lund 2009 as reported in Börjesson et al., 2016, p. 15).

2.1.2.3. Document for Action (DfA)

Many researchers – above all Otlet, who even describe that everything can be a document – are focussed on the memory functions of documents (Choksy, 2015, p. 868). The concept of Documents for Actions developed by Zacklad (2004) rather focusses on behaviour. Documents pour l'action as originally named in Zacklad's French paper are not just an amount of information, which is waiting to be recognised by a human, but are involved in some kind of outcome such as changing a job applicant into an actual employee (Choksy, 2015, p. 877). Another example can be given with reports of accounting departments of an organisation. The reports include many numbers outlining the transactions (or a summary of the transaction) performed by the organisation. Legally the organisation is required to keep these reports for a specified time. However, the reports need to be stored as documents, which represent actions and not because they are reports (Choksy, 2015, p. 874).

Documents for Actions have their focus on the transactional view to documents, which can be connected to the area of computer supported cooperative work (CSCW) in terms of coordination activities on the one hand. On the other hand they go along with the before outlined theory of documentality which can be made visible through a humorously described example by Buckland. He outlines, that he has a passport and that this passport can travel around without him. However, he is not able to cross country borders without his passport. The passport is part of a culture including people accepting it as a document, which grants rights and privileges for action (Brown and Duguid, 2000). Thus the passport represents a Document for Action which only is valid in a special social construction (Choksy, 2015, p. 871).

Especially with the emergence of new software systems and ways to collaborate as outlined in the previous written chapters, more and more Documents for Actions are created. Thus Zacklad (2013, p. 252) himself names blogs and wikis as examples of Documents for Actions. However, one major challenge of DfA is their management along their lifecycle, which results from their characteristics including the following aspects (Zacklad, 2006):

- *Incompletion/Status*: DfA are often published while they are in an incomplete state. Therefore, evolving DfA and stabilised DfA are being distinguished.
- *Changing/Versions*: DfA are getting updated constantly creating different versions of the documents as well as their fragments.
- *Fragmentation*: While they are in their evolving phase, DfA are expanded through different fragments such as annotations, which are only loosely linked semantically.
- *Multiple Authors*: The various parts of DfA are often created by various authors.
- *Relationship*: There is often a non-trivial relationship between the document's fragments and their creators.

All these characteristics lead to the final content of DfA, which “*remains largely indeterminate*” (Zacklad, 2006, p. 206), challenging the latest document theories. For the understanding of documents today it is therefore important to define documents in a way which accounts for their characteristics being on-going, in the same way it was done in the 1950s to define documents as tangible and self-defined objects by Biret (Zacklad, 2006, p. 207). Furthermore, Zacklad stresses the importance of new principles for indexing and classification of DfA in order to facilitate operational information management activities and to contribute to the long term knowledge management of DfA through successive capturing of different versions during their evolving life.

2.2. Enterprise Collaboration: A Source of Social Business Documents

In recent years, changing technologies have had significant impacts on organisations, changing their business models and value chains (Markus and Porak, 2000), their communication methods and the way they create and use documents. While collaborative work and knowledge sharing are not new phenomena, they are increasingly being supported by Social Software tools such as wikis, instant messaging, blogs or forums, which are grounded on Web 2.0 technologies. Enterprise Collaboration Systems (ECS) are organisational software platforms which are built around Social Software and classical groupware components (Leonardi et al., 2013; Schubert and Williams, 2013) and could therefore also be described as “*socially-enabled*” collaboration systems (Hausmann and Williams, 2016).

There is no overall agreed and used terminology differentiating the different systems and “*The social media landscape is rich, highly varied, and complex*” (Aral et al., 2013). However, in order to separate the personal and the business use of Social Software, Schubert and Williams (2013) developed the classification as shown in Figure 2. The term Social Software is used as the overarching term describing systems that enable the human-computer interaction including the communication and interchange of people in a network (Schubert and Williams, 2013) and thereby uses Web 2.0 applications (Richter and Koch, 2007). Depending on the access and the ownership Social Software can be divided into two separate groups: Social Media and Enterprise Collaboration Systems. Social Media are open platforms on the Internet that can be used by private people as well as by organisations. Enterprise Collaboration Systems on the other hand are closed, behind-the-firewall platforms which are used within organisations (Schubert and Williams, 2013, p. 225). They are often also referred to as Social Business Systems (Jones, 2012, p. 4). Organisations that use all or parts of the above described Social Software can be named Enterprise 2.0 (McAfee, 2006) or Social Businesses (Kiron et al., 2012, 2013).

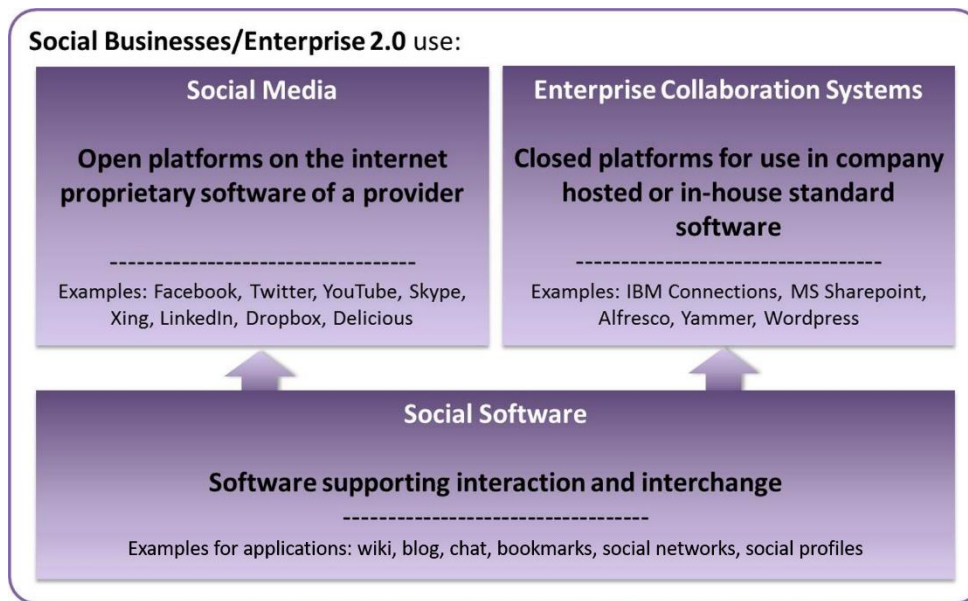


Figure 2: Social Software and its manifestations
(adapted from Schubert and Williams, 2013, p. 225)

There are thousands of different vendors and products on the market, which support the communication and collaboration of people in a company. However, the distribution of software vendors within the market is quite dominant. The top 10 software vendors accounted for nearly 69% of the worldwide collaboration market (Stevkovska, 2016). Microsoft is leading with around 20% market share, followed by Cisco with 11% and Citrix with 10%. IBM, who with IBM Connections developed one of the first broader software suites that entered the ECS market (Drakos et al., 2013), accounted for 5% of the global market in 2015. Other vendors, to name a few, are Atlassian, Tibco Software, OpenText or Liferay (Drakos et al., 2013).

As new vendors are still entering the market and acquisitions and consolidations are changing the market quickly, it still remains dynamic and highly competitive (Drakos et al., 2013). Besides, the integration to traditional Enterprise Social Software suites such as e-mail gains more and more traction (Markets and Markets, 2014) so that it can be assumed that the market will grow further in the future.

As socio-technical systems Enterprise Collaboration Systems *“are comprised of hardware, software, people and their work practices, organizational procedures and business processes”* (Hausmann and Williams, 2016, p. 46).

Key characteristics of ECS and Social Software in general can be found within different definitions (Corso et al., 2009, p. 225; Frappaolo and Keldsen, 2008; Herbst and vom Brocke, 2013; Richter and Koch, 2007; e.g. van Osch and Coursaris, 2013, p. 703). Bringing together the main aspects of the definitions, ECS usually support:

- the communication of people,
- the development of user-generated content,
- the relationships and connections between people and
- the interaction and collaboration between people and groups.

These characteristics go along with the key drivers and activities for organisations to start using Social Software, which are the need to find and share expertise, knowledge and content, as well as to break down departmental and geographical barriers (Jones, 2012, p. 5; Miles, 2011a, p. 4f).

In order to support all these activities ECS are often integrated systems encompassing many different applications sometimes also referred to as features, functions or modules (Schwade and Schubert, 2017), which most of can also appear as standalone applications. The most prominent examples are (Frappaolo and Keldsen, 2008; Schubert and Williams, 2013; Wilkins and Baker, 2011):

- bookmarks
- blogs
- chat
- community spaces (sites)
- forum
- instant messaging
- mashups
- microblogs
- podcasting
- RSS
- social gaming
- social networks
- social profiles
- tagging
- web conferencing
- wikis

Even though there are no fixed definitions for the different applications (Payne, 2008, p. 7), most applications of the same name have the same characteristics and components in the different systems, which result from the common purposes of the applications. The main applications used beside instant messaging, which seems to be the most common feature (Miles, 2010), are social networks, wikis, microblogging, video sharing, blogs, project sites and newsfeeds (Herbst and vom Brocke, 2013; Macnamara and Zerfass, 2012, p. 296). However, within the following only those applications are shortly outlined that are further addressed and/or examined in the analysis part of this thesis (chapter 5).

Communities/Sites: Within their paper, Jeners and Prinz (2014) talk about shared workspaces. Looking into the different software systems, these workspaces are most often called communities (as in IBM Connections) or sites (as in Atlassian Confluence). Except for their descriptions, communities most often do not offer own functionalities/content, but give the possibility of bringing different applications together as a container. They provide an overview of its content for the members of the community (Schwade and Schubert, 2017).

Blogs: The word 'blog' emerged from the word 'weblog' created in 1997. It is composed of web and log, which should outline the nature of a blog being on the Internet and its functioning as a meeting minute. Blogs can be seen as some kind of diaries or journals, which are created by individuals, containing information about a particular topic to communicate historic or up-to-date information. Usually blogs offer the feature to comment on individual blog posts for the reader to write his or her opinion to the blog post owner (Baxter and Connolly, 2013, p. 105; Payne, 2008, p. 7). Each blog entry is dated and within one blog the individual entries are usually

listed in reverse chronological order. It is commonly said that blogs should be updated regularly where updating refers to creating a new blog entry (Herring et al., 2005).

Discussions/Forums: The applications that offer the user the possibility to write postings and share these with other users so they can read and answer/comment on the post are often called discussions or forums. A sequence of such posts and answers are called thread and is usually shown as a tree structure. In order to separate different postings, discussions can be separated through the use of different topics. As the mode of operation of discussions is similar to a notice board, they are also often called bulletin board (Koch and Richter, 2009, p. 33). As the name implies, discussions are mostly used by people in order to discuss topics through the Internet.

Wikis: The word wiki originally comes from the Hawaiian language meaning something like 'quick', or 'informal' (Leuf and Cunningham, 2001, p. 14; Payne, 2008, p. 7). Within their book Leuf and Cunningham (2001, p. 14) define a wiki as *"a freely expandable collection of interlinked Web "pages", a hypertext system for storing and modifying information—a database, where each page is easily editable by any user with a forms-capable Web browser client."* This database of information should be easy and quick to edit. The main activities, which can usually be performed within wiki systems, are content publishing, updating/editing, browsing, linking, commenting and removing content (Leuf and Cunningham, 2001, p. 33; Payne, 2008, p. 7). A key characteristic of wikis is their versioning which allows to keep a complete history of the changes that have been performed. Used within companies, wikis can help organisations in creating knowledge repositories (Hasan and Pfaff, 2006) and in reusing knowledge (Stocker and Tochtermann, 2009).

Research in the area of Social Software increased enormously within the last years. However, while some areas are developing quickly and broadly other areas are only within their beginning phase (Aral et al., 2013). A Social Software research study conducted by Williams et al. (2013b) examined which areas have been and are in the focus and if academic literature is addressing practitioner reported challenges in the area of Social Software. The study thereby revealed, that topics such as adoption, use and impact are discussed by both parties. However, the amount of studies dealing with topics such as technology, integration, governance, risks and compliance (GRC) as well as information/content was clearly different, the latter receiving a much higher attention by practitioners than within the academic field. The theme of information/content deals with the management of information arising in Social Software applications and is related to the general information management practices of organisations.

Most of the applications of ECS enable the creation of some kind of information and content, which parts of can be labelled as Social Business Documents. As the main object of this dissertation a working definition of SBD is provided in section 2.3 below. However, practitioners are already discussing issues around the social content. In order for this study to also address SBD from the academic side we need to know the system SBD are created and stored in to get to know the usage and changing possibilities of SBD, which in turn influence their management.

Therefore, the nature and structure of Social Business Documents within Enterprise Collaboration Systems is further examined in chapter 5.

2.3. Working Definition of Social Business Documents

The history of the word document as well as a definition of digital documents has already been outlined in chapter 2. Documents bring our knowledge and impressions into use that would only last for a limited time, if not kept in documents (Lund, 2009). With the emergence of Enterprise Collaboration Systems more and more content is created, which is now either created there instead of in another system or would otherwise not have been kept anywhere. The concepts of documentary practice in conjunction with the insights in ECS presented above give reason to the finding that some of the ECS content are documents. The use of the term document also for describing the information addressed in this dissertation, follows the work conducted by authors within library and information science (e.g. Briet, 2006; Buckland, 1997). Digital documents are not restricted to specific formats or mediums.

Furthermore, within his process of documentarisation Zacklad (2006) refers to activities that apply to social content: it is distributed over space and time, disseminated by individuals and groups and captured – in this case with the help of ECS. Therefore, the documents of ECS can be named Social Business Documents and can be seen as a subclass of digital documents.

Zacklad further outlined the three main functions of techno-informational equipment: (1) representation of work and processes; (2) semiotic production process independent documentary resources; and (3) management of content including its various fragments. These functions go along with what is needed to create social content, thus Social Business Documents. In conjunction with techno-informational equipment Zacklad further described the process of substitutive coordination, which includes automated processes performed by techno-informational equipment. Enterprise Collaboration Systems partly offer support for these processes to undertake coordination activities, which further encourages the view of social content as documents.

The term social document is often explained with examples such as wikis or forums and can be seen as socially-constructed artefacts, which reflect communication (Scifleet and Williams, 2011, p. 3). However, based on their definition of digital documents, Hausmann and Williams (2015) developed a working definition of Social Business Documents, which emphasizes three different aspects. First, Social Business Documents are interactive in their nature and live through the communication and cooperation between people in a business. Second, without being tied to a special format, the creation of Social Business Documents is linked to a special kind of technology, namely Web 2.0 applications or Social Software. Third and last, Social Business Documents can consist of several objects leading to more complex compound documents. The definition of Social Business Documents is as follows:

“Social Business Documents are user-generated electronically stored semi-structured information created with Web 2.0 applications or social software components, which extend our knowledge by supporting business communication and/or informing stakeholders. With the focus on interaction between stakeholders, social business documents often do not only consist of one single instance, but are compound objects of different social content. Independent of their format, but dependent on their purpose, social business documents pass through different phases during their lifecycle (creation, use and disposition) and have different phases in which they need to be managed” (Hausmann and Williams, 2015, p. 365).

Examples of Social Business Documents, which are looked at in this study are wiki entries, blog posts and discussion posts. The definition above already addresses some characteristics such as being user-generated, electronically stored and semi-structured. It further includes one of the main characteristics of Social Business Documents: being compound documents. The concept of compound documents is not new. Asprey and Middleton (2003, p. 11,57) already discussed compound documents in the context of e-mails and HTML web pages. They describe compound documents as *“document[s] created at the time of viewing that comprises components from several digital sources in different formats brought together for display so that they manifest themselves as a coherent document”* (Asprey and Middleton, 2003, p. 317). An e-mail for example consists of its main text and can include additional attachments or links to other documents. The concept of compound documents is used as an analytical tool in this dissertation to examine Social Business Documents and their components in the following modelling processes.

Beside the characteristic of being a compound document, the definition does not further outline many characteristics of social documents nor does it specify their structure. It only describes the type of documents further examined in this research. However, in order to further clarify what is meant by Social Business Documents in this dissertation, the difference between Social Business Documents and social business content is being made.

Social Content can be seen as the umbrella term, including social documents. However, there are valid reasons for differentiation. Table 3 shows examples of Social Business Documents.

Table 3: Examples of Social Business Documents
(partly adapted from Hausmann and Williams, 2015)

Name	Description	Purpose/Aim
Wiki entry	One single page of a wiki application.	Collaborative knowledge sharing
Blog post	One post of a blog on a particular topic from one user.	Information and opinion sharing
Discussion/Forum posts	One post within a discussion/forum application open for discussion.	Exchange of thoughts and opinions
Calendar entry	Event planner and reminder.	Time planning
Task	To-do entry that can be assigned to a person/group and can have a due date.	Distribution and overview of tasks
File	A file e.g. pdf or jpg (originally without social features) uploaded to a social software system, becoming social through the upload.	Capturing information in a special format

Taking a wiki as an example, the wiki is the application in use. In its simplest form, a wiki consists of several wiki entries whose main purpose is capturing knowledge. Each individual wiki entry can be seen as a social document. Thereby, the wiki entry has its own content and metadata and even though different components such as comments or likes are often attached to them, the wiki entries themselves can exist alone without any additional social content and can thus be defined as a document. In contrast, Table 4 provides examples for social content.

The first three examples of Table 4 – like, tag and comment – represent components of Social Business Documents. Whereas the like and the tag itself do not outline anything by themselves, the comments could also be seen as social documents themselves, as they can carry much and in itself complete information. However, a comment cannot exist by its own. It is always attached to a document. Therefore, the author categorises the comment as social content. The last two examples – link/bookmark and site/community – can exist on their own and thus could be seen as individual social documents. However, their main purpose is to aggregate and link to other documents. Therefore, they are classified as social content as well.

It therefore becomes obvious as well that the differentiation between the features of Social Software and its content and documents can be quite difficult as the terms, such as wiki or forum, are often used for the features and for the content in the same way.

The differentiation between documents, content and features becomes important when thinking about the objects which need to be managed and addressed. Thus there is no need to think about the management of a single like as the like itself would not carry any relevant information. However, a like as content attached to the main document, a blog post for example, and therefore building the overall compound document should be taken into account.

Table 4: Examples of Social Business Content
(partly adapted from Hausmann and Williams, 2015)

Name	Description	Purpose/Aim	Why it is not a social document
Like	Expression of favour for a specific document.	Recommend a documents, shows consent	If seen alone, the context of the like is gone and it is no longer related to any information. All likes are the same, the difference is in what someone likes. When for example attached to a wiki entry, the like becomes part of the wiki entry social document.
Tag	A keyword or index term attached to other documents.	Clustering content for better searchability/ classifying content	A tag alone is just a word and has no explanatory power. It becomes part of a social document when attached to it and can rather be seen as a classification and/or special kind of metadata of the document.
Comment	Written annotation related to another social document.	Add opinion, concerns or ideas to a topic	A comment itself can include important information and could be seen as an own document. However, a comment cannot exist on its own and can only be created by adding it to an existing social document, thus becoming part of the social document.
Link/Bookmark	Link to another piece of information.	Record the address of something for future access	Even though a link can have other components such as likes or tags added to it, the link only refers to other content.
Site/Community	Document and content overview page.	Collection/ Aggregation/ Entry point of/for other social documents	A site can have its own, individual content, such as the site description. However, its main purpose is the aggregation of other documents.

2.4. Conclusion

Social Software and Enterprise Collaboration Systems can be seen as new developments in the area of Computer Supported Collaborative Work and Groupware, creating new kinds of documents. While in the past, the systems as well as the research field of CSCW in general addressed topics such as the nature of collaboration – differentiating between synchronous and asynchronous communication (IJsselsteijn et al., 2003) – and collaborative writing (Cross, 2001), the content perspective was not gravely addressed. The focus has partly been on the status of documents as, for example, when the last update of a document was made (Diaper and Sanger, 2012, p. 62). However, the consequences for the documents and their management are mostly not reflected on. Furthermore, also the concepts around documents and the research field of document theory has mainly focussed on cultural artefacts rather than business documents (Choksy, 2006).

However, it was questioned, if a wiki entry within an ECS, for example, should be seen as a document. In order to answer the question of what a document is today, “*we need to remember*

the path of reasoning underlying the” concepts of documents in the past (Buckland, 1997, p. 808). The perceptions of documents thereby are quite diverse and dependent on the situation and the observer. For Otlet everything that informs is a document, for Briet it is everything that provides evidence and for Buckland everything that can be given a file name. Definitions of documents vary and can occur in a very broad sense (Lund, 2010, p. 742). Weinberger (1998) even argues that *“our use of the term 'document' is simply evolving at a faster pace than some of us are comfortable with”*.

In fact, especially digital documents and the technologies around them provide many opportunities to improve the performance of an organisation (Igbaria & Sprague 1998, p.2). Documentation is all around and appears everywhere in businesses, governments and cultures (Riles, 2006, p. 5). However, the nature and structure of Social Business Documents seems to be different to other digital documents, leading to a growing need to analyse SBD itself.

Zanish-Belcher et al. (2002, p. 4) argue that because of the vast amount of documents the quality which documents and records had historically is adulterated. More and more businesses are implementing social software into their key business processes and use it internally as well as externally for communication with vendors and partners and external customer engagement (Wilkins and Baker, 2011, p. 5f). It is even said, that the programs supporting enterprise collaboration are becoming a mainstream business practice (Payne, 2008, p. 5) providing competitive differentiation for organisations (Moore, 2011) and a business critical factor (Jones, 2012, p. 11). Thus, more and more information and documents are created within these systems.

All the characteristics of digital documents and records above outlined as well as the possibilities of Social Business Documents give us a variety of positive opportunities to work with documents and gain more value from digital documents than it might have been with traditional physical documents. However, *“the changing nature of documents creates new problems”* (Liu, 2004, p. 284) and thus there are also negative aspects connected with some of these characteristics. Thereby, the consequences of Social Business Documents’ characteristics for their management has mainly been neglected by now. Taking a documentary practice view provides us with several insights as to what should be focussed on: technical, social and mental aspects including the questions around their long term management. Therefore, the next chapter provides further insights into the current management of Social Business Documents.

Chapter 3.

Current Management of Social Business Documents

Social Business Documents can “*contain important business information that requires systematic management*” (Hausmann and Williams, 2016). Enterprise Information Management is the discipline dealing with the management of documents in organisations and therefore is outlined below as the concept to address Social Business Documents. Furthermore, this chapter gives insights to the current management of Social Business Documents, including different requirements, risks and challenges.

3.1. Enterprise Information Management: Addressing Unstructured Documents

It is not a new phenomenon that documents and information in general need to be managed. However, within recent years it becomes increasingly clear that information is a strategic resource or even an asset for organisation that needs to be managed and maintained (Newman and Logan, 2006, p. 4). Information assets thereby include all physical and digital information owned by an organisation and producing value for the organisation (White and Logan, 2014, p. 10). It is vital for organisations’ success that they have full control over all their information assets and manage the information lifecycle (Svärd, 2013, p. 160). However, approaches to information management are quite fragmented (Waldron, 2008, p. 101) and so is the term itself.

3.1.1. Definition and Consolidating Concept

Within the literature a large body of research from various fields such as information science, education, sociology, human computer interaction or information systems, which investigate how and why we create, use and manage information in organisations, can be found (Trace, 2011). Terms such as Information Management, Enterprise Information Management, Enterprise Content Management, Document and Records Management and Knowledge Management can be found. Besides these management concepts we furthermore find disciplines such as Collaboration, Business Process Management, Enterprise 2.0 or Workflow Management as key terms when reading about information management. Thereby, each of these concepts is accompanied by an own system type.

Notwithstanding clear definitions and boundaries between the different concepts and systems in the area of EIM do not exist. Even within a single discipline a clear differentiation does not exist and often it is not clear if there really is a difference (Kampffmeyer, 2013, p. 4). Vendors, practitioners, but also researchers are often using the terms for the concepts, but also for

documents, content and information interchangeably (Olsen et al., 2012; Sprehe, 2005, p. 300; vom Brocke et al., 2011b), especially when it comes to the technology supporting these concepts.

Within computer science, for example, information management is often used as the term to describe information technology management (Wilson, 2002). Within library and information science the term information management has been "*associated with all those activities necessary for the effective acquisition, organisation, storage, preservation, retrieval, dissemination and use of information resources*" (Scifleet, 2010, p. 26). It thus rather focusses on the processes, including both, the technologies, but also policies and strategies, which are connected with managing the information. When looking at information management we should therefore include perspectives from different disciplines such as business principles, management science, information systems, information science, information technology and computer science, for example (Rowley, 1998; Taylor and Farrell, 1992, p. 320). The aim of information management is to improve the effectiveness of the whole organisation through the management of its information as a resource and providing relevant information in a timely and cost-effective way (Wilson, 2002).

Very simply described Enterprise Information Management (EIM) is information management from an enterprise perspective. Similar to the broader concept of information management there is no official definition of Enterprise Information Management at hand (Newman and Logan, 2006, p. 2). However, many authors have written about the scope, purposes and benefits of EIM. Newman and Logan (2006, p. 2f), for example, give a very holistic definition of EIM. They describe Enterprise Information Management as "*an integrated discipline for structuring, describing and governing information assets, regardless of organizational and technological boundaries, to improve operational efficiency, promote transparency and enable business insight*". Thus they include internal and external information as well as paper and digital ones. In their further description of EIM they go on with outlining EIM as an integrative discipline bringing together technological, business and organisational areas, which goes along with the definition for information management and takes into account the systems, policies, frameworks, people and processes of an organisation (Ladley, 2010, p. 9). Figure 3 below shows the different terms and how they are embedded and connected.

Comparing Enterprise Information Management with Enterprise Content Management, Enterprise Information Management can be seen as the wider concept. ECM is a relatively new approach to information management (Svärd, 2013, p. 160) and a relatively young field in academia (Tyrväinen et al., 2006, p. 672) and practice (Dillnut, 2006, p. 39). This might be explained through the content it is looking at. Enterprise Information Management includes all information of an organisation, structured and unstructured (Blair, 2004, p. 65). In contrast to this, the concept of ECM, developed within the mid-1990s when the web begun to become more important. Organisations started to introduce web content. This web content needed to be managed and ECM started to emerge (Päivarinta and Munkvold, 2005). Since then the focus of

ECM became broader and today it includes content and information that is less structured (semi- and unstructured information (Blair, 2004, p. 65)) and exists outside traditional databases or transactional systems such as Enterprise Resource Planning systems. Examples of such documents and information are word processing documents, e-mails, digital images, PDF files or videos.

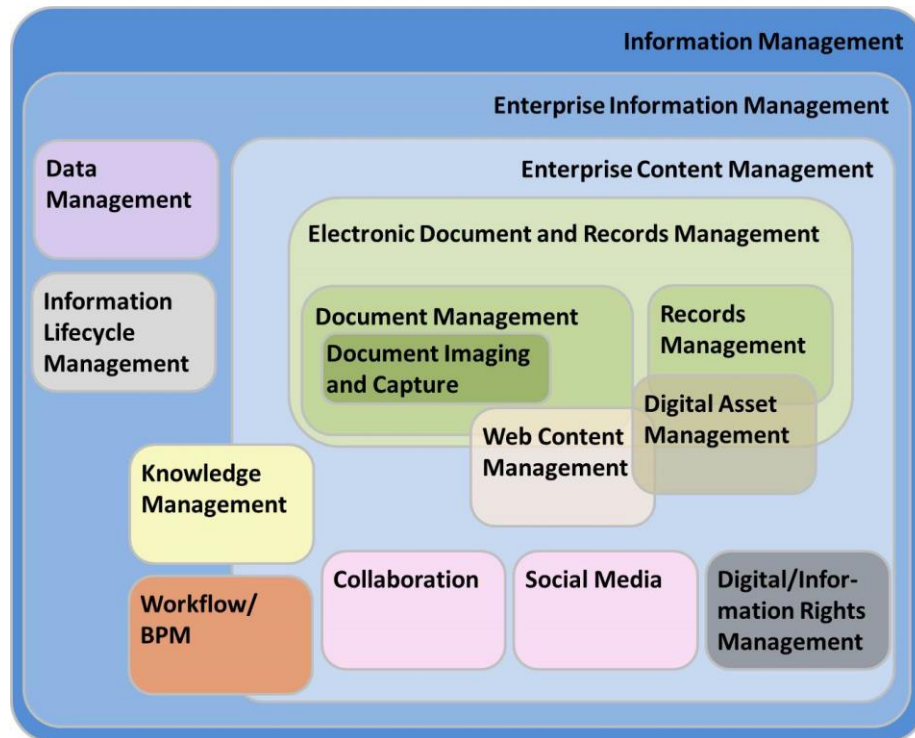


Figure 3: The Information Management Domain
(adapted from Benevolo and Negri, 2007, p. 13; Datamonitor, 2009)

For practitioners the term ECM mainly refers to systems and technologies, however, the challenges addressed by ECM are only partially technological in nature (Tyrväinen et al., 2006, p. 628). ECM is a multi-dimensional research phenomenon (Tyrväinen et al., 2006, p. 631) and even though the term is extensively used, there is confusion about its meaning (Smith and McKeen, 2003).

Similar to the concept of ECM, today also Enterprise Content Management Systems (ECMS) often incorporate components such as Document Management, Web Content Management, Records Management, Collaboration and Business Process Management/Workflow (Götzer et al., 2014; Usman et al., 2009) and a differentiation is becoming increasingly difficult and is further diminishing (Asprey and Middleton, 2003, p. 36). Thus many vendors today offer ECMS suites incorporating the above mentioned components, image-processing and social content as well as extended components, such as search, business intelligence content analysis and web analytics (Frappalo and Keldsen, 2008; Genovese, 2012; Gilbert et al., 2011; Götzer et al., 2014; Tay, 2012). What should be kept in mind, but seems to be forgotten quite often today, is that ECM emerged from document management, which in turn was developed to manage the documents relevant for the legal and business processes of an organisation (Kampffmeyer, 2003).

Vom Brocke et al. (2012) outline four dimensions of ECM, which can be seen as the requirements in order to gain the benefits ECMS can offer. They are efficiency, availability, consistency and traceability. Efficiency mainly points to cost and time savings and availability to the point that information and documents must be stored in the way that they can be retrieved afterwards. With consistency the unification of content across an organisation is outlined. Last, traceability refers to the need to control everything that is happening with a document during its whole lifecycle to be able to meet compliance regulations.

In order to meet these requirements ECMS offer many different functionalities such as (Asprey and Middleton, 2003, p. 92; Raynes, 2002, p. 304):

- Document production and capture
- Version control
- Metadata management
- Classification
- Check-in/Check-out
- Complex document relationships
- Security of documents
- Document review and approval
- Free-text search and information retrieval
- Viewing
- Metadata
- Workflows
- Archives and disposal
- Digital signatures
- Architecture
- Effective interfaces with other systems
- Audit trails
- Security processes

They thereby keep information such as a unique identifier, the author, the owner, a classification, the time of creation, title, keywords and many more (Asprey and Middleton, 2003, p. 294).

One of the reasons why all these functions are included in ECMS today is that the market around ECMS, developed from document and records management systems, has gone through a strong consolidation (Gäb et al., 2012). Today, some authors say that the market is quite mature (Datamonitor 2008) whereas others are arguing it is immature (Päivarinta and Munkvold, 2005). However, the market is growing. Thereby the variety of systems is growing as well and hundreds of software vendors are offering different products with quite a wide range of functionalities, architectures and price tags (Päivarinta and Munkvold, 2005).

The market thereby is quite dominantly controlled by only a few vendors that gain nearly half of the ECM revenue: EMC, IBM, OpenText and Oracle (Gilbert et al., 2011), which can also be seen as the traditional vendors. Major vendors also include Microsoft, Hyland Software, HP, Xerox and Alfresco (Weintraub, 2011). Other smaller vendors are, for example, Fabersoft, Laserfiche, Adobe, Objective, Saperion or d.velop. It should be taken into account what an AIIM study reveals concerning the amount of ECM systems in one company: according to the AIIM, 72% of the interviewed large organisations use three or more ECM, DM and/or RM systems of which 25% even use 5 or more systems (Miles, 2011b).

While in general only little academic literature had been produced in the area of ECM (Haug, 2012, p. 351) a very comprehensive overview of existing ECM publications can be found in Alalwan and Weistroffer (2012). However, they identified that most academic papers discuss issues around the tools, thus being in the technical dimension and lacking adequate meta-analysis research of the current state within the field (Alalwan and Weistroffer, 2012, p. 454).

As mentioned before, ECM covers two separate, but connected issues which need to be looked at: the different software tools for managing content and the strategy itself for managing the whole process (Shegda, 2011). Therefore, Smith and McKeen give a very broad and comprehensive definition: ECM *“is an integrated approach to managing all of an organization’s information including paper documents, data, reports, web pages and digital assets. ECM includes the strategies, tools, processes, and skills an organization needs to manage all its information assets (regardless of type) over their lifecycle”* (Smith and McKeen, 2003, p. 674). Within their definition of ECM Grahlmann et al. (2012, p. 272) take the same approach, but describe the lifecycle further with *“capturing, creating, managing, using, publishing, storing, preserving, and disposing content”*. Thus, it is everything needed to think and do about content in the organisation and includes different dimensions such as tools, strategies, processes and people (vom Brocke et al., 2010).

As Figure 3 shows, many more concepts are connected with EIM and ECS. It is not the aim of this dissertation to outline them all. However, as document and records management are the key concepts dealt with in this study, they are further addressed in the next section.

3.1.2. Document Management Aspects

In today’s businesses documents become of significant value again and should be managed as a resource (Basden and Burke, 2004, p. 360). Organisations need to know which documents and information they have and how they can use them in the best way to support their business goals. Therefore, ECMS are mainly implemented by organisations for reasons of error prevention arising from documents, compliance improvements, increase in employee productivity (Kraus, 2015) and handling of the content chaos at hand (Miles, 2011b) in terms of keeping documents together, finding them more easily.

As a method helping to exploit the strategic potential of information (Buchanan and Gibb, 1998, p. 29) and revealing the different kinds of information that should be mentioned, an Information Audit can be used. Botha and Boon (2003) describe the Information Audit as entailing *“the systematic examination of the information resources, information use, information flows and the management of these in an organisation. It involves the identification of users’ information needs and how effectively (or not) these are being met”* (Botha and Boon, 2003, p. 24).

The information asset register is one outcome of an Information Audit. Addressed differently by the different authors, nearly all audit processes include some kind of capturing and categorisation of an organisation’s information (Botha and Boon, 2003; Buchanan and Gibb, 1998). The register can thereby be defined as *“a collection of documents and their artifacts”* that

lists sources, metadata, origins and many more. The richer the register is the more effective it is (Glushko and McGrath, 2005, p. 227).

The ITIL (IT Infrastructure Library), for example, provides guidance on what has to be considered when establishing an information asset register. It lists different criteria such as that an asset has to be uniquely identifiable or an owner needs to be assigned, which should be included in the register.

Beside the general guidance through ITIL, there are different information asset register templates available. In the following three are shortly outlined, as these can also be used for identifying the metadata of information (see section 6.1.4).

- *InfoMap*: Includes an information inventory data form classifying information and outlining administrative metadata such as ownership and responsibilities. It further asks for supported processes and the storage format (Burke and Horton, 1988).
- *TAHO* (Tasmanian Archive and Heritage Office): Methodology for establishing an information asset register including five main areas of metadata: asset information, people, management, usability and technology requirements. They further include aspects such as status information of an asset, compliance and risks (Latham, 2013).
- *ISO27000*: Toolkit (Excel spreadsheet), including an information asset register and separating the information of assets into three main categories: (1) metadata about the organisational unit and the processes of the assets; (2) 'information asset details'; and (3) information about the protection of the asset (McColl, 2012).

However, when identified, the information and documents need to be managed. Thereby managing generally refers to trying to achieve set goals by planning, directing and supervising the processing of a plan. It is the governing of something (Ladley, 2010, p. 9) and not a new phenomenon. Paper documents, just like digital documents, need to be managed. Thereby different aspects such as generally accepted principles, laws, regulations, policies, etc. need to be account for. Within the following some of these aspects are shortly outlined in order to give an impression about influencing aspects.

Information Management Principles

Waldron (2008) outlines that all information management activities should be incorporated in an information management strategy. As a key element of such a strategy the following 9 principles should be addressed:

1. Information should be seen and managed as a *corporate asset*.
2. Information can be *confidential* and therefore needs to be held *secure* preventing unauthorised access.
3. Information must be *accessible* for those who require it.
4. In order to be adopted systems supporting information management must be *easy to use*.
5. Captured information must *comply* with legislation and operational requirements.

6. Actions around information management should be *based on standards* if available.
7. It should be possible to *preserve* information regardless of the system it was produced in.
8. Information must be managed in line with organisational *guidelines*.
9. All information needs to be *stored and managed the same*, regardless of the format.

Most of these principles express some kind of requirements for managing information. However, especially with the new types of content and documents that exist today this is not always easy.

Information GRC: Laws, Regulations, Frameworks and Models

Information governance represents *“the discipline of managing information according to its legal obligations and its business value”* (Paknad, 2010). The concept of governance thereby is highly related to risks and compliance. Therefore the three concepts of government, risks and compliance should be looked at as an intergrated concept and today most often are addressed together with the acronym GRC (Governance, Risks and Compliance) which was first introduced by Pricewaterhouse Coopers in 2004 and is since becoming a widely spread business requirement of organisations (Gill and Purushottam, 2008).

Information GRC can be defined as *“an integrated, holistic approach to organisation-wide governance, risk, and compliance ensuring that an organisation acts ethically correct and in accordance with its risk appetite, internal policies, and external regulations through the alignment of strategy, processes, technology, and people, thereby improving efficiency and effectiveness”* (Racz et al., 2010). This includes activities around ensuring accessibility, use and control of information, data protection, business continuity and others (Ban et al., 2010).

One reason, information GRC currently gains importance is founded in more and more laws, guidelines, regulations, compliance requirements and standards emerging, which organisations are forced to comply with. The legislation addressing information management issues highly differs between countries. Prominent German examples dealing with fiscal documents are the Tax Code (Abgabenordnung (AO)) which allows to store documents on a data carrier if this complies with the GoB Commercial Code (Handelsgesetzbuch (HGB)) or the Generally Accepted Accounting Principles (Grundsätze ordnungsgemäßer Buchführung (GoB)), which aim at protecting people against incorrect information and information loss. Further, provisions of how to deal with document are made, for example, through the Civil code (Bürgerliches Gesetzbuch (BGB)), the Copyright Act (Gesetz über Urheberrecht und verwandte Schutzrechte (UrhG)), the Federal Data Protection Act (Bundesdatenschutzgesetz (BDSG)) or the European General Data Protection Regulation (GDPR) (EU Datenschutzgrundverordnung).

Thereby, the new GDPR of the EU, for example, *“represents one of the most significant changes in data protection and privacy law for 20 years”* (O’Brien, 2016, p. 81). Among many other things, the new regulation enforces the appointment of a dedicated data protection officer and

introduces European-wide data breach notification requirement (O'Brien, 2016, p. 82). Furthermore a right to be forgotten is introduced through the GDPR (Haynes, 2016, p. 92).

Leaving the German and EU-jurisdiction, other often cited laws in connection to document management are the Federal Rules of Civil Procedure from the USA, which influence the way organisations must manage their electronically stored information and therefore affects nearly every business document; the Freedom of Information and Data Protection Act for the UK, which affects public authorities and forces them to provide public access to parts of their information; or the Sarban Oxley Act from the USA, which (simply put) addresses all companies who act with securities in the USA and aims at the reliability of their reporting.

All of these laws provide different legal requirements to be complied with. In addition to these laws and regulations there are several guidelines, which can influence the management of documents. Among these are: TR-ESOR, TR-RESICAN and MaRisks. Furthermore, several frameworks and models can be found that support the IT/information governance of organisations by providing guidelines and best practices for information management. Thereby, the most prominent models and frameworks seems to be: BIP 0008, which is a guide on the legal admissibility of electronic records (Waldron, 2008); COBIT 5 as an international framework that addresses the activities around IT Processes (ISACA, n.d.); MoReq2, which specifies the collective requirements for the management of electronic records by EDRMS (Inforesight Limited, 2009); and VERS, which is a "*framework of standards, guidance, training, consultancy and implementation projects*" (State Government of Victoria, 2016) of electronic records. A comprehensive list of models can be found in Mokhtar & Yusof (2016).

Retention Periods and Policies

Depending on the document content, there can be different reasons why a document should or needs to be preserved. These can either be organisational internal reasons, such as that the document is needed for the conduction of business or the document contains historic relevant information, or external evidential reasons such as a legal requirement to keep the document. A document retention policy outlines the rules, that determine how long certain documents need to be retained, before they can or need to be deleted (Barker et al., 2009, p. 117). The deletion process, in the best case, should then be rule-based and automate (Kraus, 2015). However, the legal requirements differ from country to country and there are also industry-specific regulations, which need to be taken into account.

Furthermore, the reasons outlining which document to store how long are often not specified in a sufficient manner. Because of this lack of transparency many organisations and people interested in document and record management are providing example document retention policies on the Internet, including retention periods (e.g. American Bar Association or AIIM). Most of them are aimed at American businesses. Therefore, the retention periods cannot be adapted per se to German organisations. However, the policies show examples of how to classify documents for setting retention periods. Proposed times, for example, are at least six years from

the date of filing with tax documents or three to seven years for public document such as press releases. Further examples can be found in Corwin (2010), Götzer et al. (2014, p. 259) or Monitor (2009).

Retention periods outline how long a document or record needs or should be kept at least. However, one of the big challenges for organisations is that they often do not know what information they have and what they should retain for how long. One reason for the uncertainty about the times is that the organisations might be influenced by different regulations at the same time all indicating different retention periods (Burnett et al., 2008). Besides, many organisations are not aware of the legal requirements and/or the risks they take by not setting adequate retention periods and do not have them included in their organisation's information management processes (Barker et al., 2009).

Retention policies are especially important when it comes to e-discovery. *"Discovery is the process of gathering information in preparation for trial, legal or regulatory investigations, or administrative action"* (Volonino et al., 2007, p. 231). E-discovery describes the discovery investigation process for digital documents (Sipior et al., 2014, p. 332). Independent of the source, any digital information including its different versions, metadata, backups and so on need to be discoverable if relevant (Withers, 2000 as reported in Sipior et al., 2013). Within a legal e-discovery process in the USA this leads to the fact that during litigation each documents needs to be revealed and made available to the opposing party. If documents are destroyed outside of retention periods the court could assume that the document was destroyed because of potential risks (Barker et al., 2009, p. 181f). Furthermore, if in litigation, all possibly relevant files should be retained even beyond the retention period.

Currently the topic of e-discovery is also emerging in Europe more and more. Thus, a Gartner report predicted that 50% of companies would have been asked to reveal social media documents for e-discovery by the end of 2013 (Logan, 2010).

Document Standardisation

Standards are used in order to define a general level of quality and to establish generally accepted definitions, requirements and/or processes. Looking at electronic documents, records and archival, many different standards can be found. They mostly address the storage and conversion of document into proper retention formats. It can be distinguished between standards addressing the hardware and standards addressing other areas such as organisational matters and storage formats (Gäb et al., 2012). In the following a few examples are shortly outlined in order to provide an impression of the broad landscape of standards:

- *Content Management Interoperability Services (CMIS)*: CMIS defines a domain model, which works on top of existing content management systems and supports the content exchange between applications (OASIS, 2012).
- *Document Object Model (DOM)*: API, which defines the logical structure of documents for a faster access to HTML and XML documents (Robie, 2014).

- *Electronic Data Interchange (EDI)*: Standard for exchanging data of semi-structured business documents such as invoices or orders between companies. EDI thereby defines which characters can be used and how they should be constructed as well as the semantic layer, which maps the characters to meaningful context.
- *International Organisation for Standardization (ISO)*: Many standards related to document and records management are included within the International Classification for Standards (ICS) 01.140.20: Information sciences. A full list of these standards and their topics can be accessed through the website of the ISO: http://www.iso.org/iso/home/store/catalogue_ics/catalogue_ics_browse.htm?ICS1=1&ICS2=140&ICS3=20.
- *PDF/A*: PDF/A today is the ISO standard for long-term archiving. Its aim is to preserve the visual appearance of a document over time, independent of the tool and system it was created (ISO 19005-1 introduction).

Records Management

Within ISO 30300 the term Record Management is defined as the “*field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records*” (ISO 15489, Part 1). Even though the term Records Management is also widely used in Germany today, originally the German translation would have been “Schriftgutverwaltung” (Kampffmeyer, 2012, p. 6).

However, when it comes to records management, more specialised functions than for ‘normal’ document management are required. Even through the audit trail, classification or versioning, as mentioned above, are also important functions for records managers, records further require functions such as the declaration of records, file plans and retention schedules (Shepherd and Yeo, 2003), which often are not included in ECMS directly. Additionally section 2.1.1 already outlined different characteristics and qualities to be accounted for in records management systems. Going along with, and partly overlapping, are the principles records management should follow as outlined by ARMA, a non-profit information management organisation. These are (ARMA International, 2007; Stuart and Bromage, 2010, p. 222):

- *Accountability*: Establishing responsibilities for the management of records and creating policies and procedures to guide people in managing records according to the information governance program.
- *Integrity*: Establishing authenticity and reliability of records.
- *Protection*: Ensuring security of records against harm.
- *Compliance*: Be in pursuance with legal regulations and organisation’s policies.
- *Availability*: Ensuring timely, efficient and accurate retrieval of needed records.
- *Retention*: Maintain records over time according to regulatory requirements.
- *Disposition*: Ensuring adequate destruction of records which are no longer required.
- *Transparency*: Documenting business processes and activities and make them available for all employees and interested parties.

While traditional document management aims at managing the operational level by focussing on the operational needs and is used in order to maximise efficiency, records management aims at managing and recording evidence about these operational activities. Records management is therefore rather administrative in nature (Asprey and Middleton, 2003, p. 89; Chen et al., 2011, p. 172) and aims at the long-term retention of documents by using automation and policies (Gilbert et al., 2011, p. 6). It is thereby important that all of the outlined characteristics, qualities and principles are addressed and maintained in each phase of a record's lifecycle (Mokhtar and Yusof, 2015a, p. 403f).

Furthermore, it needs to be kept in mind that though physical files such as books could be preserved and read for centuries, we cannot predict if digital documents can be read in even a few years. Today the ability to create documents has increased exponentially, but the lifetime of the technology used to store these documents has decreased at the same time. Digital documents have quite a short physical lifetime and need to be backed up regularly in order to be able to archive them for a longer term (Liu, 2004, p. 281).

Archiving

When looking at information management literature and software, archiving is another term and concept that can be found and is often related to records management. In many countries the terms records and archives are even used interchangeably (Mokhtar and Yusof, 2015b, p. 180) and the term electronic records management is used as a rapprochement to bring together both concepts (Gilliland-Swetland, 2005, p. 225). However, while records management was introduced within the mid-1990s to address law and management theories (Mokhtar and Yusof, 2015a, p. 404) archival science emerged around the 17th century as historical repositories (Duchain, 1992). Within his paper Atherton (1985) discussed the differences between records managers/management and archivist/archiving. From a record management viewpoint it might be described that the records manager is a business administrator and an archivist rather is a historian (Brown, 1971). However, both professions have the same objective of effectively managing records across their whole lifecycle (Atherton, 1985, p. 51). Archiving thereby is based on the preservation of documents in order to guarantee the long-time value of information as well as its accessibility and usability (Digital Preservation Coalition, 2015) in a cost-effective manner (Lu and Chiueh, 2006). There is an increasing integration of archiving and records management in organisations (Myburgh, 2005) and we can see records management and archiving going hand in hand as some records might be preserved as part of an archival activity.

Because of compliance and other reasons increasing amounts of content need to be retained. However, it is not always useful to keep all information in the live system (Clarke, 2012a) and this is what most archiving system support: the preservation of documents in a separate system that is still accessible. The access to most documents however is infrequent. This infrequent access is one of the many unique challenges of long-term preservation (Lu and Chiueh, 2006). The challenges in general can be technical, social and organisational (Lorie, 2001). A technical challenge for example is to ensure that documents which are created today can still be readable

in many years (Lorie, 2001). Thereby a common practice is to convert documents into a more common and stable file format. Simple text often uses ASCII, XML, PDF and pictures are saved as GIF, PNG or JPEG file formats. However, the disadvantage of this practice is that the formatting gets lost and thus the authenticity is affected (Zanish-Belcher et al., 2002, p. 51). An example for an organisational challenge concerns the question what should be archived. This goes hand in hand with the challenges of records and the related social challenge could be to raise awareness of archiving in general.

3.1.3. Summarising the Fundamental Requirements of Document Management

While in the past traditional documents were mainly used as a way to establish control, to create identity and to enforce hierarchy in an organisation (Yates, 1993 as reported in Murphy, 2001), today documents are also often used to quickly find exactly the information which is needed to fulfil the next tasks (Levy, 2001, p. 196). As about 80 to 90% of organisational information is stored in documents (Sprague, 1995, p. 30), it is more essential than ever before that documents and the information in them are accessible, can be found easily and are being archived if needed for the purpose of, for example, legal issues.

However, depending on the roles and the value documents have as well as the different characteristics and the various document management aspects outlined above many fundamental requirements for document management can be found, which are outlined in the following. The term fundamental is used here in order to clarify, that these requirements apply for all kinds of digital documents, independently of their format.

System requirements are often divided into functional, non-functional and domain requirements. The functional requirements give a detailed description of the functionality of the system. The non-functional requirements describe aspects such as reliability and interoperability and are not directly related to a specific function of the system. Finally, domain requirements address issues such as standards or infrastructure (Asprey and Middleton, 2003, p. 278). Table 5 summarises the requirements for documents, which include all three types of requirements, as it is focussed on digital documents and the management of documents with computer systems.

Table 5: Fundamental Requirements Derived from the Literature

Requirement	Source
Accessibility/Availability	IM Principle, Record Principle
Accountability	Record Principle
Compliance	IM Principle, Record Principle
Completeness	Record quality
Confidentiality	IM Principle
Consistency	vom Brocke et al. (2012)
Discovery (searchable)	GRC
Easy to use/Usability/Re-use	IM Principle, Record Quality
Efficiency	vom Brocke et al. (2012)
Fixity	Record Quality, Records Definition
Findability	Role of documents
Guidelines	IM Principle
Integrity (authenticity & reliability)	Record Principle, Record Quality
Preservation (retention & disposition)	IM Principle, Record Principle
Responsibilities	Paknad (2010)
Security/Protection	Record Principle
Standards	IM Principle
Traceability	vom Brocke et al. (2012)
Transparency	Record Principle

The individual aspects have already been outlined in the different parts of the literature review above. However, as these build the foundation for the need to manage documents as well as the challenges to manage documents, the terms are shortly outlined in the following:

Accessibility/Availability: Documents must be retrievable by those who require them in a timely, efficient and accurate way. This requirements goes along with findability and security.

Accountability: As one aspect of information governance, accountability includes the establishment of responsibilities for the management of documents and creating policies and procedures to guide people in managing documents.

Compliance: The different laws and regulations each describe various requirements for the creation, access and storage of documents. Examples are to grant document access to tax auditors, data protection, executing the right to be forgotten or obtaining evidence. Most of these requirements lead to additional processes that need to be implemented.

Completeness: The document contains all contextual and relevant information.

Confidentiality: Outlines the protection requirements needed for the document and is one aspect of information security.

Consistency: The unification of content across an organisation as well as its conformity.

Discovery (searchable): Highly connected to findability, discovery aims at providing documents asked for in litigation.

Easy to use/Usability/Re-use: Documents need to be created and stored in a way that employees are able to work with the documents. Furthermore, it should be possible to re-use the (content of the) documents.

Efficiency: Documents should be created and used in a cost and time saving way.

Fixity: The content, structure and metadata of a record are fixed and unchangeable.

Findability: Through findability it should be ensured that needed information can be found and used.

Guidelines: Guidelines can determine how documents should be created, used and managed, for example, and should be followed.

Integrity (authenticity & reliability): Integrity includes the accuracy and completeness of documents over their whole lifetime. It is one aspect of information security. Authenticity on the one hand should ensure that a document is from the source it claims to be from. It thus involves the proof of identity. Reliability on the other hand should ensure that the system functions as expected.

Preservation (retention & disposition): In order to keep organisational knowledge and evidence of business processes, documents need to be assigned to retention periods and deleted or archived according to their context.

Responsibilities: Responsibilities outline duties and assign people to deal with something.

Security/Protection: Especially with the use of digital documents and electronic document management system, information security includes many dimensions. It needs to be ensured, that the documents and the system itself are protected against unauthorized access, fraud or disruption, for example, and meet the requirements of confidentiality, integrity and availability.

Standards: Standards define different aspects such as the level of quality, general accepted definitions, further requirements and/or processes. Organisations are often forced to comply with different standards.

Traceability: With traceability it should be ensured that all actions of a document are known. It needs to be clear what was created, edited or deleted when and by whom in order to be able to provide a full audit trail. Then the traceability can also help in the comprehensibility of documents.

Transparency: Documenting how individual documents are connected to business processes, outline their activities and make them available for all employees and legitimated parties.

As can be seen from these descriptions, the requirements are not distinct from each other and are not mutually exclusive. For example, in order to be compliant with laws and regulations,

some documents need specific retention periods, specific security standards and a specific level of integrity. However, even though they are connected, they all recall different aspects.

3.2. Risks emerging through Social Software/Social Content

Risks can be described as *“the likelihood that in certain circumstances a given threat-source can exercise a particular potential vulnerability and negatively impacts the IT assets (data, software, hardware), IT services, key business processes or the whole organization”* (Spremic, 2005 as reported in; Spremic and Popovic, 2008, p. 221). Even though many researchers have studied the benefits organisations can have from Social Media, only little empirical research has been published within the Information Systems domain that addresses the accompanying risks (Haynes, 2016, p. 90; Sipior et al., 2014, p. 331). However, because of the increasingly important role of IT in companies, the risks when dealing with business processes supported through IT are no longer only marginal technical problems. They are increasingly becoming key business problems influencing organisations’ competitive position and strategic goals (Spremic and Popovic, 2008, p. 220).

Similar to those regarding traditional IT systems, risks in Social Software can, among other reasons, emerge through humans working with the systems (employees and/or customers), the data/content itself, the technology, the organisation and law (Deloitte, 2013; Haynes, 2016; Sipior et al., 2014, 2014; Williams and Hausmann, 2014). Ladley (2010, p. 63f) differentiates between three major kinds of risks. First, business risks such as the loss of market share, decreasing reputation, loss of knowledge or failure to high targets. Second, regulatory risks (litigation) violating the statutes around privacy or security. And third, cultural risks failing to engage with ECS.

Most risks commonly share that it is the content that is in danger or leads to the danger, even though the trigger might have been a technical problem or a personal misuse. IT risk management, for example, addresses aspects such as confidentiality, integrity or availability of an information system (Spremic and Popovic, 2008, p. 222). However, not the system itself should be of importance, but the content stored in this system. Furthermore, poor information management itself can also lead to risks. Despite this, based on a survey among more than 700 organisations, vom Brocke et al. report that 63% of all these companies have not thought about the risks deriving from poor information management and 43% have no approach for meeting compliance regulations (vom Brocke et al., 2011b), even though a Gartner report of 2010, predicted that by the end of 2013 every second company would already have been asked to produce Social Media content for e-discovery (Logan, 2010).

While many risks, such as litigation or the loss of knowledge, apply to all kind of systems that somehow keep information (including Social Media and ECS), the collaborative systems further add to the existing risks and create new ones as well. It is not the aim of this dissertation to outline all these risks. However, the risks provide a major argument for the need of appropriate content management strategies and processes as they outline the worst case consequences.

Therefore, they are shortly summarised in the following. As a result it can be concluded that even though there might be differences in the strength of occurrence of risks through social media and ECS, as social media is much more out-facing, many risks apply for both.

Examples of different risks associated with Social Software are outlined by Haynes (2016), Williams and Hausmann (2014), Wilkins and Baker (2011, p. 13), Sipior et al. (2014) and Dawson et al. (2009) and include aspects such as:

- legal risks through the breach of confidentiality or regulatory non-compliance such as data-protection breaches
- risks in productivity, as people might get distracted from their work or cannot find information anymore
- organisational and personal risks of reputational damage by means of negative comments or inappropriate staff behaviour etc.
- competition risks as others might come faster through market or out innovate
- decrease in information quality
- loss of opportunity
- information loss
- knowledge loss
- loss of control
- technical exposure
- fraud

Many of the outlined risks thereby are connected. When not managing the content of wikis and blogs, for example, they might be swamped with outdated or no longer required information, which can lead to reduced effectiveness as relevant information cannot be found anymore. This could in turn also lead to the loss of opportunity and other results. Williams and Hausmann (2014) address this progress as risks chains.

Albuquerque and Soares (2011) suggest to create a code of conduct as well as rules of practice in order to address some of the risks. However, many risks are also connected to ensuring accessibility, preventing unauthorised access to confidential information, data protection and so on (Ban et al., 2010, p. 6) and therefore need to be addressed in other ways as well. Furthermore, if any information within a collaboration system includes financial related information, for example, this information falls under the GDPdU and needs to be processed accordingly. The same applies for other kind of content and related laws. Therefore, it is also important to take technical activities into account.

3.3. Current State

Up to know now only little research has been conducted on the topic of social content management. Section 2.2 outlined the current themes around Social Software research and identified, that content management is so far rather addressed within the practitioner literature than in academic literature. Furthermore, the majority of the Social Software literature

addressing management aspects is focussing on the external usage of Social Media and its management. Montalvo, for example, wrote a paper about Social Media management in 2011 (Montalvo, 2011). However, he mainly looked at how Social Media can be used for marketing and brand reputation and only mentioned management issues in respect to necessary skills in journalism and public relations. Other authors who addressed Social Media governance are Zerfass et.al (2011) for Europe and Hrdinová, Helbig, and Peters (2010) for the United States. However, there still is a “*significant gap*” in social media research (Macnamara and Zerfass, 2012) and “*the question of content management with respect to an employees’ professional and personal use is left largely unexplored in policy and guideline documents*”, even though it is a concern for many professionals (Hrdinová et al., 2010, p. 9).

Sipior et al. (2013) analysed the current state of e-discovery in Social Media. They stress that even through Social Media often is not addressed explicitly, it is discoverable and increasingly becoming of importance. However, they also outline that up to now only few studies address this issue in the legal literature and that they did not find a single empirical study from within the Information Systems literature. Currently, decisions regarding the discoverability of social media content have only be made on a case-by-case basis by the courts (Sipior et al., 2013).

However, the term of social content management has already been used as early as 2005 by Dimitri Glazkov in a short blog essay (Aladwani, 2014, p. 133). Glazkov there describes social content management as the older cousin of Enterprise Content Management and defines it as “*a set of concepts, methodologies, and standards, which enable and facilitate creation, organization, and maintenance of content by means of social interaction of individuals online*” (Glazkov, 2005). However, no further insights to its management have been given since then.

Looking at current books, describing the efficient use of documents in organisations the topic of social content management has also not been addressed at all or only in a side sentence. The book by Götzer et al. (2014) gives a good example. Within their chapter about the future of document management one subtopic is called “*ECM and Social Media*”. However, it is only about 1/3 of a page and only mentions that Document Management Systems need to be able to handle social content as well (Götzer et al., 2014, p. 335). No further insights about what ‘handle’ means are given. Also Grahlmann et al. (2012) show the different functions ECM should cover within their functional ECM framework and list instant messages, team communication and collaborative editing. But also here, no further guidance is given.

Leaving the academic field, social content management may be a current topic for practitioners, however it seems that it has not been implemented widely yet. A study by Stainbrook et al. (2014) surveyed 1,300 record, information management and information governance professionals in the USA about information governance issues including programs and strategies. Among the respondents 87% indicated that they have a records and information management program and 63% assess themselves as mature or working on addressing digital information in these programs. Nearly all surveyed organisations (92%) have retention schedules in place and 86% affirm that the schedules are media neutral and thus apply to paper

and digital content. However, over 60% of respondents also say that unneeded digital content is not deleted regularly. Reasons for this might be the emerging keep-everything cultures or because people are not sure about current practices. Looking at newer content types and storage locations such as cloud services, smart phones, Social Media and collaboration tools only 10% of respondents assess themselves as being mature in managing this content. Currently social content management is mostly overlooked and only few organisations include it into their information lifecycle practices.

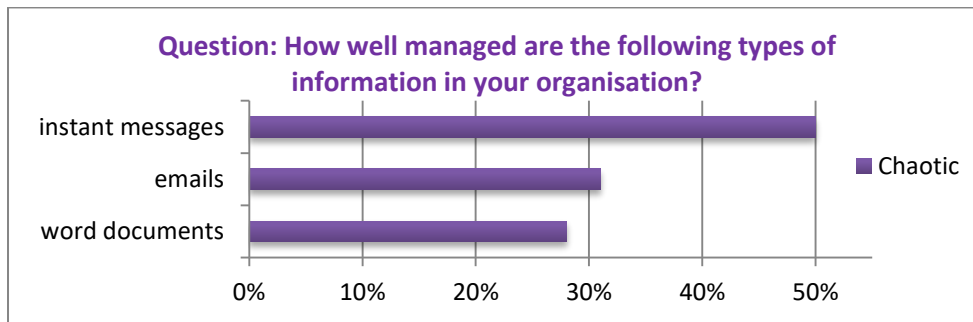


Figure 4: Management of social documents (Miles, 2011b)

Looking at a study of the AIIM where respondents were specifically asked about their management of different information types, 28% replied that they already see their management of word documents as chaotic. For e-mails this number rises to 31% and instant messages, which are quite often used to agree on something even to 50% (Miles, 2011b) (see Figure 4).

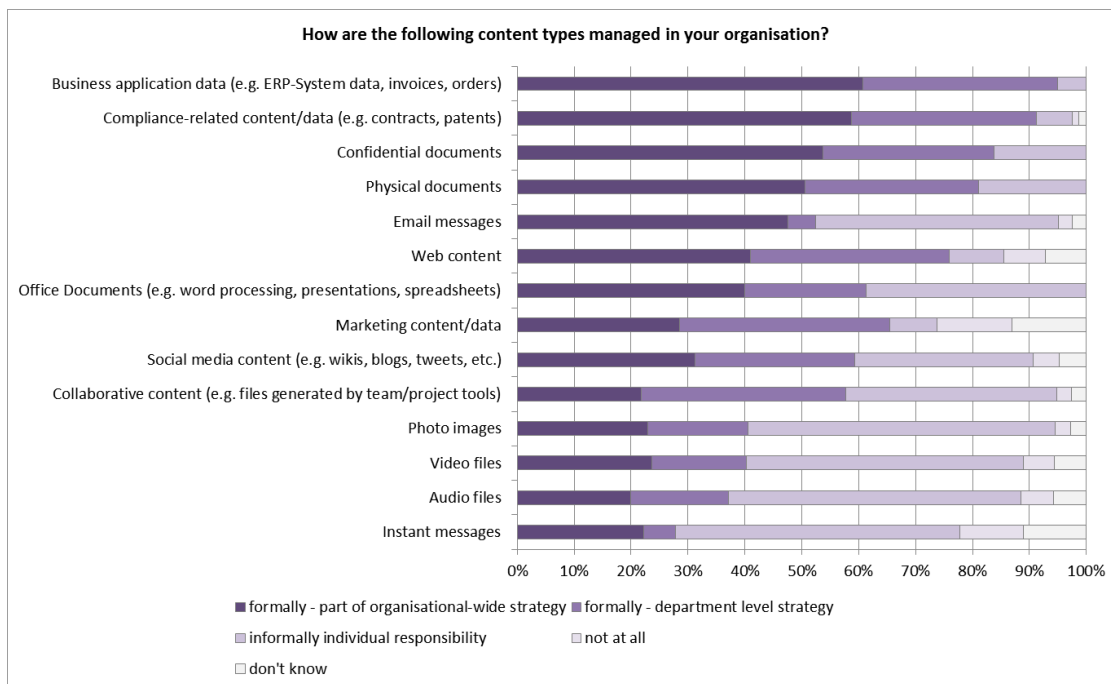


Figure 5: Degree of the management of different content types N=33; (Williams et al., 2014)

Another more recent study, conducted by Williams et al. (2014), confirms the AIIM study and even shows the difference between the content types more clearly. Their respondents were

asked to indicate how, if at all, different content types are managed within their organisation (see Figure 5). The results show that traditional content such as data of ERP systems and other compliance and confidential content is managed on a formal basis by more than 80% of organisations. However, there seems to be a lack in the formal management of newer content types such as photos, videos or audio files. This more unstructured content types as well as Social Media and collaborative content are only formally managed by less than half of the organisations.

Within their survey about social business readiness, Williams and Schubert (2015) explicitly addressed social content management by asking German companies from different industries whether they have official strategies or guidelines for the management of social content and, if yes, what is included in these guidelines. They revealed that around 60% of respondents (N=33) did not have policies or guidelines for social content management in place. If existing, the major topics, which are addressed in the strategies and guidelines, are protection and usage aspects such as restrictions and etiquette. Furthermore, information organisation activities, which include setting responsibilities, classification of content, templates and storage advices, are included in 40 to 65% of the strategies and guidelines. However, less attention is directed to aspects such as deletion of content, archiving and retention periods addressing the long-term management of documents (see Figure 6). The NARA (2010, p. 9) confirms this by outlining that many social media and social software policies and guidelines exist. However, they mostly focus on the usage of the application, not on the information management aspects.

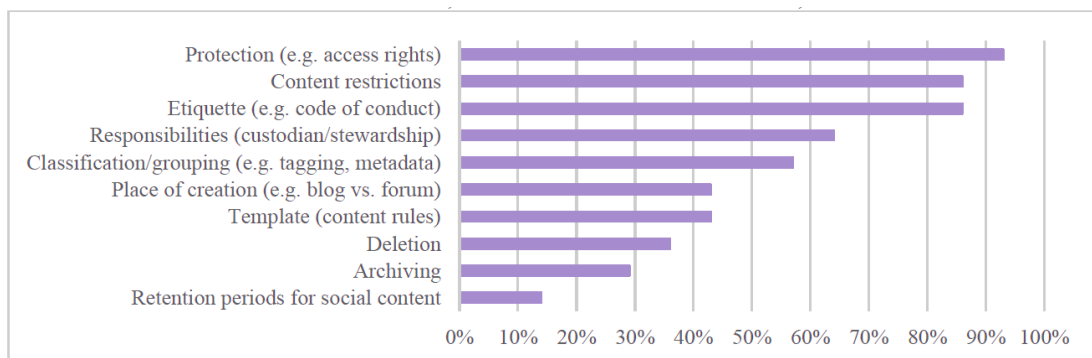


Figure 6: Aspects included in social content management strategies and guidelines
N=14; (Hausmann and Williams, 2015; Williams and Schubert, 2015)

The responsibilities of managing the content and implementing the strategies and guidelines thereby often lies with each individual content creator (40%) or is not defined at all (24%).

Furthermore, an AIIM survey with more than 500 respondents mostly coming from the USA and Canada (76%) including various industry sectors asked, which content types were included in their retention policies and records management processes. The answers show that electronic documents, such as word processing documents, images and photos, are mainly included by more than 80% of respondents. However, looking at Enterprise Collaboration Systems applications such as wikis and blogs this number drops down to less than 20% and with external Social Media even to less than 15% (Miles, 2013). They also asked about the responsibility for

governance. For internal social business content more than 25% answered that nobody is responsible. If there is a responsibility assigned, it most often is within the IT or marketing division.

These insights show that the introduction of ECS and collaborative software often is done without clear strategies for information management and the content created in the ECS is not managed as systematically as other business information. However, one example showing the consequences of poor information management can be seen from Morgan Stanley. Because they failed to keep relevant e-mails to a case which was brought against them they have been fined US\$ 10m (Waldron, 2008). A Wall Street trading firm case from 2003 is similar. The company had to pay a fine of US\$ 8,000,000 because they did not keep their e-mail correspondence with customers (Choksy, 2006, p. 47).

However, only a few models and frameworks exist, which address social content management, and these are not detailed enough. Aral et al. (2013), for example, developed an 'Organizing Framework for Social Media Research' wherein one of the four main research streams is named 'Management and Organisation'. However, they only address issues around which platform to use in which form and shortly discuss that Social Media bears new management and organisational questions, but do not address any content management aspects.

The State Record of New South Wales, as another example, developed an overview of eight different management strategies for Social Media information (State Records NSW, 2014). Each suggested strategy thereby shortly outlines the requirement, associates risks and needed tools. The strategies thereby deepen in the granularity of information management activities from the lowest one 'Leave the information where it is strategy' to the more advanced ones such as seven: 'Information for accountability strategy'. Within strategy seven for example it is outlined that one should *"deploy a rigorous management approach to all your social media activities. You capture full and accurate records of all your social media businesses"* (State Records NSW, 2014). They further suggest to use Social Media information management systems available on the market. However, even though these systems exist, they only are capable to work with Social Media applications and not with content stored in ECS. Therefore, the strategy cannot be applied and does not support this dissertation.

Coming from Social Media to models that also claim to support ECS content, a social business roadmap of the AIIM can be found (Wilkins and Baker, 2011). The roadmap includes many different aspects that need to be taken into account when using Social Software. It therefore consists of eight steps: 1) Emergence, 2) Strategy, 3) Development, 4) Monitoring, 5) Participation, 6) Engagement, 7) Governance and 8) Optimization. Even though it is said to be for internal ECS usage as well as external Social Media usage it mainly focuses on the external side. The content management thereby partly is addressed within step 2) Strategy and step 7) Governance. Thus, within the strategy section of the framework establishing a first governance framework is one of the aspects. Among others the development of a Social Media policy is outlined, which should include the official and accepted use of different applications as well as

the ones prohibited to use. Furthermore, the risks assessment is also mentioned. The Governance phase is divided into the three areas proactive, active and reactive governance (2011, p. 21ff). The proactive governance includes the guidance in regard to the use and management of Social Media technologies and processes. Here the policies should be developed further which can be done by extending existing ones instead of developing new policies for social media alone. Within the active governance issues are included that apply to day-to-day business. These include, for example, the internal monitoring for confidential information, security considerations and the enforcement of policies amongst employees. The retroactive governance includes all post-publication processes. Besides auditing and reviewing, records management and archiving are shortly outlined. It is said that records management and archiving seem to be the most challenging tasks within the roadmap as it is hard to define what a record is and what not and that the content often is stored outside the control of the company by a third party. Furthermore legal aspects are mentioned here. However, no deeper insights are outlined and areas such as archiving or long-time preservation are not looked at at all. It is only shortly mentioned, that internal sites and comments need to be monitored and managed (2011, p. 17).

Aladwani (2014) seems to be the first author who proposed a model for social content management. For him social content management is the newest area of information management. Within his process-model he outlines six aspects (six “As”) which should help practitioners and researcher to think about social content management. However, he is looking at how to gain more value from social content and goes in the direction of data mining and business intelligence. Also this model does not include any elements concerning the management of social content in respect to requirements, risks or challenges of social content. Aladwani only mentions in a side sentence that the benefits of social media are limited by laws, privacy and lack of appropriate capabilities.

In summary the different research initiatives as well as the current activities of social content management in organisations it can be concluded that both are in the early stages not yet addressing social content management in a full and adequate way. Because not addressing information management for social content can lead to significant risks and challenges in the future (Hausmann and Williams, 2015; Williams and Schubert, 2015).

3.4. Open Challenges and Research Imperatives

As the different kind of risks already indicated, challenges of and with Social Software can be quite diverse. A challenge, as outlined in the following, thereby can be seen as a problem area. The concrete challenge is dependent on the individual documents and the systems they are created, used and stored in. Furthermore, some requirements are also taken up as challenges. However, while the requirements outline a status or characteristic a document needs to fulfil, a challenge outlines the problem by addressing/getting to that status.

Challenges not only emerge from the new nature of social content, but also from employees' behaviour, business issues and technological challenges (O'Callaghan and Smits, 2005). One of the first barriers, for example, is the usage of Social Software in general. Herbst and vom Brocke (2013), as well as Jones (2012, p. 7), report about internal barriers of users to contribute to the systems, additional cost in terms of time and effort for its usage, missing involvement of senior staff and barriers in the willingness of user to share knowledge. Furthermore, Macnamara and Zerfass (2012, p. 297) outline different people centric challenges such as the lack of policies and guidelines for the usage of Social Software or the lack of training and support for employees working with Social Software.

Furthermore, once in use, different challenges of managing social content for the long time become visible as well. Thereby the challenges on the one hand build upon the different aspects of document management as described in the different sections above and on the other hand new challenges are emerging through the differences of social content compared to other digital documents.

However, Herbst and vom Brocke (2013, p. 19f) outline that there has not been much research conducted in the area of challenges of social content yet. Even if the need for social content management has been identified and understood, the interactive and collaborative nature of social content still raises many questions that remain open. For example, Gantz et al. (2007) estimate, that 20% of the data being produced today is subject to compliance rules and standards. But the question is which 20%? This is followed by the questions and maybe biggest challenge of deciding what constitutes critical business information at all (Williams and Hardy, 2011) and which social documents need to be included in some kind of management control and in in which respect (Gupta et al. 2001 as reported in O'Callaghan and Smits, 2005)? Within a study of Williams and Hardy (2011, p. 63) one participant argued, that *"The problem is that nobody can tell me what we should be keeping in unstructured information. It's very hard for even the people who own it to know whether it was worth keeping"*. Commenting on a post or clicking a like or recommend button is adding information to organisational content and might be stored (Glazkov, 2005). But we also do not want to over-retain information which can be destroyed (Williams and Hardy, 2011, p. 62). Keeping too much information or keeping the information too long, which could become visible in litigation and be used against the organisation further adds to the complexity of information lifecycle controls. It further bears future challenges in legal hold processes, which are occurring more frequently today (Stainbrook et al., 2014). Thus it might sometimes be positive for the organisation to delete information as soon as possible and allowed (Burnett et al., 2008). Furthermore, if more and more information is saved, it also gets harder for employees to find relevant information.

Nevertheless, it is possible that blog posts, comments to this post or edits on the post are important documents or records and need special treatments within the organisation (Chin, 2010; Wilkins and Baker, 2011, p. 24). Thus it needs to be defined which documents are records and corresponding actions and processes need to be applied. At a first glance Clarke (2012a)

suggests a quite simple solution. She argues that when thinking about whether specific Social Software content should be kept, the question should be asked if it would have been kept, if it were transmitted using another channel. A similar statement can be found by Wilkins and Baker (2011, p. 23). They argue that “*record managers manage records according to their content, not according to the format*”. However, what they also outline is that Social Software brings new challenges not seen before in this kind.

Coming back to the example of the cash receipt from the very beginning of this literature review (section 2.1.1) a cash receipt is commonly recognised as such, even though it is not written on it. However, because of our background and our culture we accept a cash receipt as a legal evidence of a purchase. In business every receipt needs to be kept. In private life we think about what is on the receipt and decide whether we see any importance because of warranty, for example, or whether we could destroy it. The difference arising with social content is that the purpose of a wiki entry or a blog post can be completely different for each entry we are looking at.

Alongside the questions of what actually needs to be kept and/or managed the question of how remains. Social content is collaborative content thus the questions when a conversation is terminated or a document is finished arise. Theoretically a conversation, for example, could go on forever, so when should it be archived and should it be archived at all? Which mechanisms can be used to capture this information (Williams and Hardy, 2011)? Mashups show another example. They aggregate content from multiple sources. Sometime these sources are outside the control of the organisation. How can these be captured (Williams and Hardy, 2011)?

Going along with these considerations is the question of the uniqueness of an original document which is decreasing through copies of a document and which can hardly be separated from the original. Liu (2004, p. 281) therefore asked if the difference as made in archiving practices is still relevant. However, especially in legal matters it is currently still important to identify the original. This can be a challenge if the difference cannot be identified anymore.

Table 6: Departmental Information Management responsibility
(adapted from Paknad, 2010)

	Legal & Compliance	Business	IT
Situation	Knows the obligation for information	Knows the value of information	Has the information
Problems	Many legal duties that vary by matter, country and business unit	Many different departments with different purposes and processes	Many different servers and systems which need maintenance
	Does not have the information	Does not communicate the value	Does not know the obligations or value
Worst case scenario	Only legal knows what is on hold, is a record or needs to be retained	Delete information when quota is hit	Migrate and delete as needed

Furthermore, to assign a responsible person when having collaborative documents which are authored by multiple people and include a set of hyperlinked documents is not an easy task (Schamber, 1996, p. 669). Therefore, the question of ownership is hard to define. Adding to this is the challenge that in Germany many organisations still do not have a person who has the overall responsibility for all unstructured information and is able to drive policy making and compliance (Burnett et al., 2008). Mostly, three different departments say that they have some kind of responsibility: records management, legal department and IT (Paknad, 2010). The problem is that the different departments have different information about and views on the information (see Table 6).

While the IT department is the one, who physically stores the documents, they often do not know anything about the content. In contrast, the operational business knows about the content, but might not know the structure, functions and obligations of what can and needs to be done with the different documents. Finally, the legal department knows the laws and regulations addressing documents, but they also do not know which information is stored where. An example of the different views is also given by O'Brien (2016, p. 83). He outlines, that traditionally security is a topic addressed by IT. However, privacy is a typical legal compliance issue, managed by the legal department.

Adding to all this is that through the new ways for communication and knowledge saving more information is stored digitally, which previously might only have been present in conversations or even in peoples' minds and would not have been recorded otherwise. For example, e-mails can be contrasted with conversations in social platforms. Within e-mail communication only the people who were directly addressed will be able to comment the subject discussed and it is most likely that at some point in time the conversation will be finished. Only the people who were in this conversation will have access to it afterwards. In contrast a conversation conducted within a community of a social platform might have much more people commenting it and everyone with access to the community will be able to read it.

Another area of challenges derives from the more technical and software-related issues. Besides web service standards such as SOAP, WSDL or UDDI, for example, no widely used standards for the development of Web 2.0 products exist (Grossman and McCarthy, 2007, p. 183), which adds to the challenge of identifying applicable tools and methods for SBD management. Furthermore, documents are created and stored in many different formats. With the development of PDF/A, a file format was introduced, which is often used in order to store documents in an unchangeable way for a long time. However, it is not always possible and also not always desired to convert everything into PDF/A. Therefore, one challenge is to ensure that the files formats of today will still be readable in the future. ECMS and ECS as discussed in this thesis are already two examples where documents are created, used and stored in. Taking into account a whole organisation, further examples of systems where documents are created are ERP systems, HR applications and the like. However, all documents need to be addressed within information management activities, regardless of the system it is created or stored in. This can get hard if

the different systems are not integrated and different processes are needed in order to address the documents in the different systems appropriately.

While in transactional systems aspects such as retention, security or compliance were highly discussed, these issues are neglected by users in Social Software (Moore, 2011) even though they are quite relevant. Similar to other documents Social Business Documents might have retention periods. However, as with the other documents these periods are hard to define. The same applies for information security. Things such as hacker attacks, carelessness of users, fraud, unavailable system functions etc. can all be challenges when addressing information security in all kinds of systems, thus also in Social Software.

Today many governance rules and processes already exist that can be applied to social documents as well. However, their different characteristics reveal many issues, where common practices cannot simply be applied (Wilkins, 2012). Wikis, for example, can be authored by multiple people and their content can change over time. Version controls and change tracking are necessary to capture all changes. Another example are project workspaces. During the lifetime of a project content might be changed or deleted, project plans will be updated and conversations with decisions will be carried on. All these activities need to be captured and maybe archived for later usage. Thus, compliance regulations and policies as well as records and archiving systems need to be adapted to social content (Clarke 2012; Moore 2011). However, right now most organisations are not managing social content at all (Herbst and vom Brocke, 2013, p. 20), policies for storing or deleting social content including aspects such as archiving, deletion and retention periods are missing, it is not clear how e-discovery queries in terms of litigation can be answered (Hausmann and Williams, 2015; Moore, 2011; Williams and Hardy, 2011) and social content often is not even addressed in social content strategies.

The following listing summarises the previously outlined questions and challenges in key words:

- Missing **staff involvement**
- Lack of **training** and support
- Unspecified management **processes**
- **Record declaration**
- Defining document **retention periods**
- Ensure **information security**
- Reduce **over-preservation**
- Assign **ownership/responsibilities**
- Lack of **policies & guidelines**
- Document **status** and **fixity**
- Identifying **original** documents
- **Hyperlinked** documents
- Missing **standards** in tools
- Readable **file-formats**
- Addressing/Integrating **document silos**
- Address **compliance**

Not addressing these challenges and open questions can lead to significant risks for an organisation as outlined in the previous section. Even though Information and Document Management is not a new task, organisations are still struggling with it (Williams and Hardy, 2011). Through more and changing legal and regulatory mandates (Gantz and Reinsel, 2010) as well as changing technologies and changing work practices, addressing the discipline of Enterprise Information Management is becoming more complex and is often seen as one of the

most challenging tasks for information systems managers in organisations (Sprague, 1995) as they have to address all of the challenges outlined above.

3.5. Conclusion

The biggest change in documentary practice today seems to come from the systems where documents are created. These new systems expand the document boundaries and thus lead to a need to extend the traditional definitions of documents. Not only the creation of documents in these new systems, but also their new possibilities for use lead to a need to rethink the role of documents today (Liu, 2004, p. 279).

The previous chapter addresses ECS as one example of a new kind of systems where information is created. Through taking a documentary view it was argued why parts of this information should be considered Social Business Documents. Social Business Documents thereby can contain valuable business information, wherefore the need to manage Social Business Documents is not only raised by legal obligations, but also through voluntary risk prevention (Burnett et al., 2008; Diessner et al., 2015, p. 12). Furthermore, the amount of unstructured and semi-structured information and documents, which usually accounts for about 80% of all information (Clarke, 2012b; Gantz and Reinsel, 2011), will continue to rise between 65 and 200 percent per annum depending on the industry sector (EMC Corporation 2006 as reported in Alalwan and Weistroffer, 2012, p. 441). Thereby, social content seems to be the fastest growing new content type (Gilbert et al., 2011) and therefore should find special consideration. Additionally, the development of digital documents in general has changed the way how documents are created and need to be managed (Salminen et al., 1997, p. 644). With the introduction of Social Software functions in organisations, the audience and the content types are getting broader and more complex (Gilbert et al., 2011) and further changes the way documents are structured, created and used which needs to be account for.

Through different insights from the field of Enterprise Content Management, especially including document and records management within this chapter, different aspects of the general long-term management of documents could be revealed. These all need to be transferred to Social Business Documents. However, as stated earlier, the focus of academic research in the area of Social Software concentrates on Social Media for advertising and marketing purposes. The usage of Enterprise Collaboration Systems has mostly been ignored (Richter and Riemer, 2009; van Osch and Coursaris, 2013, p. 700) and seems to be one of the most under-researched areas, even though it is quite important (van Osch and Coursaris, 2013).

Yet, archivists already started to ask questions around the originality, authenticity, accuracy, information loss, preservation, permanency, etc. of digital documents (Zanish-Belcher et al., 2002, p. 46). All these considerations are not new. However, using blogs, wikis or open platforms such as Facebook or Twitter, for example, on the one hand adds to the already existing problems of Enterprise Information Management (Aladwani, 2014; Williams and Hardy, 2011) and on the

other hand brings new dimensions into its management (Scifleet, 2010, p. 31), which creates new problems.

"Organisations [still] remain uncertain about the business contribution and long-term management of social software" (Williams et al., 2013b) and do not know how to govern it (Aral et al., 2013). As these new ways of creating and using documents *"have rarely been planned from the point of view of information management and work procedures"* (Salminen et al., 1997, p. 644), most organisations are currently not managing social content at all (Herbst and vom Brocke, 2013, p. 20).

Sprague already argued in 1995 that the management of documents is seen as one of the most challenging tasks for information system managers (Sprague, 1995, p. 29). Since then the complexity of types and characteristics of documents has even been growing. Up to now literature does not adequately answer the questions of what document types we have, which data types are included or how different documents are formatted (Raynes, 2002, p. 305). If we thought that paper was our problem it was because we mixed up the medium and the working methods (Levy, 2001, p. 77). Macevičiūtė and Wilson (2002) stated, that *"The means for resolving the problems may change, but the need to understand those problems and develop solutions will remain"*. Consequently, it is first of all important to fully understand the problems arising with the management of Social Business Documents as they are different from traditional documents in their characteristics, even though the procedures for SBD management may change as well. Furthermore, in order to also address organisational challenges more deeply it is necessary to conduct more research in the area of ECS within organisations (Richter and Riemer, 2009). Both, the technical analysis of the nature and structure of SBD as well as the organisational insights of SBD management lead to different challenges in their management.

Chapter 4.

The Way Forward: Research Design

This chapter describes the research design for this study and outlines the specific design choices that have been made to investigate the nature and structure of Social Business Documents and to understand the challenges associated with their long-term management. While many different philosophical and methodological classifications for research design can be found in the literature (see for example Creswell, 2003; Crotty, 1998; Hevner et al., 2004; or Orlikowski and Baroundi, 1991) they all include an underlying theoretical perspective and the selection of appropriate research methods.

The **theoretical perspective** of research encompasses the ontology and the epistemology and influences how things are understood. Often it is also referred to as the research paradigm. The paradigm thereby can be seen as a conceptual framework for research, which includes beliefs and assumptions that a researcher follows for a specific study (Kuhn, 1962). According to Crotty (1998, p. 10) "*ontology is the study of being*". It questions what is out in the world we should know (Hay, 2002, p. 64). Related to the ontology is the epistemology, which builds the fundamental philosophy of a research and is the study of knowledge asking how we can get to know about it (Crabtree and Miller, 1999; Dillon and Wals, 2006, p. 550; Hay, 2002, p. 64). It determines how people look at their research (Hjørland, 2000, p. 38). Brought together into the theoretical perspective, researchers such as Neuman (2003), Myers (2011) or Orlikowski and Baroundi (1991) differentiate between three different theoretical perspectives: positivism, interpretivism and critical. Even though the differentiation is clear in theory, within a research study the differentiation between the theoretical perspectives is not always clear cut and parts of two perspectives will be quite often taken over time.

This dissertation mainly adopts an interpretative research approach. Interpretivism believes that the world is constructed by peoples' subjective experience of the world and that they have influence and the potential to change it in terms of social and economic behaviours. For this study this means that the phenomenon of interest, the long-term management of Social Business Documents, is studied by accessing the meaning people assign to it (Orlikowski and Baroundi, 1991). It can be changed and formed through the interaction of people and thus the researcher as well as employees participating in the study are able to change the phenomenon. Furthermore, Social Business Documents only come into existence through the interaction of people and it is assumed that the long-term management of SBD can only be achieved through actions humans take.

An aim of an interpretative perspective can be to explain the status quo of something. Through the document modelling and analysis conducted in this study the current status of how SBD are constructed within their systems is examined. Furthermore, the content of Social Business Documents as well as the ways how SBD are currently managed over their lifecycle is investigated in order to identify the status quo of the long-term management of SBD.

The research methodology can be seen as the “*strategy, plan of action, process or design*” of research methods used (Crotty, 1998, p. 3) and therefore is often also referred to as the **design frame** in a broader sense. This study follows an **exploratory** research design, meaning that it is aimed at understanding, clarifying and defining the nature of a problem (Thomas, 2011): the challenges of managing SBD.

A further commonly used categorisation of the research design, which is helpful with consideration to the data collection (De Vaus, 2002), is the distinction between **qualitative** and quantitative research. This classification makes statements about what the collected data will look like and therefore how it can be analysed. While within quantitative research numerical data is collected and then analysed using mathematically based methods such as statistics (Aliaga and Gunderson, 2002 as cited in Muijs, 2004, p. 1), qualitative data is rather in words instead of numbers. The qualitative approach aims at providing additional insights in understanding complex phenomena by adding a researcher’s interpretation and understandings to the collection of data. Therefore, the qualitative approach is often used when analysing people in context in order to explore their perspectives and behaviours (Kaplan and Maxwell, 2005). Additionally, there is a growth in mixed methods research which is described with many different types in the literature (Creswell et al., 2003; Creswell and Clark, 2007). The four main types however are triangulation, embedded, explanatory and exploratory (Creswell and Clark, 2007, p. 59).

While mainly using typical qualitative research approaches, such as interviews, focus groups, documents and the researchers’ impression (Myers, 2011), this study applies a mixed method exploratory design by examining the SBD nature and structure through document modelling and identifies challenges in the long term management of SBD through survey research. Thereby the results of the first method inform the second. However, at the end, the different results are brought together in the interpretation.

The further classification of this study, the different methods used as well as their connection to each other and to the different research questions is further outlined in the sections below.

4.1. Classifying this Research Study

The **phenomenon of interest** in this study is the long-term management of social business information as manifested through Social Business Documents in Enterprise Collaboration Systems. The research activities undertaken examine Social Business Documents (the **object** of the study) with the aim of better understanding this document artefact (**unit of analysis**), including the nature and structure of SBD and the different challenges these bring to the long-

term management of SBD. Only by studying Social Business Documents within the systems they are created and used in, that is in their natural environment, it is possible to identify their characteristics and current functional capabilities. Thus, Enterprise Collaboration Systems are the **subject** of this study (see Figure 7).

The **theoretical lens** describes the theoretical approach to researching the problem in which the object is studied. Traditionally there were three broad categories of disciplines: the natural science explaining what the world is made of, the social science trying to explain the human world and how to predict and improve it and humanities which is interpreting human activities (Repko, 2012, p. 5). However, as more and more topics emerged which cannot be classified into one of the categories the field of interdisciplinary studies emerged, which are between or emerge from two or more fields and relate to a distinct area of study (Stember, 1991, p. 4).

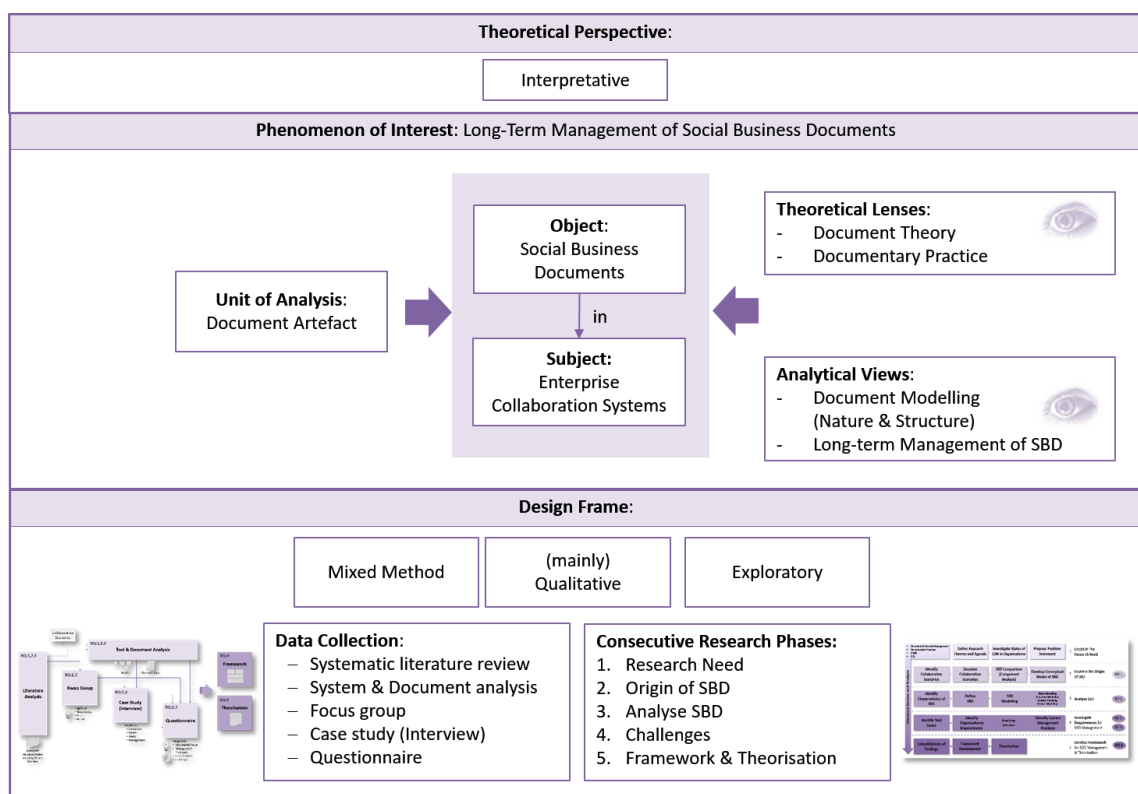


Figure 7: Research Classification

Within this study, the theoretical lenses draw from aspects of document theory and documentary practices to provide the focus on documents and their management within their systems. Document theory and documentary practice are interdisciplinary research fields as they include aspects from humanities, social science and natural science (Lund, 2010, p. 747). As outlined in the literature review (see section 2.1.1) document theory is an important discipline, which questions what constitutes a document and what the requirements for documents are. Document theory furthermore has been used to explain traditional documents and therefore provides a starting point for analysing Social Business Documents. Additionally, practice theory is concerned with the everyday activities of something (Schatzki, 2001, pp. 12–13). Together practice theory and documentary practice provide us with the view to examine the day to day activities and processes that grow around Social Business Documents, which in

turn leads to an assessment of the value of SBD and needed practices for the long-term management of SBD.

While the theoretical lens guides a research in terms of the theories that assist in shaping the research approach and guides what data should be collected, the **analytical view** guides the application of the theory and the analysis of the data. Each analytical view thereby frames the research into a specific direction. This dissertation draws on two analytical views: document modelling and the long-term management of SBD.

Through the use of document modelling it is possible to analyse the nature and structure of Social Business Documents within their originating systems. As outlined in chapter 5 of this study, four different modelling techniques are developed and examined. Each modelling technique focusses on a different aspect of SBD primarily analysing the technical and functional facets of SBD. This results in four different Social Business Document Information Models: conceptual, structural and functional information model as well as an SBD metadata model (see section 6.1). For comparative reasons and in order to identify the similarities and differences between the different SBD the modelling and analysis have been conducted within four different ECS/ECMS: Alfresco Community, Atlassian Confluence, IBM Connections and Microsoft SharePoint (see section 5.2.2 for the selection criteria).

The focus group, case study/interview and a questionnaire investigation involved participants who used IBM Connections as their ECS and provided insights to Social Business Documents' content as well as current SBD management processes and activities. The content analysis thereby leads to insights about the value of SBD and the need for SBD management practices. The current long-term management processes outline the status quo of SBD management and indicate open challenges.

4.2. Mapping Research Questions, Methods and Phases

The methods used for data collection and data analysis within a research project are dependent on the questions asked, the extent of control the researcher needs over behavioural events as well as the degree of actuality needed (Yin, 2009). The connections of the research objectives, research questions, main data sources as well as the different research phases of this study are outlined in Table 7 below, before more insights to the data sources and the research phases themselves are given.

Table 7: Mapping Research Objectives, Questions, Main Data Sources and Research Phases

Objective	Question	Main Data Source	Research Phase
Establishing objectives and questions		<ul style="list-style-type: none"> ▪ Literature Review 	<i>RP1</i> : Establish the Research Need
RO1: Describe the nature and structure of Social Business Documents and examine how these change throughout their lifecycle.	<p><i>RQ1</i>: How can Social Business Documents be described?</p> <p><i>RQ1 (a)</i>: Which types of Social Business Documents are currently available and in use in Enterprise Collaboration Systems?</p> <p><i>RQ1 (b)</i>: How are Social Business Documents constructed and what is an appropriate model for describing and representing their construction?</p> <p><i>RQ1 (c)</i>: How do Social Business Documents change over their lifecycle?</p> <p><i>RQ1 (d)</i>: What are the characteristics of Social Business Documents?</p>	<ul style="list-style-type: none"> ▪ Literature Review ▪ System Analysis ▪ Document Analysis 	<p><i>RP2</i>: Examine the Origin of SBD</p> <p><i>RP3</i>: Analyse SBD</p>
RO2: Identify current requirements and challenges associated with the creation, use and disposition for the long-term management of Social Business Documents.	<i>RQ2</i> : What are the current requirements and challenges associated with the long-term management of Social Business Documents in the academic literature and currently experienced by practitioners?	<ul style="list-style-type: none"> ▪ Literature Review ▪ Focus Group ▪ Case Study (Interview) ▪ Questionnaire 	<i>RP4</i> : Investigate Challenges for SBD Management
RO3: Investigate current strategies, policies and practices for managing Social Business Documents.	<p><i>RQ3</i>: How, if at all, are organisations currently managing Social Business Documents?</p> <p><i>RQ3 (a)</i>: Do organisations have strategies and policies for the management of Social Business Documents in place and, if yes, what do they contain and what is their scope?</p> <p><i>RQ3 (b)</i>: What processes exist for Social Business Document management and how do they address the challenges identified?</p>	<ul style="list-style-type: none"> ▪ Case Study (Interview) ▪ Questionnaire 	<i>RP4</i> : Investigate Challenges for SBD Management
RO4: Establish a framework addressing the challenges of the long-term management of Social Business Documents.	<i>RQ4</i> : How can the research findings be consolidated to provide a framework to guide organisations in addressing their challenges for the long-term management of Social Business Documents?	<ul style="list-style-type: none"> ▪ Literature Review ▪ System Analysis ▪ Document Analysis ▪ Questionnaire 	<i>RP5</i> : Develop Framework for SBD Management & Theorisation
RO5: Progress the theory in the field of documentary practice and information management.	<i>RQ5</i> : How can the research findings extend current theorisation in the field of documentary practice?	<ul style="list-style-type: none"> ▪ Literature Review ▪ System Analysis ▪ Document Analysis ▪ Questionnaire 	<i>RP5</i> : Develop Framework for SBD Management & Theorisation

As can be seen in the table above, six different data sources/methods are used: literature review and analysis, system analysis, document analyses, focus group, case study and questionnaire. They are listed according to the time when they were used within this study. Each of these

methods thereby was used with a special objective and they all build on each other. Figure 8 outlines how the different methods are connected to each other as well as to the research questions and outcomes.

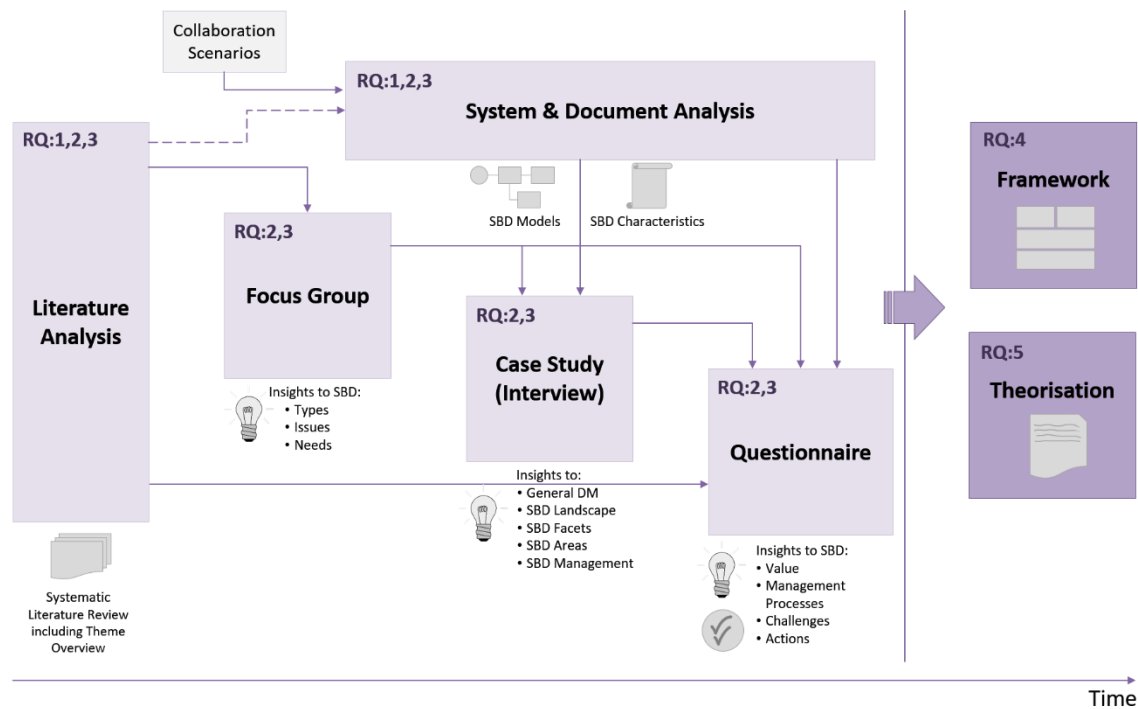


Figure 8: The connection of data sources and outcomes

The collaboration scenarios are not a research method or data collection tool, but they provide a framework for the tool and document analysis and therefore are also shown within the diagram. The findings from all methods are brought together and are then used in order to develop the final framework as well as for the theorisation within the domain of documentary practice.

4.2.1. Research Methods

Even though there is no singular research methodology that is strictly followed and a mixed method approach is used instead, the construction of this study, the linkage of the data sources as well as the overall aim of the study are closely linked to what is described in an action research approach (see for example Thomas, 2011 for further descriptions of research methodologies). The goal of action research is to contribute to *“the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework”* (Rapoport, 1970, p. 499). Action research thus is applied research where the researcher plays an active role by studying the phenomenon in its natural setting (Chiasson and Dexter, 2001). The process of action research often is described as a cyclical approach, where the findings of the first step influence the second and the findings of the first cycle influence the second cycle. The most commonly used action research cycle was developed by Susman and Evered (1978) (Baskerville, 1999). It includes five phases: diagnosing, action planning, action taking, evaluating and specifying learning (see Figure 9).

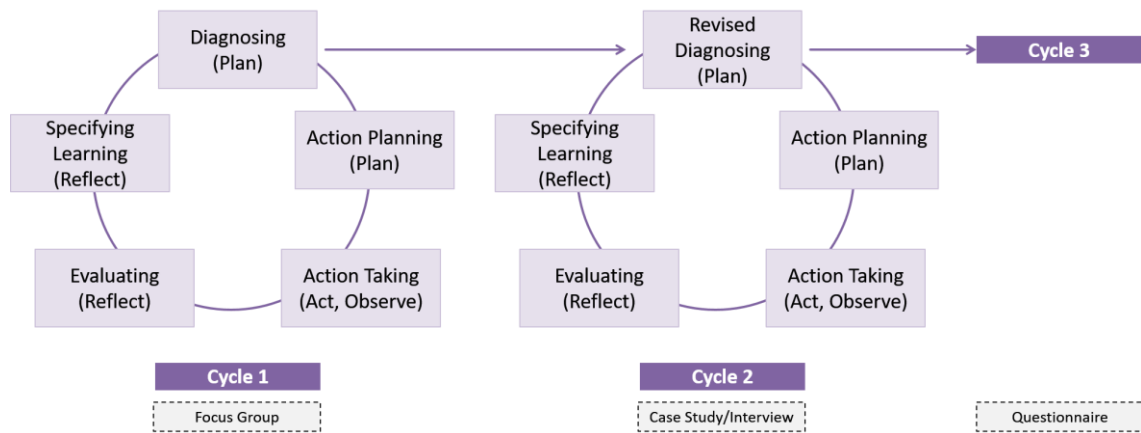


Figure 9: Action Research Cycle
(adapted from Susman and Evered, 1978, p. 588)

All steps should contribute to the development within the studied social system where the problem is faced.

Within this study especially the data collection methods involving participants – focus group, case study and questionnaire – are used in order to identify the different aspects of the management of documents and the challenges of managing Social Business Documents. Furthermore, these methods could be seen as three cycles of research, each influencing the next one. The main ideas of what to find out are the same for all three methods, but the findings are deepening over time/methods. However, each method was planned, conducted/observed and reflected on before the findings of the first method were used to plan the next, which reflects the cycles of an action research approach. Through this procedure it is possible to get more precise findings with each method. However, as the research is not directly working within one of the participating companies and the direct influence is only partially given, the study is not following a pure action research methodology.

Within the following, the different methods used are briefly described.

Literature review and content analysis

A literature review builds the foundation of a research project in information systems (Webster and Watson, 2002). It *"is a systematic, explicit, and reproducible method for identifying, evaluation and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners"* (Fink, 2009, p. 3) and therefore is essential for any research study (Webster and Watson, 2002).

According to the object and subject of this study, the main literature has been described in the chapters 2 and 3: Enterprise Collaboration Systems as the source of SBD, documentary practice as the theoretical foundation and Enterprise Information Management as the discipline dealing with the management of Documents in general. Analysing and bringing together the content of these different literature strands leads to insights into the current state of Social Content management and identifies open risks, challenges and research imperatives providing the

foundation for further conducting this research project. Furthermore, as an ongoing process, literature is further discussed throughout this dissertation where available and appropriate.

Functional and structural system analysis

System analysis is often named together with system design and is used in the development of systems. However, system analysis can also mean to examine systems and their functionalities and capabilities in order to understand what they contain and where there are limitations in their usage.

Within this study system analysis is applied in four different ECS/ECMS in order to examine their capabilities and functionalities to create and work with Social Business Documents as well as to understand the way they capture and store the SBD itself, including their different components and metadata elements. In a second step, the findings of the system analysis, as well as the document analysis build the foundation for the development of SBD information models (see chapters 5 and 6).

Document analysis

As documents mostly consist of words, text or images, document analysis is a qualitative research method used to review and evaluate documents. It can help to develop empirical knowledge (Bowen, 2009). However, this dissertation applies document analysis in two different ways.

Closely related to the activities of the system analysis, the Social Business Documents themselves are analysed within the systems they are created and used in. Thereby the focus is on the nature and structure, as well as the characteristics SBD have (chapters 5 and 6). However, document analysis is also used within the investigations in business in terms of identifying and evaluating the kind and types of documents used by companies in ECS (chapter 8). These insights help in identifying the need for management activities of SBD.

Focus group

Focus groups can be defined as a qualitative *“research technique that collects data through group interaction on a topic determined by the researcher”* (Morgan, 1996, p. 6) and are often described as a special kind of group interview. Different authors distinguish between focus groups and group interviews by their degree of formality, group size or specialized facilities, for example (Fontana 1989, Khan and Manderson 1992, McQuarrie 1996 as reported in Morgan, 1996, p. 6). Thereby the following characteristics have been identified:

- one moderator, often represented by the researcher (Morgan, 1996, p. 2)
- participant group consists of a minimum of 4 and maximum of 12 participants, typically they involve 6 to 10 participants (Litosseliti, 2003, p. 3) who share similar interests (Krueger and Casey, 2014)
- data is gathered through a focussed discussion on a special topic of interest (Krueger and Casey, 2014)

- purpose can be: help with decision making; help capture insights on behaviour; provide insights on organisational concerns and issues (problem identification); obtain different perspectives; etc. (Krueger and Casey, 2014; Litosseliti, 2003, p. 18; Morgan, 1998, p. 14).

As the first part of the investigations with business participants a focus group was used as a supplementary source for preliminary data gathering in this study. Thereby 12 representatives of 9 different companies, all using the same ECS IBM Connections discussed the questions of what kind of SBD they use in their organisation; in which application they store the information (where); and how SBD are currently managed throughout their lifecycle. The findings of the focus group provide first insights into the documents themselves, current issues as well as the challenges of managing SBD. In line with Morgan's (1996, pp. 2–3) suggestion, these findings were then used to develop further questions within a case study and a questionnaire.

The description of the implementation as well as the results of the focus group can be found in section 8.1.1 to 8.1.3.

Case study (interview)

Often case studies are viewed as a methodology leading the research as the main design frame of a study using multiple data collection methods such as observations, interviews or questionnaires (Thomas, 2011, p. 37). However, a case study can also be seen as a method for data collection and can be defined as the "*analyses of persons, events, decisions, periods, projects, policies, institutions or other systems which are studied holistically by one or more methods*" (Thomas, 2011, p. 23). Case studies thereby offer the possibility to keep in touch with the subject of study (Flyvbjerg, 2001, p. 132). Within the literature many different categorisations and descriptions of case studies can be found (see for example De Vaus, 2001; Merriam, 1988; Stake, 1995; Yin, 2009). The approach proposed by Thomas (2011) is followed in this dissertation. Thomas (2011) structures and distinguishes case studies according to their subject, purposes, approaches and processes.

Thomas differentiates between three main subjects: key/example, outlier and local knowledge case. The key case, as the case study used in this dissertation, is conducted because it represents an excellent or leading example of a specific case type. The organisation that was analysed with the help of the case study in this dissertation was, in contrast to most other organisations, already thinking about the management of SBD and was therefore a leading case. The purpose is intrinsic, meaning it is done because of own interest (Stake, 1995), as well as explanatory, which aims to understand an issue that is problematic or uncertain and where more knowledge is desirable. The approach being interpretative is in line with the theoretical perspective of this dissertation. Finally, the process followed can be described as a single study, being a snapshot of the current situation of the management of SBD in a leading case company. It is also partially retrospective as the case study looks back at the history of the ECS introduction in the company and the challenges they encountered with SBD management.

The case study data was gathered through interviews, which represent one of the most important sources in case study research (Gillham, 2000, p. 13; Thomas, 2011, pp. 23, 68; Yin, 2009). Within this study two structured interviews were transcribed and analysed to provide insights on two different levels. The first interview focussed on how traditional digital documents are managed within an organisation and led to a descriptive case study document. The second interview then gathered in-depth information about SBD management, which was used for a descriptive case study document focussing on SBD management. It was additionally coded in order to identify the different facets and areas of SBD management. The process as well as further background information about the conducted case study, the interviews and the coding can be found in section 8.2.

Questionnaire

Survey are often used to quantify results from qualitative investigations within qualitative research (Newsted et al., 1998). From an epistemological point of view, surveys can thus be used to obtain and validate knowledge. Common techniques in survey research include different forms of interviews such as telephone or face-to-face interviews as well as questionnaires (Cohen et al., 2007; Gray, 2013), both with the intent to seek verbal or written responses to questions or statements (Neuman, 2003; Straub et al., 2005).

As the last and final step of the investigation within this thesis, this study used an online questionnaire. Building upon the focus group, case study and system and document analysis, the questionnaire summarised the findings about the usage purpose of SBD, their current management as well as open challenges for their long-term management and verified them with a broader group of participants. Therefore, most questions have been closed question. The description of the implementation as well as the results can be found in section 8.3.1 to 8.3.3.

4.2.2. Research Phases

The overall structure of this research project is separated into five phases (see Figure 10):

Phase 1: Establish the Research Need

Phase 1 is the initial phase of this research project and not directly connected to a research objective or question. It develops the argument for this dissertation and outlines the research motivation to investigate the long-term management of SBD. Thus, through the investigation of documentary practice, Enterprise Information Management and Enterprise Collaboration Systems literature the unmanaged status of Social Business Content in general (Hausmann et al., 2014) is outlined. Furthermore, a study conducted on Enterprise Information Management provided first insights to the unmanaged status of social content in organisations (Williams et al., 2013a). Together, these investigations build the foundation and argumentation for a research theme of SBD Management.

Based on these preliminary findings, the problem statement justifying this thesis is developed, the research aim, objectives and questions are defined and the research orientation is proposed.

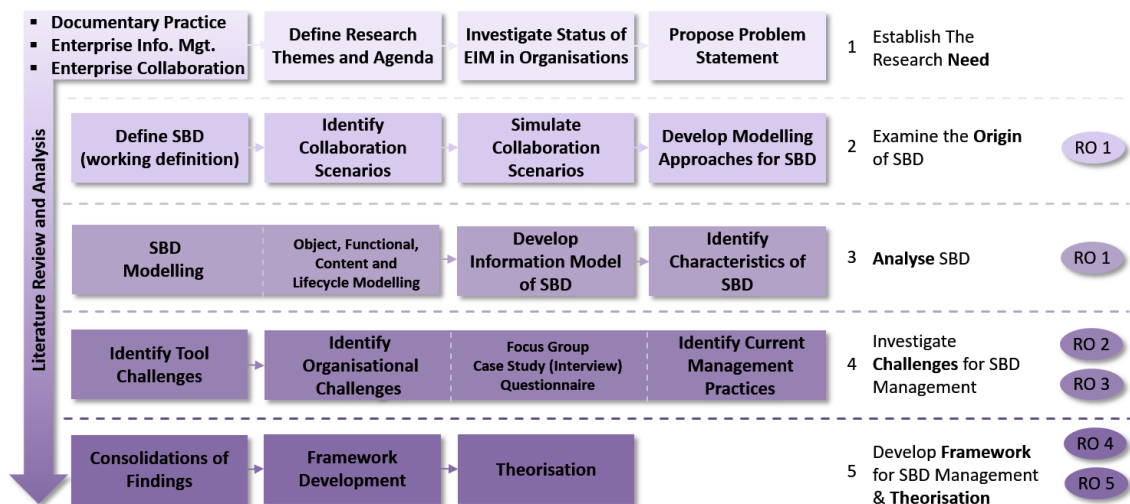


Figure 10: Research Phases

Phase 2: Examine the Origin of SBD

Phase 2 was triggered by the need to understand Social Business Documents themselves as well as their contexts of use. In order to set the boundaries of what is analysed and investigated in this study a working definition of SBD is developed and a differentiation between Social Document and Social Content outlined. Furthermore, collaboration scenarios are identified, which portray the collaborative use of and work with Enterprise Collaboration and Enterprise Content Management Systems. The collaboration scenarios in turn are simulated within the four selected systems in order to establish document examples. These document examples aim at representing the various manifestations SBD can have and are used within the next phase in order to analyse SBD.

In addition, phase 2 is required in order to develop the four different modelling approaches that are used to describe the nature, structure and modification possibilities of Social Business Documents within the different systems.

Phase 3: Analyse SBD

In order to effectively manage Social Business Documents over the long term, it is necessary to examine them in greater detail and to understand their technical construction and their functional possibilities (e.g. to be edited and/or expanded) in their context (Burke and Horton, 1988, p. 10) as these can lead to different challenges. To achieve this phase 3 is the actively related analysis of the implemented SBD scenarios.

Through the actual modelling activity and the analysis of the models, within one system, across different systems and finally across applications, four different Social Business Document information models are developed aiming at representing the general nature and structure of SBD across systems. Furthermore, a set of characteristics of Social Business Documents influencing the way SBD can and need to be managed and leading to different challenges is outlined.

Phase 4: Investigate Challenges for SBD Management

Phase 4 investigates the challenges for the long-term management of Social Business Documents. It first draws on the results of phase 3 and identifies the management challenges of SBD, which arise through the tools themselves and the characteristics of SBD. Following, the research activities including organisational participants (focus group, case study/interview and questionnaire) are conducted with the aim to identify the kinds of SBD used in organisations as well as the challenges of managing Social Business Documents.

Overall, the purpose of the activities in phase 4 is to identify and assess the challenges of managing SBD, which are then used as inputs for the development of a framework for SBD management.

Phase 5: Develop Framework for SBD Management & Theorisation

Drawing on the results of the previous research phases, phase 5 consolidates the findings in order to develop a framework addressing the challenges for the long-term management of Social Business Documents. The framework includes recommendations addressing the challenges for organisations as well as system developers.

In addition to the practical outcomes, the final step of the dissertation is represented by a theorisation of the findings in order to adjust and extend the knowledge of Enterprise Information Management and documentary practice. Therefore, the findings of this study are abstracted to match and extend existing theories and frameworks to (1) include Social Business Documents as another important document type needing to be managed and (2) to outline the specialities of Social Business Documents distinguishing them from traditional and other digital documents.

4.3. Context of This Study

This study is conducted by the author alone as a single study in the area of the long-term management of Social Business Documents. However, it is embedded within a wider research initiative around Enterprise Collaboration Systems and a project called IndustryConnect, which both bring together industry partners and researchers in order to establish joint research projects. At the time of writing this dissertation, IndustryConnect had 21 company members, which represent various industry sectors, all using the ECS IBM Connections. They all face similar, but also different challenges in the implementation, use and management of their ECS. Through regular workshops with the industry partners, further collaboration using a joint collaboration platform and individual meetings, both among the researchers as well as individual researchers and industry partners, various topics in the area of ECS are addressed. The long-term management of Social Business Documents as the topic of this dissertation is one of them. Other topics currently include:

- Use cases and scenarios within ECS (Schubert and Glitsch, 2015, 2016)
- Social Analytics in ECS (Schwade and Schubert, 2017)
- Adoption Challenges of ECS (Greeven and Williams, 2016)
- Benefit Realisation Management of ECS
- Integration of data and information at the digital workplace

Together these different topics are progressing the understanding in the area of ECS in its whole.

4.4. Research Confidence: Assumptions and Limitations

This research study uses multiple data collection methods, which all have different strengths and weaknesses. For example case studies have been seen as less desirable in earlier times than other research methods such as experiments, because they were claimed to have a lack of rigor, did not follow systematic procedures, were not useful for scientific generalization, took too much time and produced too many unreadable documents (Yin, 2009). However, many authors have also shown that case studies and other qualitative methods are a valid and good research method if they are conducted with rigor, or how Guba (1981) and Lincoln (Lincoln and Guba, 1986) call it: trustworthiness. Trustworthiness includes the four aspects of (1) truth value, (2) applicability, (3) consistency and (4) neutrality and is also often referred to with the terms of (1) internal validity, (2) external validity or generalizability, (3) reliability and (4) objectivity. Validity thereby is used to explain the truthfulness of finding whereas reliability is the stability of findings (Altheide and Johnson, 1994).

However, taking up the aspects of Lincoln and Guba (1986), truth value can be established by “member checks”, meaning to ask participants to confirm the gathered data such as the interview transcript. Within this study, the findings gained through the document and system analysis have been verified through the participant-facing investigations. Furthermore, the findings of the focus group, which provide preliminary insights, as well as from the case study and interviews, which only represent one specific company have been brought together and the findings have been triangulated with a broader group of ECS users through the final questionnaire. This process allowed the researcher to confirm or reject the different findings.

The applicability derives from the strict definition of external validity which seeks to identify the extent to which findings can be generalized or not (Yin, 2009). Applicability asks whether and to which degree these might fit to another situation with similar conditions. Within this study SBD in four major ECS are analysed from the technical perspective and the derived information models represent the findings of all four systems. Because of the different backgrounds of the analysed systems it is likely that the findings will also apply to SBD in other ECS. The investigations involving participants have only been conducted with participants using one specific ECS. The applicability of the findings therefore could be questioned. However, even though some system specific findings can be found, many findings around SBD are on the conceptual and organisational level, not specified to system functions. Furthermore, the participants most often are using more than one collaboration system and thus have a broad knowledge. Therefore, the findings as reported in the final framework are likely to be applicable

to all Social Business Documents in different systems and different organisations. Furthermore, the final discussion about the theorisation within document theory (chapter 10) takes a system-independent view on SBD and is valid for the domain in general.

Consistency as a concept describes the dependability of reliability and traceability of the findings. Thus it should ensure that the research is traceable and, if repeated, would come to the same findings (Yin, 2009) and at the same time requires a reflection on the research instruments potential to prevent from getting the same results (Lincoln and Guba, 1986). Social Business Documents only came into existence through developments of web 2.0 technologies and it can be assumed that in the future this technology will further be developed. Therefore, it currently cannot be said if and how the source/system of SBD will change. However, the process of the research investigation can be outlined and supports the criteria of consistency. Through the mapping of the research objectives, questions, methods and steps in section 4.2, the logical process to link the questions to the collected data and conclusions has been presented.

Finally, with the neutrality it can be differentiated between the neutrality of the investigator, thus the researcher as well as the produced data. Through the analysis of different ECS as well as through the triangulation of the different data sources used in this study the author established system neutral findings. Furthermore, the investigations of the challenges and needs for the management of SBD have been established through several key ECS players working across different industry sectors. Thus, the findings represent a larger body of people and are not made up by the author. However, as a limitation it also needs to be kept in mind that this study follows an interpretative approach and that the researcher is directly involved in the investigation. Thus, the researcher may affect the interviews through mere presence, asking questions and collecting data (Gillham, 2000, p. 7). Aside from this the research had the assumption that information provided by participants would be truthful and according to reality.

Chapter 5.

Social Business Document Modelling

With the emergence of new technology, often comes the development of new document types (Glushko and McGrath, 2005, p. 355). With the widespread use of applications, such as wikis and blogs within Enterprise Collaboration Systems and the integration of these application into Enterprise Content Management Systems, new digital business content arises. This new content is created in a new way (Dearstyne, 2007, p. 27) and changes the characteristics of documents (Riles, 2006, p. 6). The working definition of Social Business Documents outlined within section 2.3 already pointed to the concept of compound documents. Compound documents can consist of multiple digital sources which can all have different formats (Asprey and Middleton, 2003, p. 317).

Salminen et al. (1997, p. 644) outline that in order for organisations to effectively use their knowledge which is stored in documents, it is important to carefully plan the information structure and analyse the documents at hand. Further, Burke and Horton outlined the importance of looking at the different elements and aspects of information when dealing with the management of information. They compare it with Inuits building an igloo. They need the individual ice blocks in the right shape in order to build it. Likewise, information managers need to know the different elements/components of information in their contexts in order to be able to manage the information (Burke and Horton, 1988, p. 10). Glushko and McGrath further point this out by saying *“Whether documents are traditional or brand new, we need to identify and understand them because they are the most visible parts of the processes that people and businesses carry out”* (2005, p. 356).

The nature and structure and thus the different components and characteristics of Social Business Documents are not clear yet. Therefore, this chapter outlines the modelling process and an analysis of Social Business Documents in four different systems in order to be able to develop SBD information models. The information models present the general components of SBD as well as their conditions and help to define and derive the characteristics of SBD. It thereby addresses Research Question 1: How can Social Business Documents be described?

5.1. From Modelling to Challenges: Plan of Action

The process for the modelling of Social Business Documents includes the development and implementation of three different collaboration scenarios that lead to the creation of Social Business Documents. These scenarios represent the development of a wiki entry, a blog post and a forum/discussion which are then used to examine SBD within four different systems: IBM Connections, Alfresco Community, Atlassian Confluence and Microsoft SharePoint. The analysis

of the SBD is conducted with the help of four different modelling approaches: object, functional, content and lifecycle modelling. The various justifications for using these four modelling approaches, as well as the analysis itself, are outlined in the following subsections. The findings of the analysis of the different systems are consolidated and brought together to develop SBD information models and to derive the characteristics of SBD. Finally, all insights are used to inform the next part of this study which outlines the management challenges that derived from the system and documents itself.

As the whole process with all the different systems and approaches is quite complex, Figure 11 portrays the process in an overview diagram. The left part of the picture, including the approaches and systems, will be recursively used as a small side diagram in the following sections in order to highlight the aspects currently under discussion and to guide the reader.

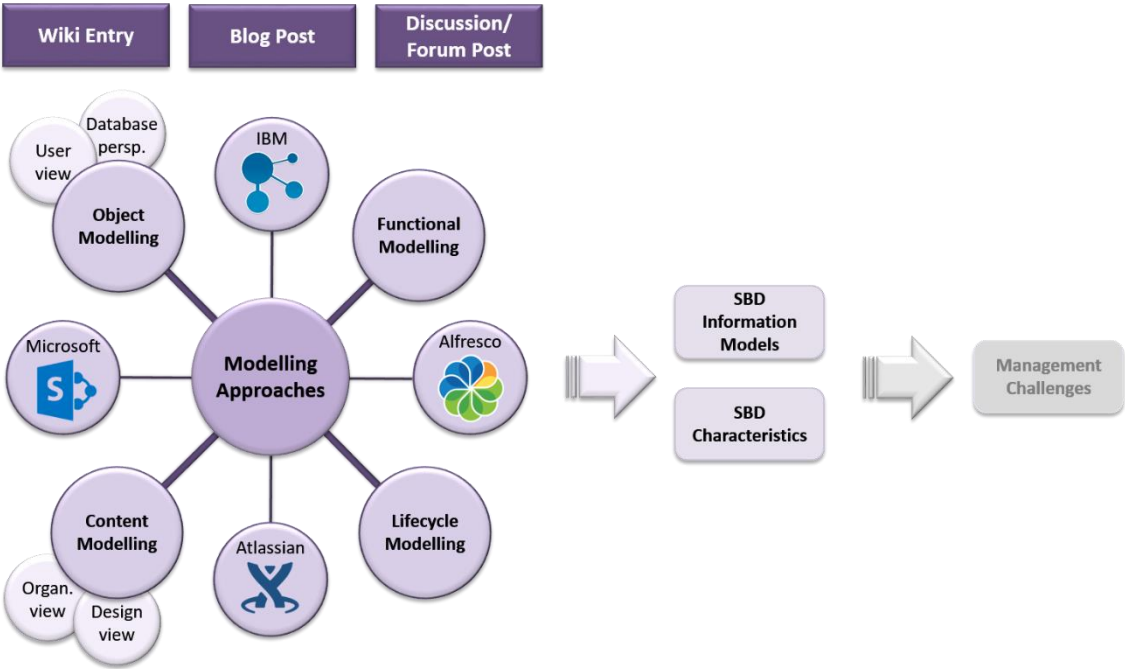


Figure 11: From Modelling to Challenges: Plan of Action

It should also be noted that a full analysis was conducted of all four systems. However, in order to maintain the readability of this thesis, the analysis of IBM Connections and Alfresco Community is comprehensively portrayed to show what has been examined in the different modelling approaches, whereas the modelling and analysis of Atlassian Confluence and Microsoft SharePoint have been shortened for publication.

The justification for the process, the tools and the different approaches are given in the following.

5.2. The Modelling Process

Currently, a process for modelling Social Business Document does not exist within literature. However, what can be identified from prior research are different processes within the field of document engineering which encompass ideas from different fields such as information and

system analysis, electronic publishing, business process analysis, business informatics and user-centred design. Document engineering provides methods for analysis and design of information in business processes to show their specifications and rules for coordination in order to implement a developed document (Glushko and McGrath, 2002, 2005, p. 5).

Thus, in contrast to the approach in this study, which is to analyse existing Social Business Documents, document engineering is developed with the objective of creating new documents. Nevertheless, the steps suggested in the document engineering process of Glushko and McGrath (2005) can also partly assist in analysing SBD. Figure 12 shows the steps of the document engineering process and maps them to the steps of this dissertation.

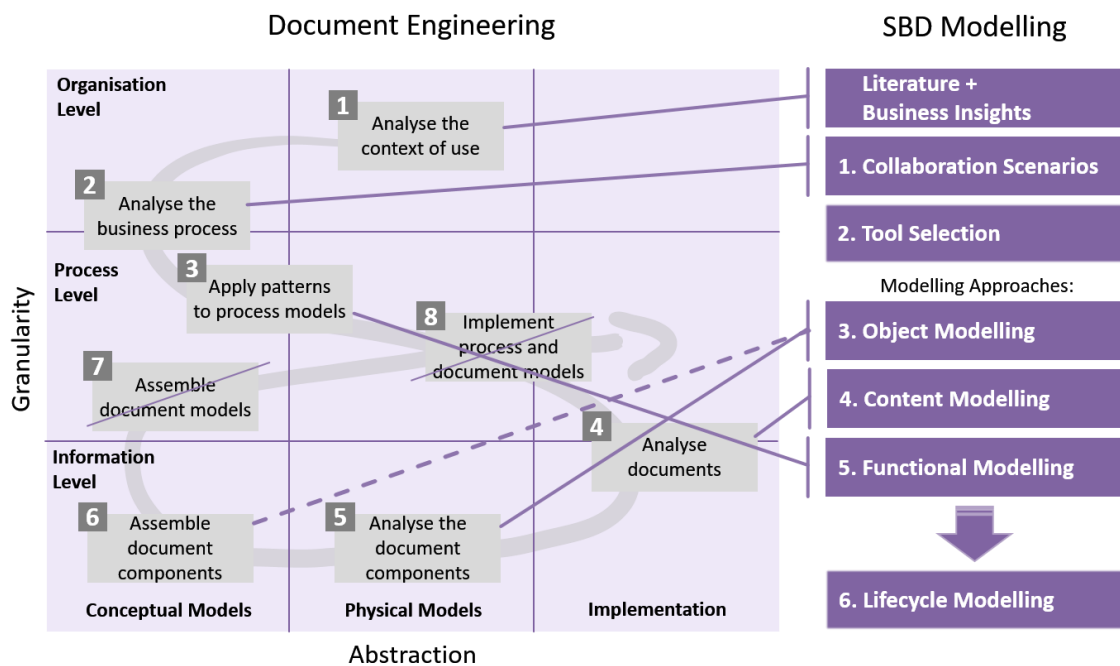


Figure 12: The Document Engineering Approach adapted to the Modelling of SBD
(adapted from Glushko and McGrath, 2005, p. 33)

The document engineering process normally starts with an analysis of the context of use including the business itself and its requirements. Even though this is also done within this study through the literature review and especially through the business investigations (see part III), it is not a direct part of the modelling approach which focusses on the technical capabilities and characteristics of SBD and their systems.

Step 1 of the Social Business Documents modelling process therefore is the development of collaboration scenarios. Whereas document engineering analyses existing business processes, three different collaboration scenarios, each using a different kind of Social Business Document, are established in order to use these for the implementation and analysis of SBD within different systems. The scenarios are outlined in section 5.2.1 below.

Step 2 represents the selection of tools in which the scenarios are implemented and in which the SBD are analysed. The selection criteria and process is described in section 5.2.2.

Finally, steps 3 to 6 include the actual analysis of SBD through four different modelling approaches. With the exception of the lifecycle modelling, which provides a synthesis of the three other approaches in order to outline the changes of an SBD during its lifetime, each modelling approach derives from a step within the document engineering approach. Thereby the order is reversed as no new documents are created, but existing ones are being analysed. Each SBD modelling approach is outlined in section 5.2.3.

Steps 7 and 8 of the document engineering process are not mapped to this study, as they deal with the implementation of documents which has already taken place with the SBD.

5.2.1. Collaboration Scenarios

In order to be able to analyse Social Business Documents within their originating systems, example documents are needed. Practical examples are often created within system design through use cases or scenarios which can also be used for document analysis. *“The quality of the document analysis [thereby] heavily depends upon the detail provided in the scenarios”* (Olsen et al., 2012, p. 108).

Within their papers, Schubert and Glitsch (Schubert and Glitsch, 2015, 2016) examine use cases and collaboration scenarios within Enterprise Collaboration Systems. They define use cases as *“activities that are unpredictable in their exact sequence (and thus flexible)”* (Schubert and Glitsch, 2015, p. 164) and a collaboration scenario as *“a sequence of activities that is carried out by one or more people (actors) in an effort to achieve a common goal (collaboration)”* (Schubert and Glitsch, 2015, p. 163). Thereby use cases express wider organizational activities and can consist of one or more scenarios. Most prominent examples of use cases in ECS are knowledge sharing, enterprise communication and project and team organization. Collaboration scenarios in turn describe the detailed view of activities such as file sharing, creating and managing meeting minutes, discussions or information exchange (Schubert and Glitsch, 2016).

Three different collaboration scenarios, each representing typical information exchange and communication activities and each illustrating the usage of a different social functions, are outlined below. The scenarios represent activities in a travel agency which organises outdoor sports holidays for individuals and groups. The organisation works together with companies all over the world and has its own representatives in different countries. In order to easily communicate between the different employees, but also with customers who have booked a holiday the company uses an ECS. The ECS, for example, supports the employees in developing new activities. Thus, when a new adventure is planned, a new community/site is created where the employees can first gather all information and plan the exact trip. Later, this information is transferred to a community/site where the customers are invited to join in order to get all the information which they need and get to know each other before the trip. In addition, the company provides their customer with information about the journey, such as the schedule, country and security information and travel immunization information which are provided

through travel communities/sites in the ECS. All this information is changing regularly and needs to be up to date so that customers always get the latest information.

Table 8 outlines three different typical collaboration scenarios of the organisation which occur when extending their portfolio and communication with customers.

Table 8: Collaboration Scenarios Examples
(adapted from Hausmann and Williams, 2016)

Scenario	Developing a program outline	Searching for partner: keep employees up to date	Customer request: Discussing experiences
Description	The company needs to create an outline of a travel program providing a short overview of each day. Once finished, this information will be published as information to customers.	A partner for one special activity needs to be found, but the case company is waiting for additional information from the supplying company. As time passes, an update on the current status should be given to employees to keep them up to date.	The company provides information about immunization advices of countries. One customer asked back about the necessity and experiences of and with a special inoculation.
Application	Wiki	Blog	Forum/Discussion
Addressed	Internal	Internal	External
Tasks involved	<ul style="list-style-type: none"> ▪ Find & capture program information, to inform employees about the outline ▪ Update information, enabling all project members to work on the outline ▪ Comment information; ▪ Improve findability 	<ul style="list-style-type: none"> ▪ Formulate & capture update information ▪ Disseminate information to employees ▪ Edit information because of a mistake ▪ Comment information ▪ Improve findability 	<ul style="list-style-type: none"> ▪ Formulate question ▪ Ask question to the company and to the other customers ▪ Answer the question

The two internal facing scenarios using the wiki and the blog applications could also be performed using some kind of word processing tool to capture the information and shared drives to store them. Furthermore, e-mails could be used to distribute any additional information. However, the disadvantage would be that only assigned employees could access the information and therefore only they would have the possibility to make new contributions (Hausmann and Williams, 2016). By using wikis, blogs or similar applications, the information exchange can become much easier (Dearstyne, 2007) as communication is more transparent and visible for a broader user group.

The third scenario, outlining external communication with customers, would not really be possible without a Social Software application. A customer would maybe call the company in

order to ask his question and he would get the answer of the company. However, he would not get access to the customers' experience as he would not get in contact with them.

Altogether the three scenarios represent a variety of different functions that need to be performed from different users and in different points in time. With the implementation of these scenarios in ECS systems and the simultaneous analysis through the different modelling approaches it is possible to identify the various structures of SBD elements as well as their changes over time and through the different interactions.

5.2.2. Tool Selection

In order to analyse the nature and structure of Social Business Documents, the above outlined scenarios, including the different steps described in them, need to be implemented into appropriate systems. As already discussed within the research orientation as well as the literature part, this study mainly focusses on Enterprise Collaboration Systems. However, the functionalities of ECS and ECMS often overlap. Therefore, we can find systems which are described as and originate from ECMS but also include many social functions. Depending on the perspective of argumentation they can therefore also be seen as ECS. An example of such a system is Microsoft's SharePoint. When first developed, it started as an Enterprise Content Management System and also today it is often used as a file repository. However, today Microsoft SharePoint also includes many collaboration features and is sold as the Enterprise Collaboration System of Microsoft. The same applies to Alfresco. Alfresco is clearly an ECMS. However, today it also offers applications such as a wiki and functions for commenting and liking documents. Therefore, the tool selections for analysing SBD within this study considers both software types.

There are many vendors and software offerings available in both areas, ECS and ECMS. However, this study limits its analysis to the following four systems:

- IBM Connections 4.5.0.0
- Microsoft SharePoint 2013 SP1
- Atlassian Confluence 5.8.14
- Alfresco 5.0.d

The reasons for the chosen number are limitations in time and resources to analyse further systems as well as the assumption that these four systems represent a valid selection from which comprehensive findings can be abstracted. The reasons for the selection of these four systems are the following:

- IBM Connections was chosen as one of the first broader, fully integrated software suites in the area of Enterprise Collaboration Systems on the market (Drakos et al., 2013).
- IBM Connections, together with Microsoft SharePoint and Atlassian Confluence are among the most widely used ECS in the market (Drakos et al., 2013).
- Alfresco is the most widely used open-source ECMS and is also offering many social collaboration functions and features.

In addition, it was an essential requirement of the research study that the author has the resources, licences and administrative rights to run all four systems on their own IT-systems, providing the possibilities for full database and back-end analyses.

Deeper insights about the possibilities of each system, as well as information about the actual software version, are outlined within the individual modelling section 5.3 to 5.6.

5.2.3. The Modelling Approaches

In order to deepen the understanding of Social Business Documents and in a second step to discover challenges which makes the management of SBD more difficult, deeper insights into the technical as well as organisational implementation and instantiation of SBD are required.

Document engineering is used as a reverse engineering approach within this study. According to the above described steps, four different modelling processes are developed within this dissertation: object modelling, functional modelling, content modelling and lifecycle modelling. A short overview of each modelling approach is given in Table 9.

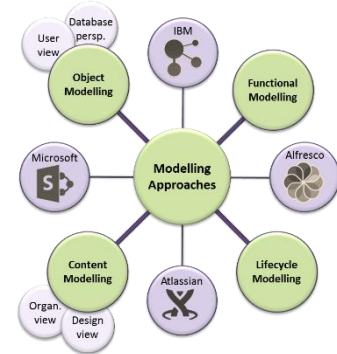


Table 9: SBD modelling approaches
(Hausmann and Williams, 2016)

Modelling approach	Aim	Outcome	Contribution
Object modelling	Identify syntactic elements of structural information model of SBD	(UML) class diagrams, ER-diagrams	Understand the technical implementation of SBD in order to identify their structure which in turn help to develop methods for the long-term management of SBD.
Functional modelling	Identify functional information model of SBD	(UML) activity diagrams	Understand the user-side modification that can be applied to SBD over their lifetime.
Content modelling	Identify semantic and organisational elements of structural information model of SBD	Design view, Metadata models	Understand the organisational requirements for information about SBD.
Lifecycle modelling	Identify changes of SBD during their lifecycle.	Lifecycle view	Understand which elements of SBD change over their lifetime and how these impact the management of SBD in order to identify SBD management challenges at different point in time.

Each modelling approach takes a different view of Social Business Documents and uses the diagram notations in an adapted form to fit the need to describe the different aspects of the nature and structure of Social Business Document and to be able to establish different information models. For example, the ER-diagrams in this work do not contain any cardinalities

included in the Chen notation, but focusses on the entities and their relation to each other, as well as their attributes. The granularity of each modelling approach was chosen by deciding which information can best assist in addressing research objectives one and two in order to deepen the understanding of the nature and structure of SBD and identify possible challenges for their long term management arising from the systems itself.

5.2.4. Object Modelling

The object modelling is aimed at describing the technical system perspective of Social Business Documents and identifying the syntactic elements in order to develop structural information models of Social Business Documents. To achieve this, the instantiated documents within different systems are analysed using the outlined collaboration scenarios in order to simulate their actual implementation. Thereby the different components of Social Business Documents, their attributes and their relations to each other in the database are outlined.

The structural models are represented through the use of ER-diagrams and UML class diagram representations. As originally developed, the entity-relationship model is designed and used as a tool for database design. It builds on the three data models: network model, relation model and entity set model (Chen, 1976, p. 9). Within the ER-model, an entity is the representation of a 'thing' which can be clearly identified and is shown as a rectangular box. Relations are associations between the entities (Chen, 1976, p. 10) represented by lines connecting the boxes. Furthermore, attributes, shown as ovals connected to an entity, can be used in order to further outline entities. As it is not possible and not always constructive to capture all information about entities and relationships, the ER-model limits its representation only to the information which is necessary for database design (Chen, 1976, p. 11).

Object Modelling: User Perspective (ER-diagram)

Within the object modelling for Social Business Documents, the representations of ER-diagrams are not used for the database design, but for the user perspective on information (entities and attributes) and their relationships to each other. It outlines the main components of a Social Business Document (shown as gray entities), how it is implemented within the system and which main attributes (e.g. metadata) a user can see when working with the system itself. For the purpose of readability, further relations between the light gray entities, which represent main entities that are important to understand the implementation but are not part of the main SBD, and entities representing document components are not shown.

Object Modelling: Database Perspective (UML class diagram)

In turn, the UML class diagrams expands the static user view of components from the ER-diagram. This is done through outlining the dynamic aspects of the systems from the database view including excerpts of the actual database implementation of interest for the long-term management of SBD. It thereby represents the logical and physical level of SBD. The Unified Modelling Language (UML) can be seen as a de facto standard for modelling software design

and analysis within Information Systems. The UML class diagram outlines a domain as objects represented by classes and relationships between them in order to describe the static structure of the domain on a semantic level. Each class can be described through its title, attributes and operations (Berardi et al., 2005, p. 71,73; Fowler and Scott, 1997).

By describing the syntactical structure of SBD with the help of UML class diagrams it is possible to examine where content is stored, how the different components of a Social Business Document are linked to each other and what and where metadata is stored. The system set-up is an important factor in the management of content as it influences, for example, the backup process and the possibilities for exporting content. Furthermore, UML diagrams offer the possibility to identify further metadata which is stored in the system, but is not visible for the user in the system front-end.

5.2.5. Functional Modelling

What can be done to and with a Social Business Document is investigated with the use of functional models. Maler and Andaloussi (1995) stated that there are three activities that can happen to or with a document: (1) it can be created and modified; (2) it needs to be managed, stored and archived; and (3) it is utilised. The functional model is constructed along the lifecycle of information and its stages creation, use and disposition (see section 2.1.1.3) which includes the above-mentioned activities.

By analysing Social Business Documents from a user perspective, the functional modelling shows through which activities a social document can be changed. The functional modelling thereby determines the functional information model of Social Business Documents including the processing and modification possibilities of Social Business Document in order to better understand their characteristics. Therefore, the basis for the functional model is the interaction of the user with the system (Hausmann and Williams, 2016). The words *functions* and *activities* are used interchangeably within the functional modelling approach here. However, with the modelling literature both, functional and activity models can be found. The activity analysis thereby examines the goals of people using the document. The intentions of the users and the roles of the documents are examined (Olsen et al., 2012, p. 111). In contrast, the functional modelling as used in this thesis asks for the functions that can be performed to or with a document.

The representation used for the functional modelling in this study derived from the UML activity diagram which is a behavioural modelling technique (Fowler and Scott, 1997, p. 141) drawing from ideas of Petri nets, event diagrams and SDL state modelling techniques. Activity diagrams can be used for describing workflows and behaviours. The main element is an activity which can, dependent on the perspective, be some kind of task or a method for a class (Fowler and Scott, 1997, p. 129). Used as a representation for the functions of Social Business Document an activity represents the conceptual perspective and describes a function/task you can perform to or with

a Social Business Document. Whereas a flowchart can only depict sequential processes, activity diagrams can outline parallel processes (Fowler and Scott, 1997, p. 131).

However, as activities around Social Business Documents can happen in parallel, they often do not follow a strict order and can be performed several times, the pure representation as proposed within the UML activity diagram model is not completely suitable here. Instead, a functional map is developed which uses the general representations of UML activity diagrams, but further indicates the fuzziness within the use phase of a Social Business Document. Thus, according to the general lifecycle, the functional models are separated into the three main stages: creation, use and disposition which are indicated through coloured backgrounds – green for creation, blue for use and red for disposition. However, at the same time components have their own lifecycles which are embedded within the overall Social Business Document lifecycle and are indicated through the same colour code.

5.2.6. Content Modelling

Salminen et al. (1997, p. 653) describe a content model as something that *“is created by providing, for each document object, a document component description, a reuse table, and a structure description”*. Parts of this have already been covered through the object modelling. The content modelling enhances the understanding of the structural description with the help of two different views.

Content Modelling: Design View

The design view outlines how a Social Business Document is stored and displayed in terms of its semantic document format. Web documents are often constructed through some kind of Markup Language (ML). Markup Languages are instructions which include information on what a document (or a process) looks like and how it should be processed (Maler and Andaloussi, 1995, p. 5). HTML – the HyperText Markup Language, is an application of SGML - the Standard General Markup Language, which is humanly readable and supports the creating of *“information about the information”* (Maler and Andaloussi, 1995, p. 3). Today, HTML is the main language used to describe the presentation (design/layout) of content on web pages. Developed in 1998, XML – eXtensible Markup Language – is another subset of SGML and often seen as an improvement on HTML (Glushko and McGrath, 2005, p. 17,42; Maler and Andaloussi, 1995). Today XML seems to be the lingua franca of the Internet (Salminen et al., 2014, p. 2564). It describes the content itself and thus separates the content and the presentation (Glushko and McGrath, 2005, p. 52) and therefore has two structures. They describe the logical structure which consists of elements represented through `<...>` and `</...>` tags and the physical structure which contains the different component files (entities). In order to manage XML documents, both structures need to be taken into account (Salminen et al., 2014, p. 2566).

As Social Business Documents represent digital documents whose presentation is managed by different output devices, the separation between the logical and physical structure is important for their long- term management, as the *“document that appears on the screen must be explicitly*

saved onto a persistent storage medium" (Beaudoux and Beaudouin-Lafon, 2001). Furthermore, the different components of SBD get compiled by the time of viewing and might be saved in different formats. The analysis through the design view will investigate the differences and outline the current state.

Content Modelling: Organisational View

Burke and Horton (1988, p. 57) propose the creation of a data form for each information type including for example the following details: ID of the information, resource name, location, organisational unit, resource manager, operating contact, description of content, purpose supported, storage media, prepared by, date, etc. The collection of all this information is then used to build an information/document inventory which shows all information types that are at hand. From the outlined details, it should then be possible to answer questions such as who (sources) holds which information (documents such as annual reports or trade publications), who is responsible for them and many more. As Glushko and McGrath point out, the richer the inventory is, the more effective it is (2005, p.227).

In line with these considerations, the organisational view provides further insights to the document's descriptive content by identifying and categorising the metadata of Social Business Documents and their components. Thereby the organisational view assists in identifying audit related information required for managing Social Business Documents.

5.2.7. Lifecycle Modelling

Most lifecycle models which can be found in literature describe the different steps a document takes over its life and separate between different sequential phases (Salminen et al., 2014). The Lifecycle modelling in this study also differentiates the phases of creation, use and disposition but is used as a method to visualise changes in documents over their lifetime. It therefore aggregates the findings of the object, functional and content model and build up on their different visual elements.

Thus, outlined within the lifecycle view are the different users which could be involved at the different stages, the activities from the functional modelling, the components of the users document view and the entities and attributes of the object modelling. Furthermore, the changing metadata as identified through the content modelling is indicated. With the use of the colours green (create), blue (change) and red (delete), the same colour-code as used for the life-phase is used to indicate the stage of the metadata.

The resulting lifecycle view thereby does not claim to be complete. As the order of functions that can be performed with Social Business Documents is not fixed, it only shows examples of what could be done. However, the goal of the lifecycle view is not to provide a full outline of all possible stages, but to identify the possible changes. By identifying the changes, including new information and components that are added as well as those which are deleted, it is possible to

provide a holistic view of Social Business Documents. These insights can then assist in identifying different management challenges of SBD emerging over time (Hausmann and Williams, 2016).

5.3. Tool Analysis: IBM Connections Modelling

IBM Connections is the Enterprise Collaboration Software platform of IBM. First launched in 2007 with the name IBM Lotus Connections, IBM Connections is currently available in version 6.0 (status 04.2017). IBM Connections' goal is to support businesses in improving their knowledge sharing, and decision making and enabling better coordination and cooperation between employees. IBM Connections consists of several applications which offer different functionalities (Figure 13).

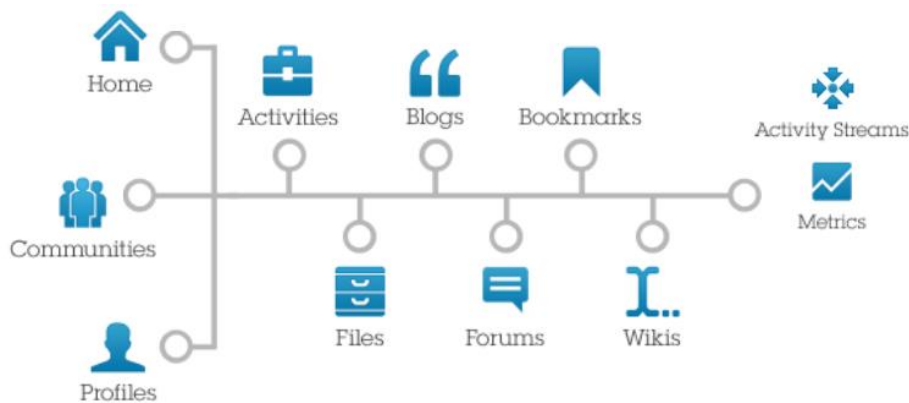


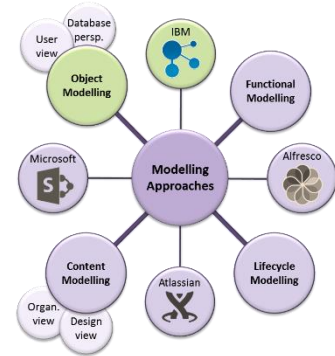
Figure 13: IBM Connections' Applications (IBM, 2014)

Every user in IBM Connections has his or her own profile, where contact details can be outlined and through which people can become connected to each other. All the profiles together constitute a directory of the people in an organisation. In addition, each user has their own home page. The home page is comparable to a landing page. Here a user can post their own status updates and get information about other people's status and about the current status of the information he is following (activity stream). The six main applications: activities, blogs, bookmarks, files, forums and wikis can either be used independently of any other application or integrated in communities. The communities provide team/topic related spaces where memberships can be managed and information be shared.

Within the following, IBM Connections version 4.5.0.0 is analysed. Thereby the applications wikis, blogs and forums are used as components embedded in a community. Each community can only have one wiki, one blog and one forum application with one or more wiki entries, blog and forum posts representing the SBD.

5.3.1. IBM Connection: Object Modelling

The object modelling for IBM Connections is separated into the user view (section 5.3.1.1) and the database perspective (section 5.3.1.2) which are outlined in the following.



5.3.1.1. Object Modelling: User View

In IBM Connections each kind of social document is constructed a bit differently. Therefore, the user view describes the user visible elements of the different documents separately below.

IBM Connections Wiki Entry: ER Diagram

Within the IBM Connections' wiki the entries are structured hierarchically and can either be created at the top level or as children of other wiki entries. One designated wiki entry is used as a landing page when the wiki application is opened. This entry is created automatically when the wiki application is added to a community. However, it is possible to create other entries on the same hierarchical level.

Figure 14 shows what the developed wiki scenario could look like when it has been implemented into IBM Connections. In addition, the different components are highlighted.

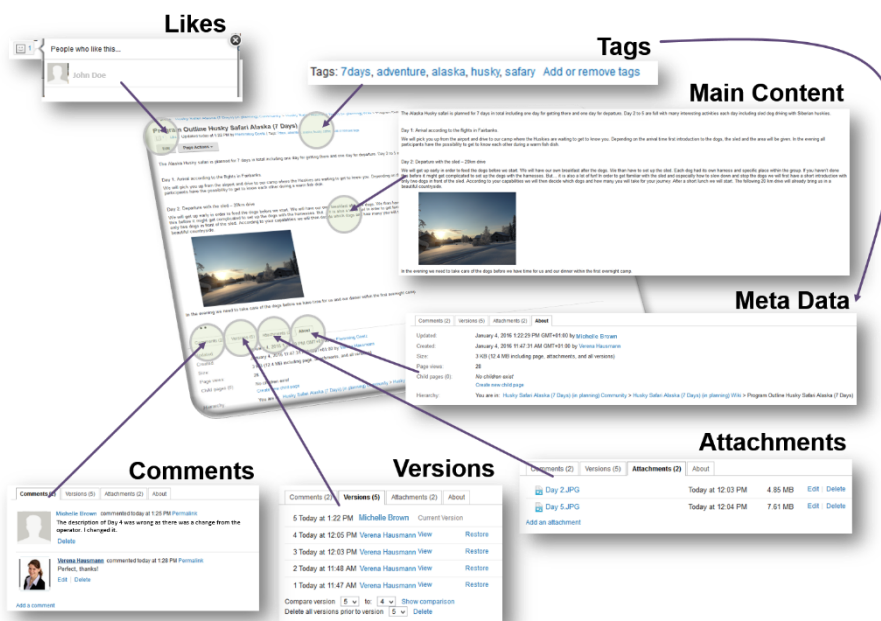


Figure 14: IBM Connections Wiki Entry – Document System View

In general, when creating a wiki entry in IBM Connections, this entry automatically has some metadata defined. Further information then can and needs to be defined by the user. After the initial creation it is possible to add comments, likes and tags to the entry itself which all contain further information. The content of a wiki entry can contain text including style information, tables, links, etc. Furthermore, it is possible to include pictures and other files as attachments to the entry. Each time a wiki entry is edited, it is versioned and older versions are available for

review. All these different entities and attributes are outlined in Figure 15 below. The automatically added metadata thereby is marked with a superscript 1.

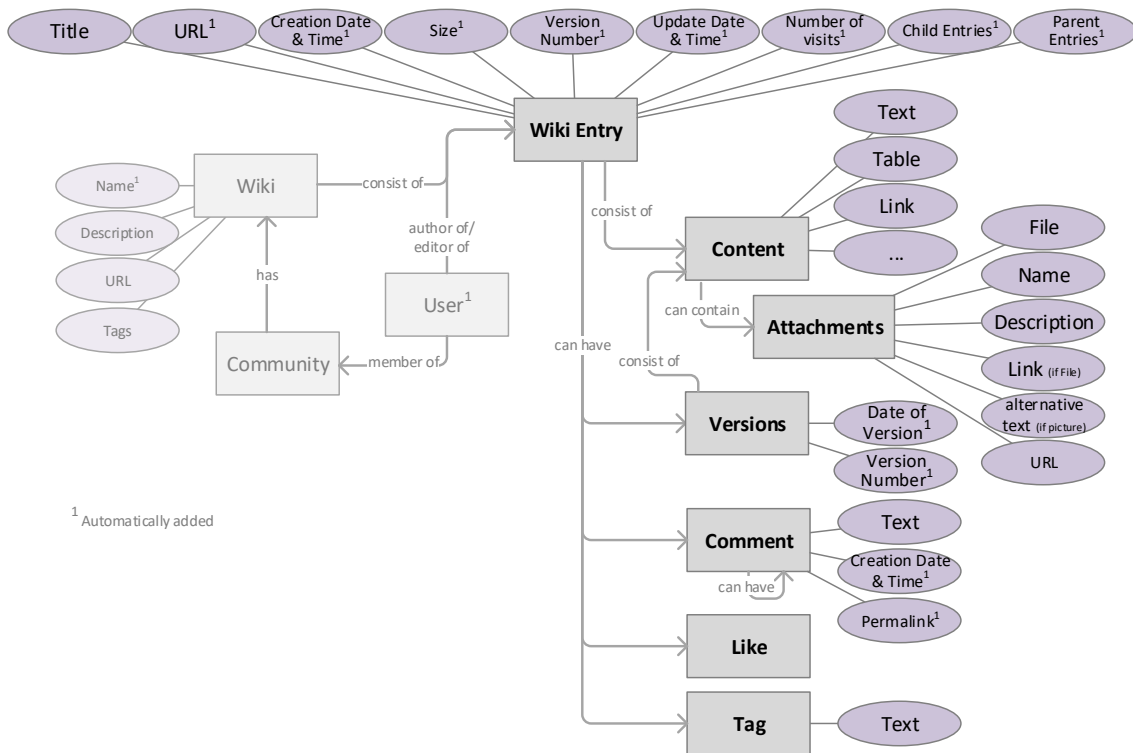


Figure 15: IBM Connections Wiki Entry – ER Diagram

Besides the aspects outlined in the user perspective, the wiki itself offers the possibility to view an index page which outlines a summary of all existing entries in the specified wiki.

IBM Connections Blog Post: ER Diagram

In order to get to the level of a blog post document, a blog itself needs to be created. At the beginning this blog is empty without any blog posts and consists only of some metadata such as a name, URL, etc. On creation of a blog post, this blog post will have some metadata automatically added, such as author, creation date and time. Other information, such as the title, needs to be added by the user mandatorily. Furthermore, users have the possibility to work with the blog post and extend it with different other blog components such as comments, tags or likes.

Figure 16 displays the scenario of keeping employees up to date by using a blog post in IBM Connections.

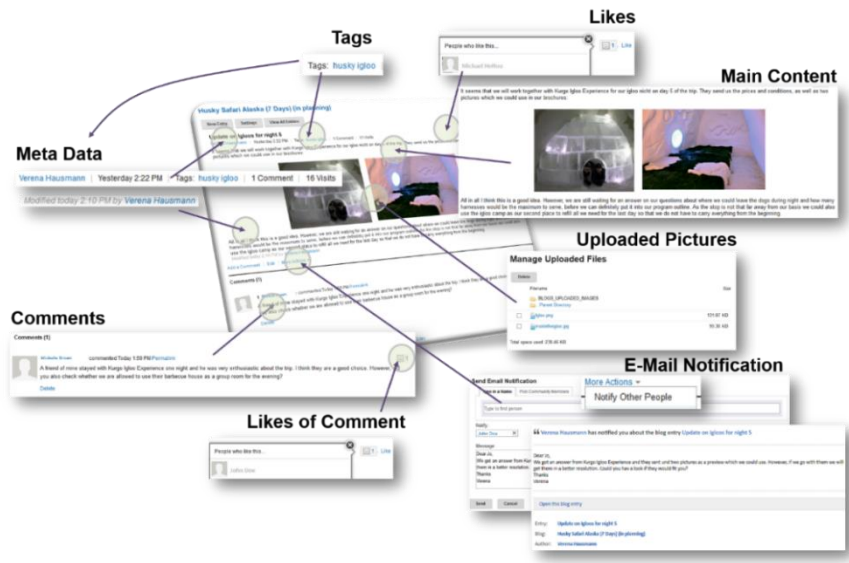


Figure 16: IBM Connections Blog Post – Document System view

In addition, Figure 17 shows the abstract user view of this blog post with the use of the adapted ER-diagram. Within IBM Connections' blog post, the text component (entity) can include normal text (attribute), tables, images, links to URLs and/or documents, I-Frames, Flash films and emoticons. Furthermore, the text attribute itself can include style details. This is different from all other text attributes shown below. A blog post has no versioning functionality, thus only the latest version of the document can be seen. However, the update time is automatically added if a user edits the post. Additionally, a user can add the blog post to another blog when writing a comment to the blog post.

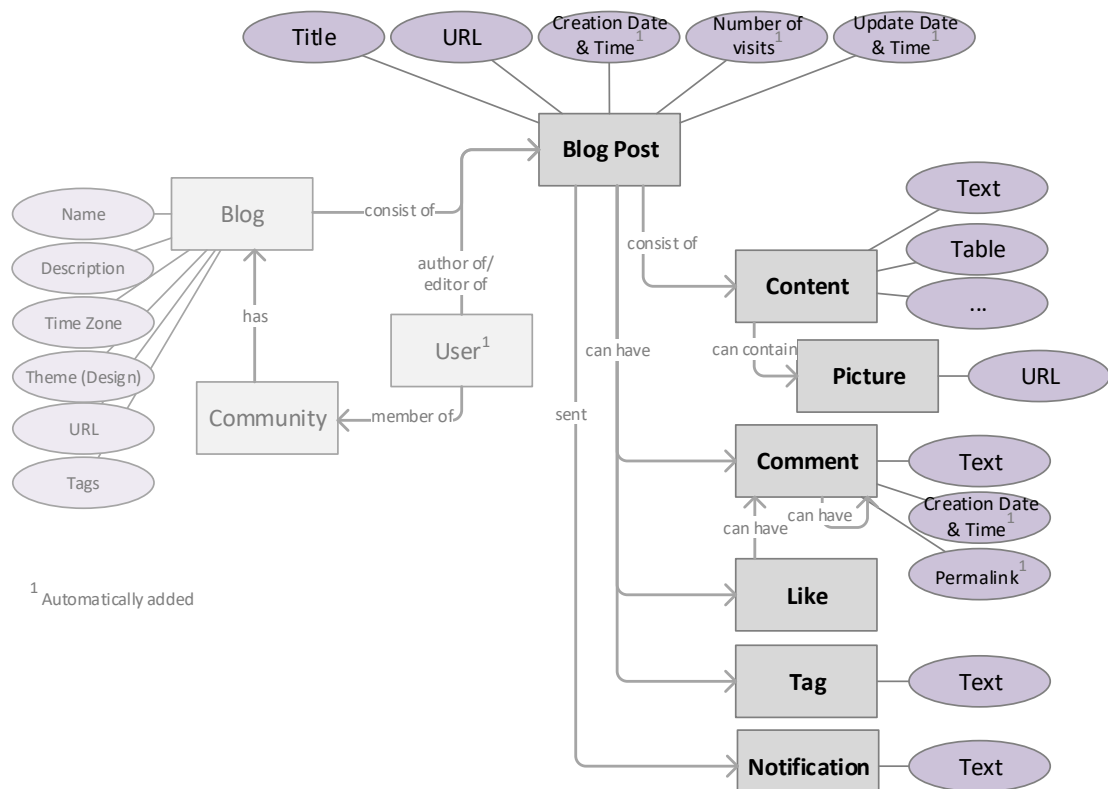


Figure 17: IBM Connections Blog Post – ER Diagram

IBM Connections Forum Post: ER Diagram

The IBM Connections system example resulting from the implementation of the collaboration scenario 'discussing experiences' is shown in Figure 18.

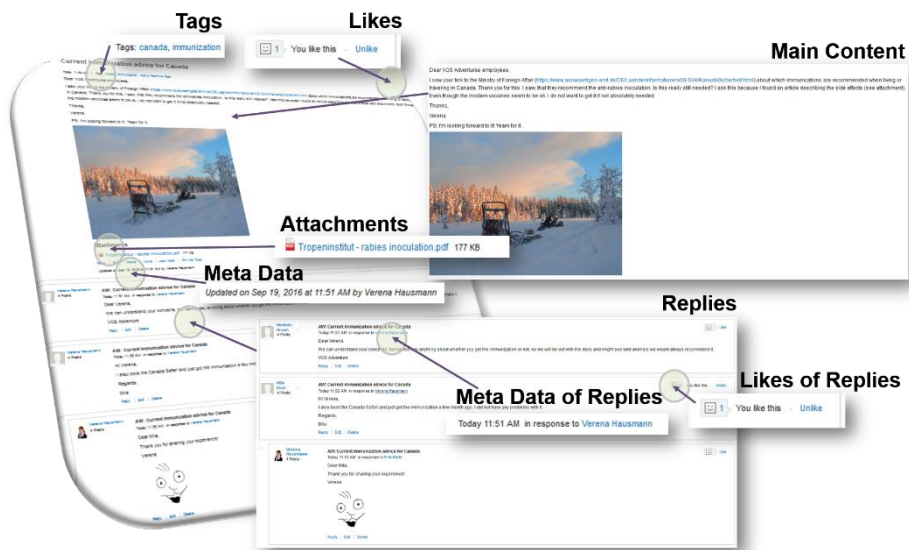


Figure 18: IBM Connections Forum Post (Topic) – Document System view

What can already be seen from this figure is that there is no component called comment. However, forum posts in IBM Connections offer the possibilities of replies, which are similar to comments. One difference is that replies of a forum post have a hierarchical structure, indicating to which reply the new reply was based. Furthermore, the replies can consist of the same element as the main post content. Thus, the reply functionality does not have a simple text editor options as is the case in the other IBM Connections applications, but contains the same text editor and attachment options as the main forum post.

The way forums are embedded in IBM Connections is a bit different to wikis or blogs. There is also only one forum application available per community. However, within this community, different forums can be created. Each forum can have meta-information assigned to it and consists of one or more forum posts, called topics in IBM Connections. Each forum post in turn consist of its main content, which can, beside text and tables, contain links to pictures and links to files which will get uploaded to a user's 'own files' which is an application outside the community. Furthermore, it is possible to add attachments, tags and likes to a forum post. The different elements and attributes visible from the user perspective are shown in Figure 19.

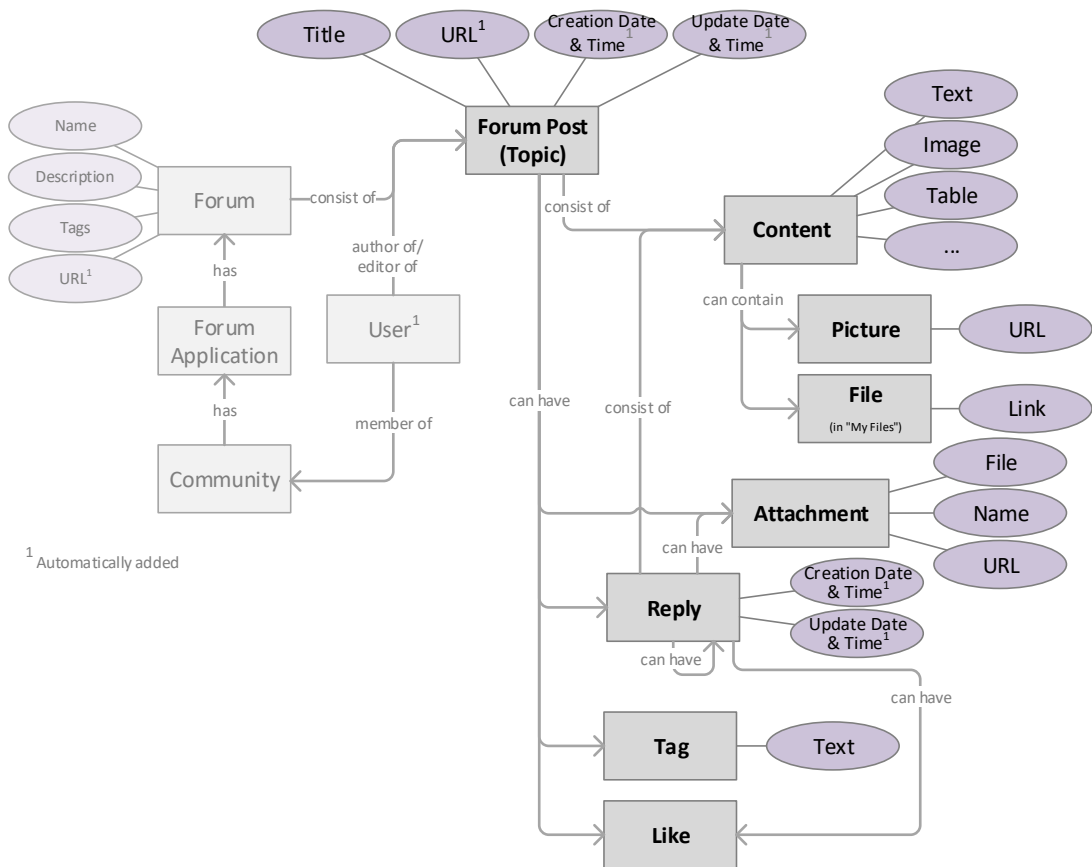


Figure 19: IBM Connections Forum Post – ER Diagram

What becomes visible from the three user perspective modellings is that even though the three documents are similar, each has its own structure and each has its own peculiarities. In order to be able to manage these documents it is therefore important to know and account for these differences to ensure that no information is lost.

5.3.1.2. Object Modelling: Database Perspective

IBM Connections, as installed on the analysed system, uses an IBM DB2 Database and has one database server which uses 4 different instances. Additionally to other databases which are needed for the whole system, each IBM Connections' application has its own database including several database tables. In this dissertation the databases that are connected to the wiki, blog and forum applications are analysed. These include the following tables:

- WIKI
- BLOGS
- FORUM
- (F_TRY_ITEMS)
- (METRICS)

Thereby the WIKI, BLOGS and FORUM databases represent the applications as their names imply. The F_TRY_ITEMS database lists deleted content. Even though there is no possibility to retrieve the content, the events that are locked in this database can show who (user) did what (event) and at which time. The METRIC database is one of the central IBM Connections databases as it contains the mapping of communities to its content. The F_TRY_ITEMS and the METRICS database are not further analysed here, but the METRICS database is important in

order to understand the system structure/set-up and the F_TRY_ITEMS might become of interest when it comes to the comprehensibility of content actions.

IBM Connections Wiki Entry: UML Class Diagram

Figure 20 shows the database construction of a wiki entry within IBM Connections. The wiki entry is embedded within a wiki application and all other components are linked to the user who either created, edited, viewed or deleted the wiki, its entries or a single component of it. Outlined, however, are only those classes, attributes and connections which are of importance for the management of the wiki entry. The main information about a wiki entry is saved within the 'Wiki Entry' table. However, the content of the wiki entry is not saved in here or any other database table. The content of wiki entries is saved as files within the filing system of IBM Connections. The database table only keeps a 'File_ID' which references the content file. The same applies to attachments of the wiki. The metadata is saved within the database table 'Attachments'. However, the files themselves are saved within the file systems. Furthermore, each social component (comment, like and tag) as well as data emerging through further functions, such as versioning, download possibilities or deletion and the structure, have their own database tables.

IBM Connections Blog Post: UML Class Diagram

Within the UML class diagram in Figure 21 each table of a blog post, which is of interest for managing the information within a blog post, is visualised as a class. Additionally, the important database columns are shown as the attributes of the class. There are no individual database tables for the blogs in the different communities. All blogs, blog posts and blog post components are saved together in the specific database tables. The main information of a blog post is saved within the table 'Blog Post'. Also the main text is saved as a CLOB file within the database table. Furthermore, each component such as comments, likes and tags all have their own database tables. Thereby each tag of a blog post is represented by an own row in the 'Tag' table for example and the 'Blog Post' table only saves the number of likes. In order to see who liked the post the table 'Likes' is necessary. The connections between the individual tables and the main 'Blog Post' table is most often the blog post ID.

For each edit of a blog post, a new entry is created in the 'Edit History' database table. However, even though this table tracks changes, the specific content of what was changed is not kept. It is only tracked that a specific person changed the post at a specific time. The 'Entry Hitcounts' table counts the number of users who viewed the blog post without recording who viewed the post. A history in terms of date and time about deleted post can be found in the 'Delete Post' table.

Even though files can be uploaded from the blog post interface, they are only linked to from within the text and are saved within the files component. Therefore, files are not seen as own attachment components of a blog post and are also not visible in the UML diagram. Furthermore, even though it is possible to include pictures into a blog post, these are also not

visible in the UML diagram as they are also only linked to from the main text and are saved as files in the IBM Connections file system.

IBM Connections Forum Post: UML Class Diagram

Regarding the structure, the backend of the forum application in IBM Connections is different as the wiki and blog applications. The forum application works with nodes which have different entries within the table, depending on what they represent (see Figure 22). The NODEUUID thereby is a unique number of the rows/entries within the node table. If the entry belongs to the creation of a forum itself (visible through the NODETYPE column), a new and unique FORUMUUID is created. If the entry in the database belongs to a topic, reply or field, the FORUMUUID refers to the forum the entry belongs to. The same, just on a different level, applies to the column TOPICID. If the entry refers to a forum, then the TOPICID is empty. If the entry refers to a topic, a unique TOPICID is created. All replies and fields belonging to this topic will then have the same TOPICID listed in the table. Thus, the DF_NODE table captures the metadata of a forum, a topic (a forum post), a reply and a field (an attachment) indicating its specification through the NODETYPE field. The content of each node is saved through the D_CONTENTREF table in which the MIMETYPE outlines how the content is saved. Mimetypes in the forum in IBM Connections are for example text/html, application/pdf or image/png. Except for the field (attachment) the content is saved as a CLOB file within the column DESCOFLOW. If the node represents an attachment, the field id is saved within the COREFUUID within the node table and the link to the file system is given through the CURI column in the content table.

Additional forum post components such as likes and tags are saved in their dedicated tables. However, the reply, which is seen as an additional component itself, is saved in the same table with the same structure as the forum post itself. This indicates, that each reply has the same functional possibilities as the forum post itself. If a user follows a whole forum or a special topic, this is visible through the entries in the table 'Follow'.

Comparing the way that the three SBD are saved within the backend of IBM Connections shows important insights. The content, for example, is not always saved in the database and depending on the document type also the way the components are saved differs. However, in order to address SBD as well as their components for export activities, as an example, it is necessary to exactly know the place of storage as well as the way the components are linked. The reasons for this is that different from traditional digital document we do not have a single file anymore which can be addressed.

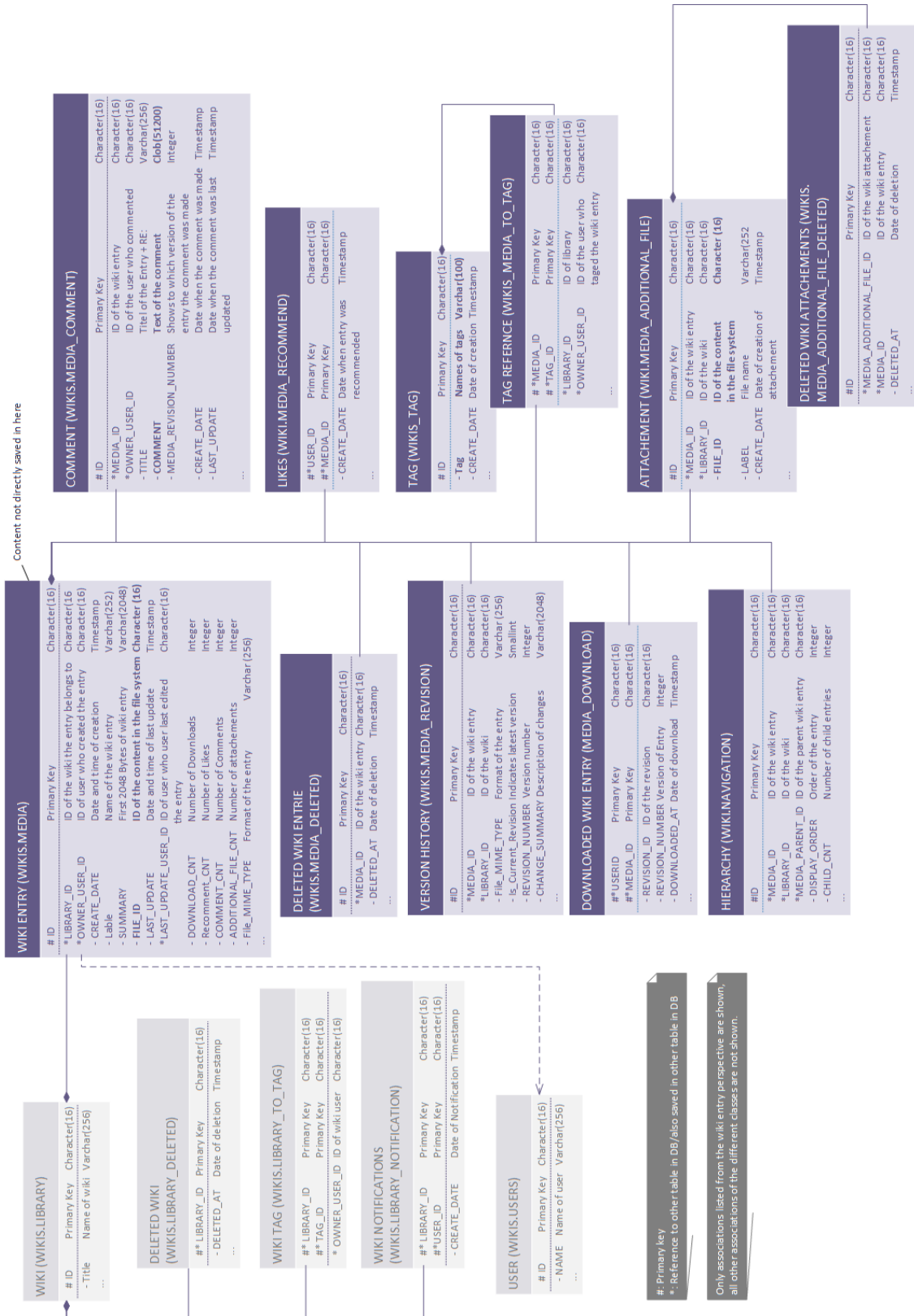


Figure 20: IBM Connections Wiki Entry – Database Perspective

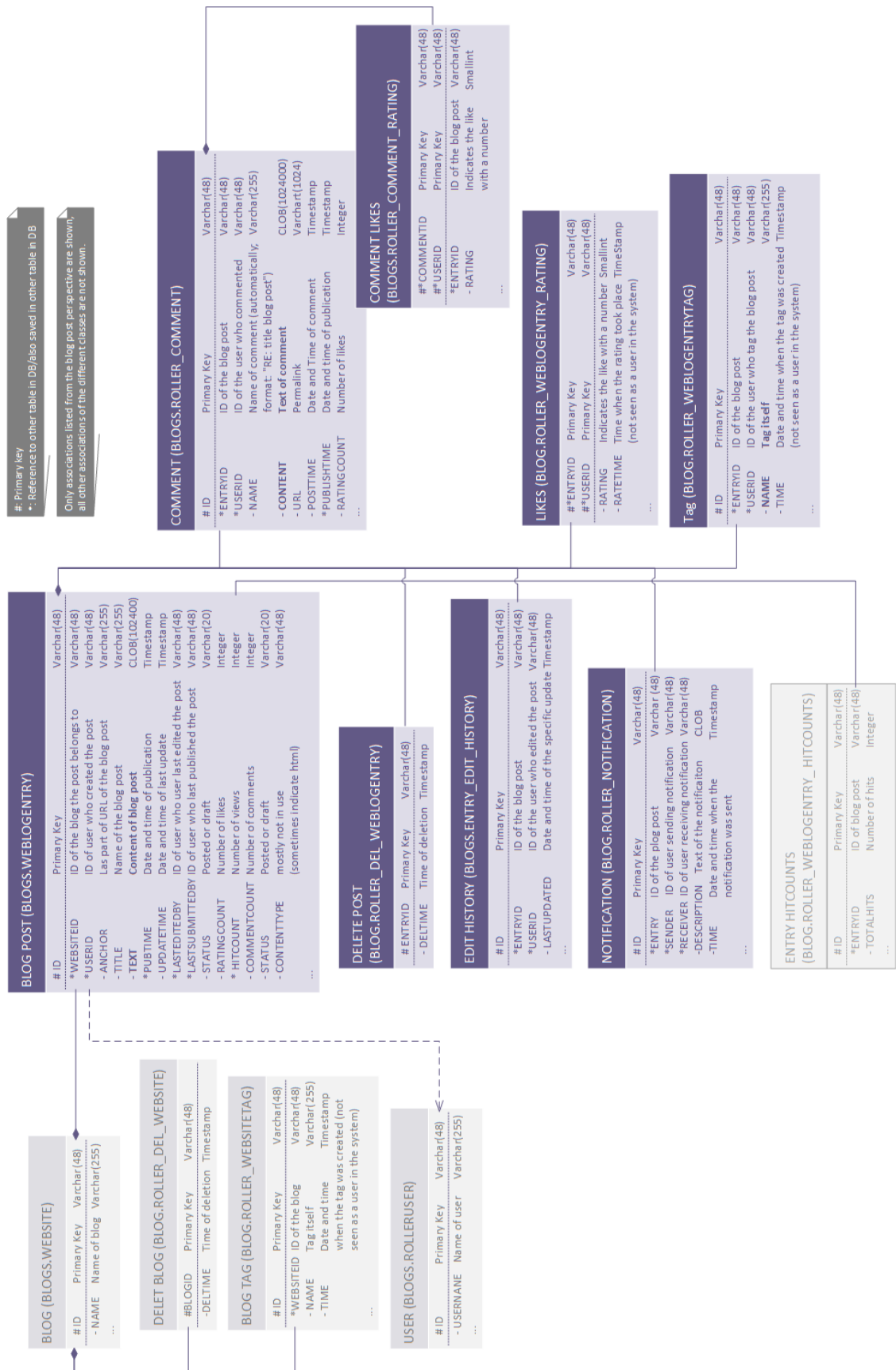


Figure 21: IBM Connections Blog Post – Database Perspective

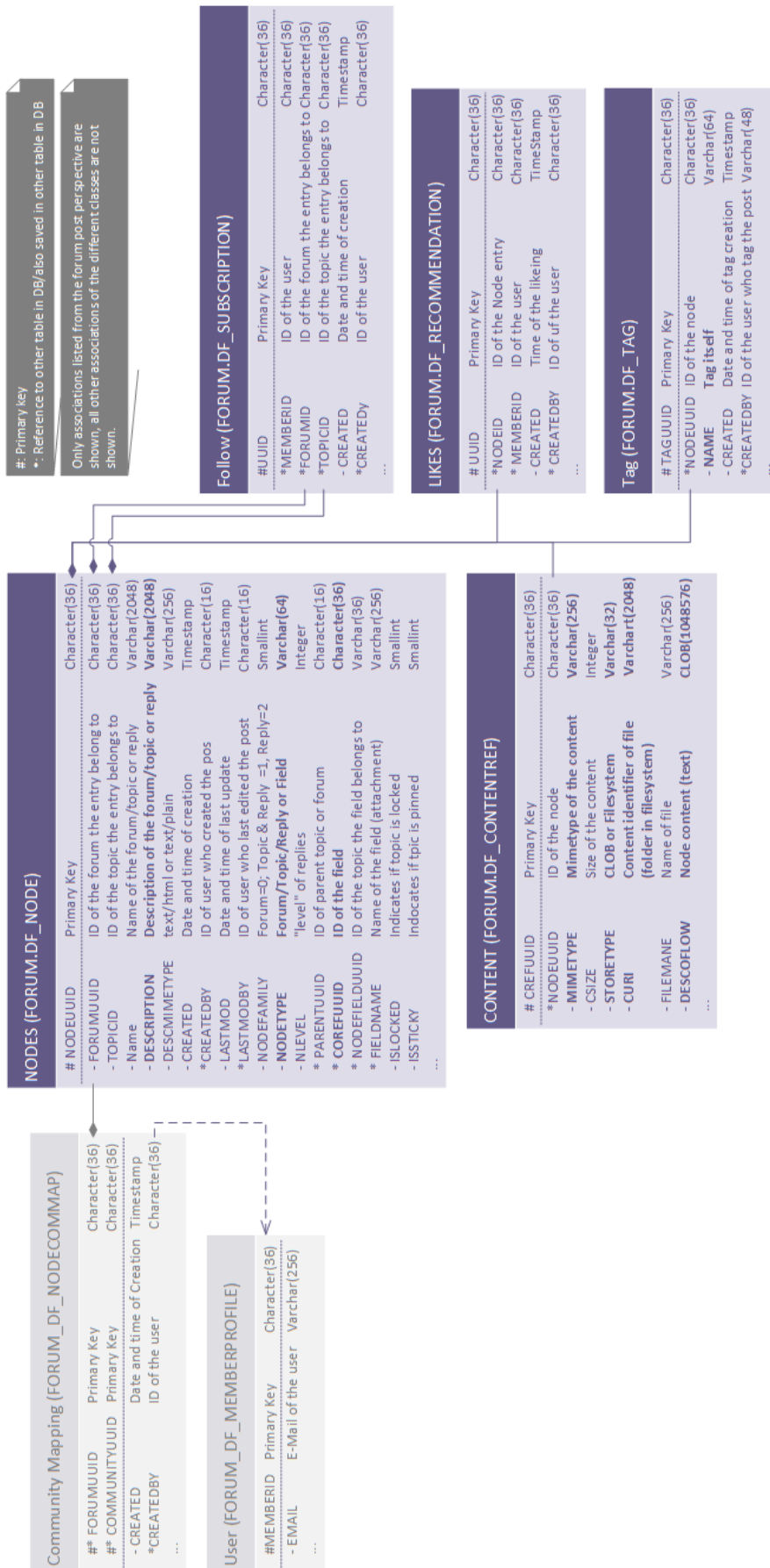
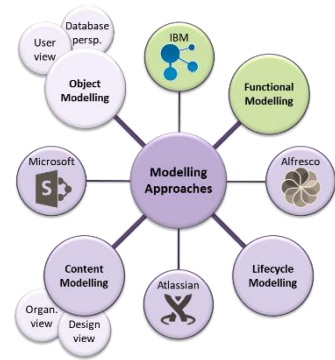


Figure 22: IBM Connections Forum Post – Database Perspective

5.3.2. IBM Connection: Functional Modelling

Within the following, the functional maps of the different analysed Social Business Documents in IBM Connections are outlined and described.



IBM Connections Wiki Entry: Functional Map

Figure 23 shows the functional map of a wiki entry in IBM Connections and outlines the activities that can be performed to/with a wiki entry. These include the enhancement of the entry with the help of components such as tags, likes, comment or attachments as well as activities around the content export (download and print). An important aspect of wikis is the versioning function which becomes visible through the view, compare and restore activities. However, these are only available after the entry was edited at least once after its creation. The final deletion of a wiki entry is only possible through a wiki trash page from the overlying wiki application.

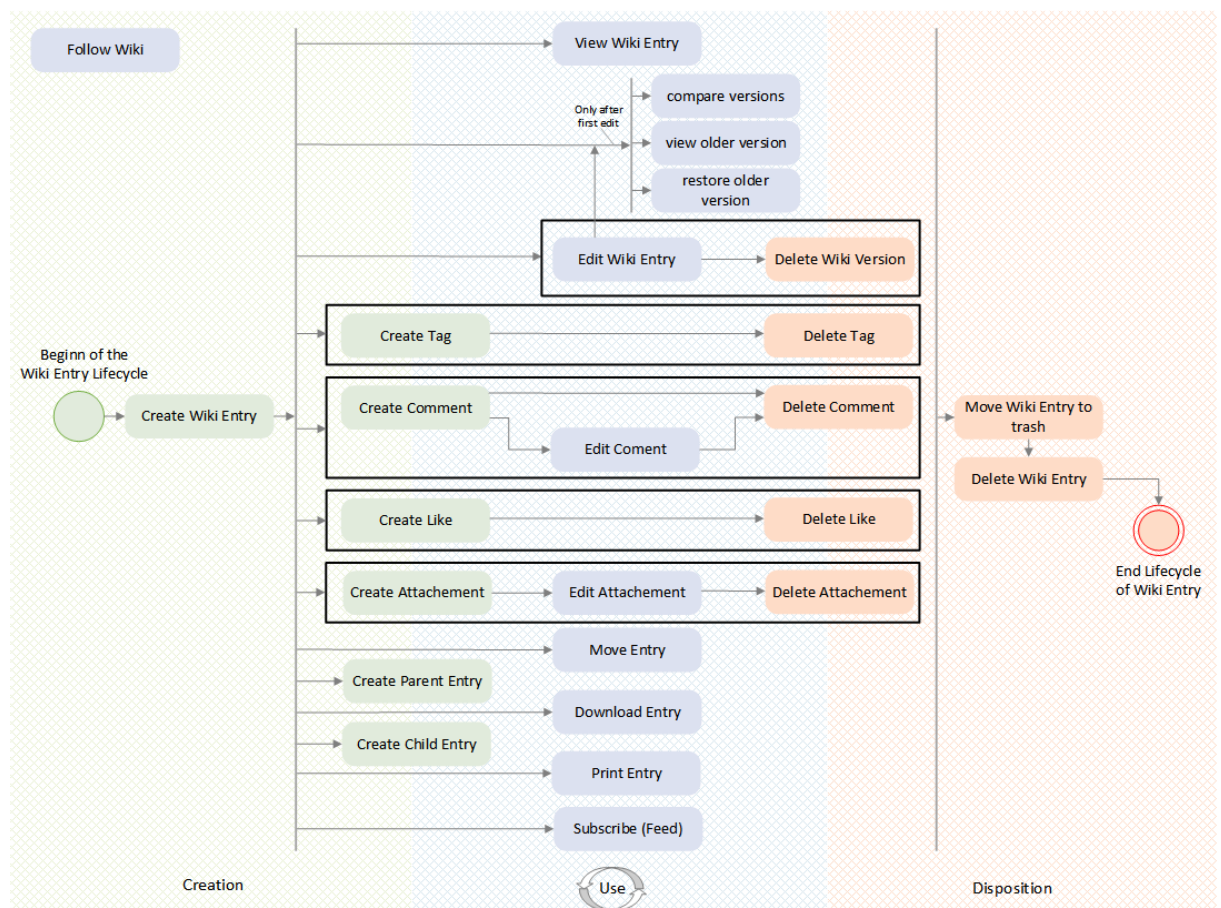


Figure 23: IBM Connections Wiki Entry – Functional Map

When printing a wiki entry, the outcome shows the path of the wiki entry (including the community and the wiki name as well as the further hierarchy), the name of the entry, its main content, its comments (including the content, its author and date), the creator, the update time

and date, the number of likes (not who liked it) and the tags. However, when downloading an entry, an html file is created which only includes the main content itself.

IBM Connections Blog Post: Functional Map

According to the general lifecycle, a blog post in IBM Connections has three main stages in its lifecycle: creation, use and disposition. Especially in the use phase, many actions can be performed (see Figure 24) including the creation of document components such as comments, tags and likes. It is also possible through commenting a blog post to use the post itself and the comment and create another, new blog post within another blog, thus creating another Social Business Document.

When editing a blog post in IBM Connections, everything that was specified by its creation, such as title, URL, text and so on can be edited again. Additionally, the further creation of tags and the deletion of existing tags are only possible through the edit blog post function.

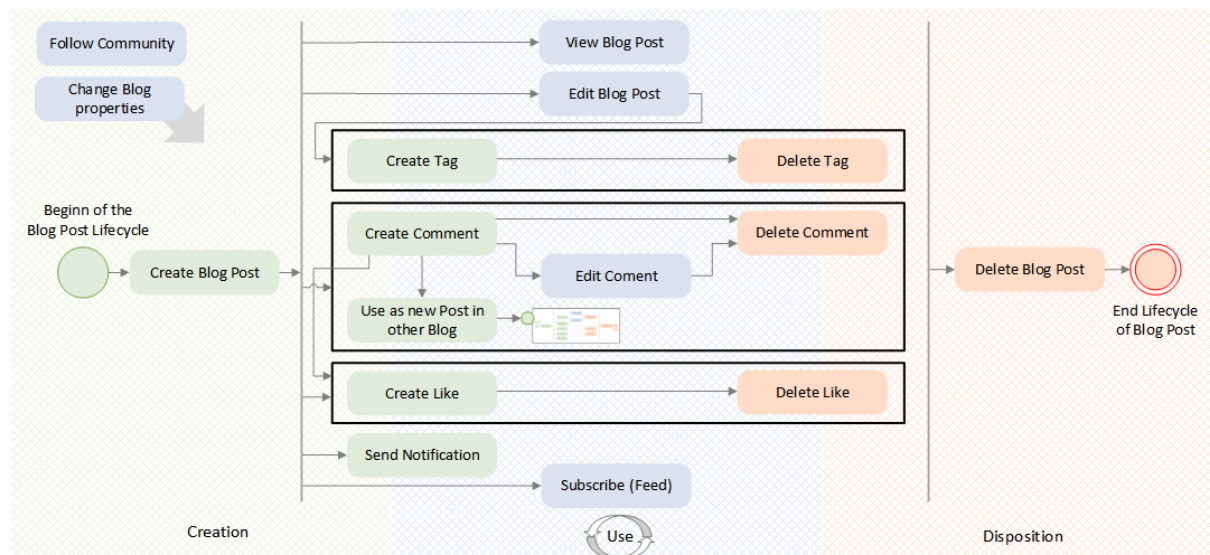


Figure 24: IBM Connections Blog Post – Functional Map

Besides these components and metadata the user has the possibility to edit some properties for the whole blog. These include the possibilities to:

- activate/deactivate the whole blog
- set the number of posts that are shown per page
- decide if emoticons can be used
- decide if people can edit entries of others
- decide if comments are possible
- decide if comments are moderated (must be released)
- decide for how long it is possible to make comments
- apply comment defaults to existing entries
- activate Blogger and MetaWeblog API

Even though these activities are not directly connected to the blog post itself but to the overall blog application, it influences what can be done to the individual post/how the individual post is visualised. Outlined above in the functional map are those activities which are possible through the standard setting.

IBM Connections Forum Post: Functional Map

As with the wiki entry and the blog post, most functions of the forum post in IBM Connections can be found within the use phase of the document (see Figure 25). After a forum is created, a topic (forum post) can be created as well. This post can then be viewed, edited, locked so that it cannot be replied to anymore from members, pinned, so that it will stay at the top of the forum's topic list, moved to a different forum or subscribed to. Furthermore, the three components of replies, tags and likes can be added, edited and/or deleted. If the whole post is deleted at some point in time, all components get also deleted and the lifecycle of the compound SBD ends.

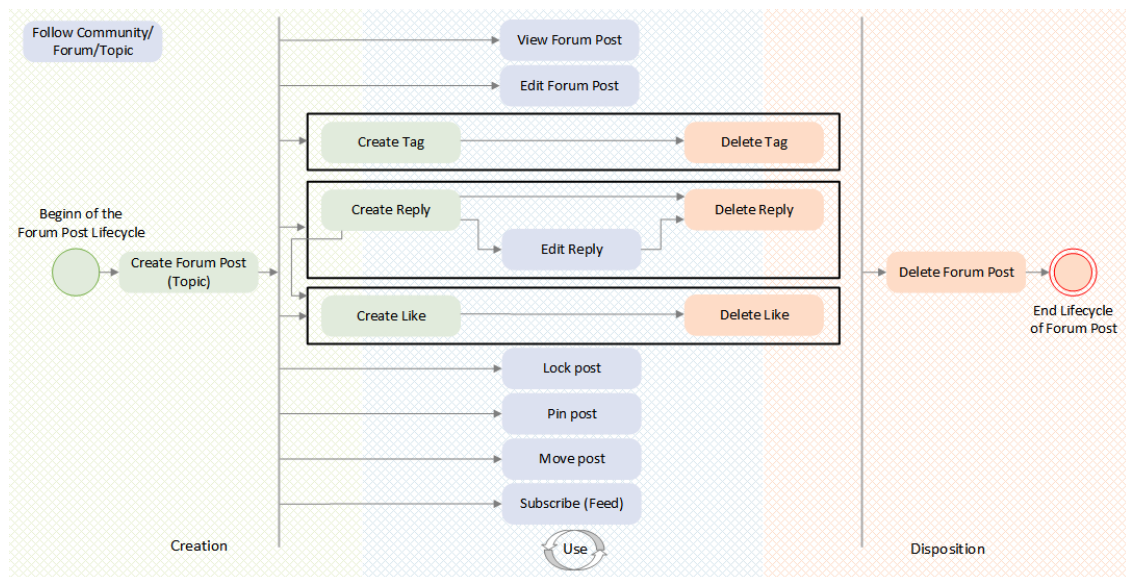


Figure 25: IBM Connections Discussion Post – Functional Map

What becomes visible through the functional maps is that each document offers the possibility to use functions in parallel, that functions are nested and that some functions, which create own components of the main SBD, have own, nested lifecycles. Furthermore, even though the different applications belong to one Software suite, the functions that are available for the different SBD differ.

5.3.3. IBM Connection: Content Modelling

The content modelling for IBM Connections is separated between the design view (section 5.3.3.1) briefly outlining the format the documents are stored in and the organisational view (section 5.3.3.2) presenting the metadata kept for each document within IBM Connections.

5.3.3.1. Content Modelling: Design View

While the final representation of SBD in IBM Connections is done through CSS in all three analysed cases, the way and format SBD and their components are saved in differs (see Table 10).

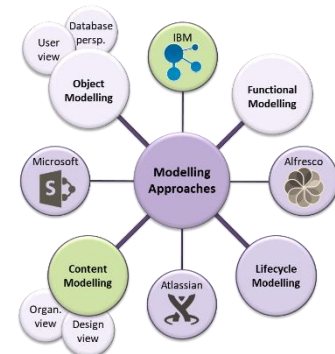


Table 10: IBM Connections Content Storage Formats

Component	Storage Format
Wiki entries' main text	XML file containing HTML code saved in the filing system
Blog and forum posts' main text, Wiki entries' and blog posts' text of comments; Blog posts' notification text	as HTML in CLOB files in the database
pictures within the text (in all three SBD)	original file format in the filing system; referenced within the text
Wiki entries' and forum posts' attachments	original file format in the filing system; referenced through the database tables
Tags (in all three SBD)	normal text as varchar in the database

While the text of the main wiki entry is saved as an XML file in the filing system, the text of blog and forum posts is saved as Character Large Object (CLOB) within the database. However, in both ways HTML is used, including formatting rules for displaying. Where available, pictures within the text are saved in their original file format and only referenced within the text and attachments are referenced through the database tables. Tags are stored as normal text, using varchar in the database tables.

5.3.3.2. Content Modelling: Organisational View

The following four tables give an overview of the metadata saved in IBM Connections for the different SBD. Thereby Table 11 outlines the general metadata available for all three document types, whereas Table 12 shows wiki entry, Table 13 blog post and Table 14 forum post specific metadata. The explanation to all three tables is the following:

- A = automatically added
- M = manually added;
- D = only visible within the database
- U = also visible from the user perspective

Table 11: IBM Connections General Metadata

Metadata Information	Description	A/M	D/U
ID	A unique identifier for a specific wiki entry, blog or forum post	A	D
User (ID)	Reference to the user who created the entry/post	A	U
Label/Title/Name	Heading of a wiki entry/ a blog post/ a forum post	M	U
Creation_Date/ Publication_Time	Date and time of the creation of the wiki entry/ Publication time of the post	A	U
Last_Update/Modify	Date and time of last edit	A	U
Last edited by	Reference to the user who last edited the entry/post	A	U

Likes - time	Reference to the user who liked the entry/post	M	U
	Date and time when the entry/post was liked	A	D
Deletion time	Date and time when the wiki entry was moved to the trash/ when the post was deleted	A	D
Tags - name - time - user (only in wiki)	ID of tag	A	D
	Name of the tag	M	U
	Date and time of tag creation	A	D
	Reference to the user who created the tag	A	D

Table 12: IBM Connections Wiki Entry's Specific Metadata

Metadata Information	Description	A/M	D/U
Parent entry	Reference to the parent wiki entry in the hierarchy	A	U
Number of child entries	Number of child wiki entries within the hierarchy	A	U
Summary	First 2048 Bytes of the wiki entry	A	D
File ID	Link to the content file of the wiki entry	A	D
Wiki Attachments - Name - creation date - last updated time - last update user - extension - file size - status (deletion) - deleted at - file id	ID of the attachment	A	D
	Name of the attachment	A	U
	Date and time of attachment upload	A	D
	Date and time of update of the attachment	A	U
	Reference to the user who last updated the attachment	A	D
	File format (e.g. jpg)	A	D
	Size of the attachment	A	U
	Indicated if attachment was deleted	A	D
	Date and time of attachment deletion	A	D
	Link to file	A	D
	Wiki Comments - content - title - date - entry version - author - update time - status (deletion)	ID of the comment	A
Content of the comment		A	U
Title of wiki entry + addition e.g. "RE:"		A	D
Date and time of comment creation		A	U
Refers to the version of the entry the comment was written to		A	D
Reference to the comment writer		A	U
Date and time of update of the comment		A	U
Marks deleted comments		A	D
Wiki Downloads - Number - user - revision - date			
	Counts the number visits of the entry	A	U
	Reference to the users who downloaded the entry	A	D
	Shows the version of the entry that was downloaded	A	D
	Date and time of download	A	D
Wiki Version	Current number of version of the wiki entry	A	U
Wiki	The wiki the entry belongs to	A	U

Table 13: IBM Connections Blog Post's Specific Metadata

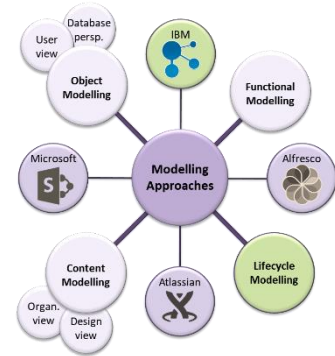
Metadata Information	Description	A/M	D/U
Blog	The blog the post belongs to	A	U
Last submitted by	Reference to user who last published the blog post	A	D
Status	Status: Available or draft of the blog post	M	U
Blog Notifications - sender - receiver - time	Content/Text of the notification	M	D
	User who sent the notification	A	D
	User who received the notification	A	D
	Date and time when the notification was sent	A	D
Connections version	Version of IBM Connections the blog post was created with	A	D
Database version	Version of the database the blog post was saved in	A	D
Blog Comments - content - date - author - user like	ID of comment	A	D
	Content of the comment	M	U
	Date and time of publication	A	U
	Reference to the comment writer	A	U
	ID of the user who liked the post	A	U
Number of visitors	Counts the number of users who saw the blog post	A	U

Table 14: IBM Connections Forum Post's Specific Metadata

Metadata Information	Description	A/M	D/U
Locked	Frozen for other users to work on	M	U
Replies - content - date - author - user like	ID of reply (NODEUUID)	A	D
	Content of the reply	M	U
	Date and time of publication	A	U
	Reference to the reply writer	A	U
	ID of the user who liked the post	A	U
Mimetype	MIME type (file identification) of the nature and format of the content	A	D
Forum	ID of the forum the post belongs to	A	U
Attachment	ID of the attachment	A	D
Connections version	Version of IBM Connections the forum post was created with	A	D

5.3.4. IBM Connection: Lifecycle Modelling

Figure 26 shows the lifecycle view of an IBM Connections wiki entry, developed through the use of the previously conducted modelling approaches. It thereby only shows example activities which can be conducted. What becomes visible is that all actions, except the deletion of components, adds to the amount of metadata saved within the system. Furthermore, some activities also lead to a change in the metadata.



In addition, it can also be seen that the metadata of a comment which is deleted also gets deleted in the corresponding database table. If the main wiki entry gets deleted, all of its components, except the tag are deleted within the original files as well. The tag stays in the database as it was, only the link from the wiki entry to the tag gets deleted. Furthermore, other information will get captured in different tables. The ID of a wiki entry, for example, including its original creation and deletion data is captured in the Media_deleted table. Additionally, if the entry had an attachment, the attachment ID, including its original creation and deletion date is captured within the Media_Additional_File_Deleted table. Likes are deleted completely if the entry is deleted.

Similar findings have been derived from the analysis of the blog and forum post in IBM Connections. As the lifecycle view should only indicate the different areas where challenges can occur, the blog and forum post lifecycle views are not displayed or discussed here.

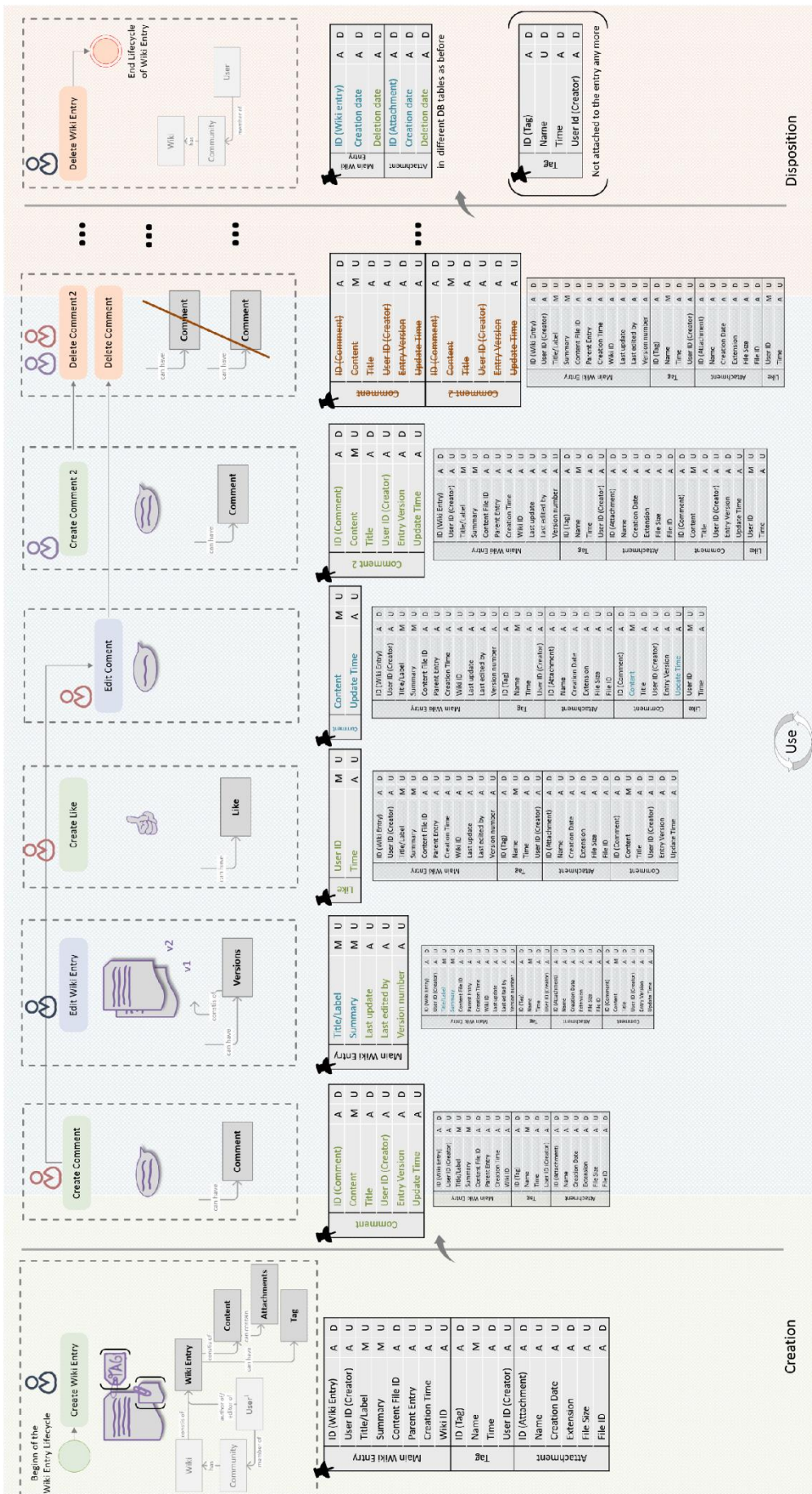


Figure 26: IBM Connections Wiki Entry: Lifecycle View

5.4. Tool Analysis: Alfresco Modelling

Alfresco is the Enterprise Content Management System of the Alfresco Software AG. Alfresco is an open-source software product which was first released in 2005. The free version is the Alfresco Community Edition, currently available in Version 5.2 (status 04.2017). Alfresco aims at connecting people, content and processes by bringing together ECM and BPM functionalities in a single web application, also including social functions and applications. By utilizing the open source standard CMIS (Content Management Interoperability Service), which is a standard for ECM systems to easily share information between systems, Alfresco has an open API for third-party developers to create add-ons. Therefore, more than 400 add-ons are currently available for Alfresco offering many different functions. Figure 27 gives an overview of Alfresco's main applications integrated in the standard installation.

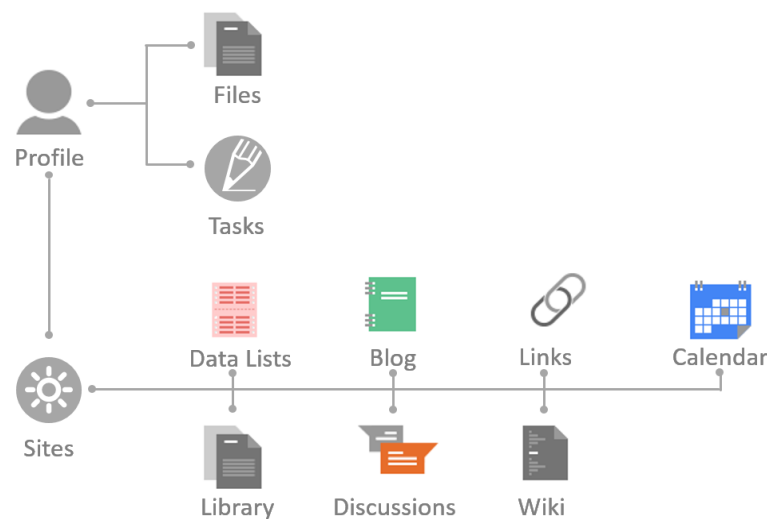


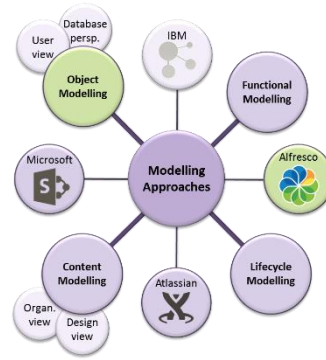
Figure 27: Alfresco's Applications

A user in Alfresco has a Profile where contact details can be outlined and through which people can follow the activities of other people. Furthermore, each user has an own file repository where folders can be created, documents can be stored and a tasks component where tasks and workflows can be assigned to himself or to someone else. All further applications – Library, Discussion, Wiki, Data Lists, Blogs, Links and Calendar - are only available through the usage of Sites. Sites are team/topic related spaces where users can work together. Besides the social applications, Alfresco also offers some further social functions such as adding comments, tags or likes. However, most of these features are only available to files and folders within the library. Which components are available with which SBD will be outlined below with the help of the different modelling approaches.

Within the following Alfresco 5.0.d including the Records Management extension in version 2.3 was used. Thereby, only the documents within the wiki, blog and discussion applications within a site are further examined. Each site in turn can only have one wiki, one blog and one discussion application with one or more wiki entries, blog and discussion posts.

5.4.1. Alfresco: Object Modelling

As with IBM Connections, the object modelling for Alfresco is separated into the user view (section 5.4.1.1) and the database perspective (section 5.4.1.2) which are outlined in the following.



5.4.1.1. Object Modelling: User View

The wiki entry, blog post and discussion post documents within Alfresco are all a bit different regarding their appearance. Therefore, the user view describes the user visible elements of the different documents separately below.

Alfresco Wiki Entry: ER Diagram

When the wiki application is added to a site in Alfresco, the wiki directly contains one entry called 'Main Page' which however is handled a bit differently to all other entries as the main page is not listed within the overview of pages. Its components and functions are nevertheless the same as all other wiki entries. There is no hierarchical structure with wiki pages in Alfresco and all entries are on the same level. It is only possible to create links between pages.

Simulating the collaboration scenario of "developing a program outline", the wiki entry in Alfresco will look as shown in Figure 28.

Name	Creator	Created	Modifier	Modified
Day 2.JPG	Verena Hausmann	Mon 25 Jan 2016 23:05:29	Verena Hausmann	Mon 25 Jan 2016 23:05:29
Day 5.JPG	Verena Hausmann	Mon 25 Jan 2016 23:06:41	Verena Hausmann	Mon 25 Jan 2016 23:06:41

Figure 28: Alfresco Wiki Entry – Document System View

Wikis in Alfresco thereby mainly consist of their content, being made up of text or links to other pages, pictures or attachments in the repository. As the attachments are independent Social Business Documents if analysed from within the repository application, they are not further outlined here. If the wiki entry has been edited, a new version is automatically created.

Furthermore, tags can be assigned to each entry. Figure 29 shows the components and metadata information of an Alfresco wiki entry as visible from the user perspective.

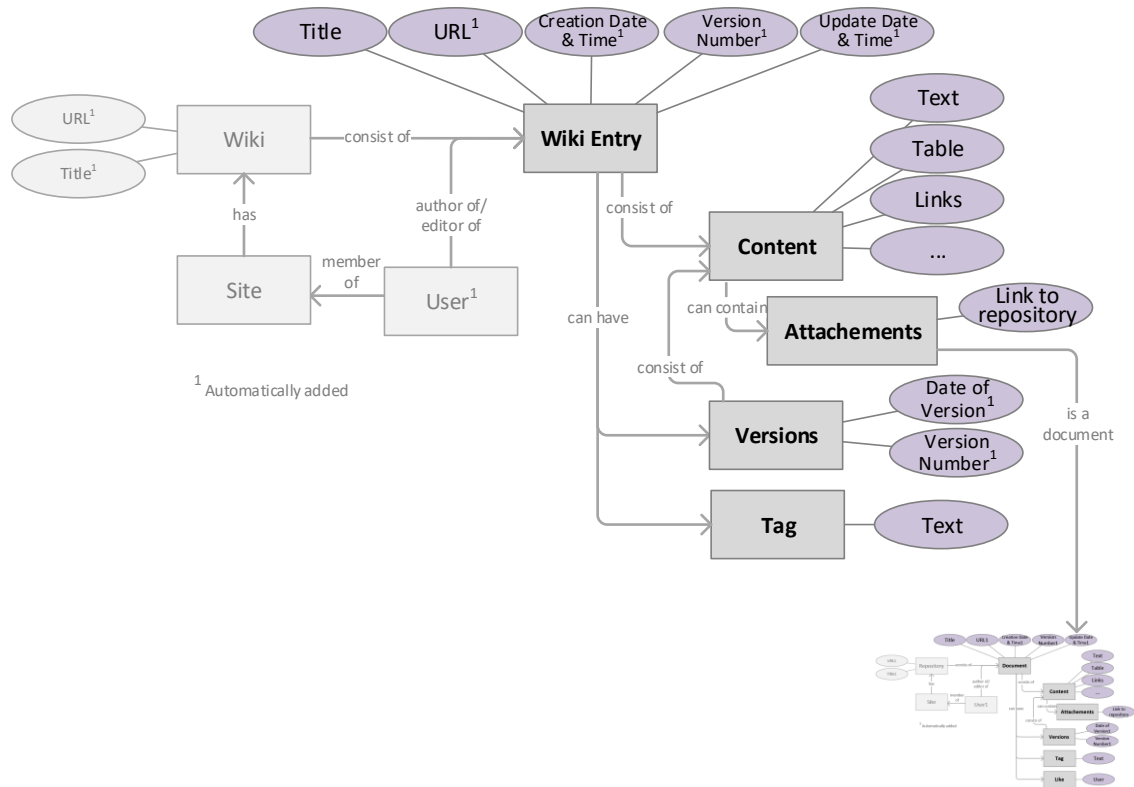


Figure 29: Alfresco Wiki Entry Post – ER Diagram

Alfresco Blog Post: ER Diagram

The blog application in Alfresco is only available through the usage of sites. After a site is created a blog can be added and a first blog post be written. Figure 30 shows the system example of the blog post in Alfresco implementing the scenario outlined above.

Name	Tags	Width	Height	Size	This vers
igloo.png	No Tags	305	252	131 KB	1.0
inside the igloo.jpg	No Tags	550	365	99 KB	1.0

Figure 30: Alfresco Blog Post – Document System View

A blog itself does not have any user-visible metadata, but a blog post does. However, the only thing required for the creation of a blog post is a title. The URL, the creation date, time and the author details are automatically added (see Figure 31). If the blog post was edited, an update hint (showing the word 'Updated' behind the title) is also added automatically. The main body of the blog posts consist of its content which can contain formatted text, links, tables or other elements. Pictures can only be added through links to a picture's URL. Furthermore, a blog post in Alfresco can have two components, namely comment and tag, both containing simple text.

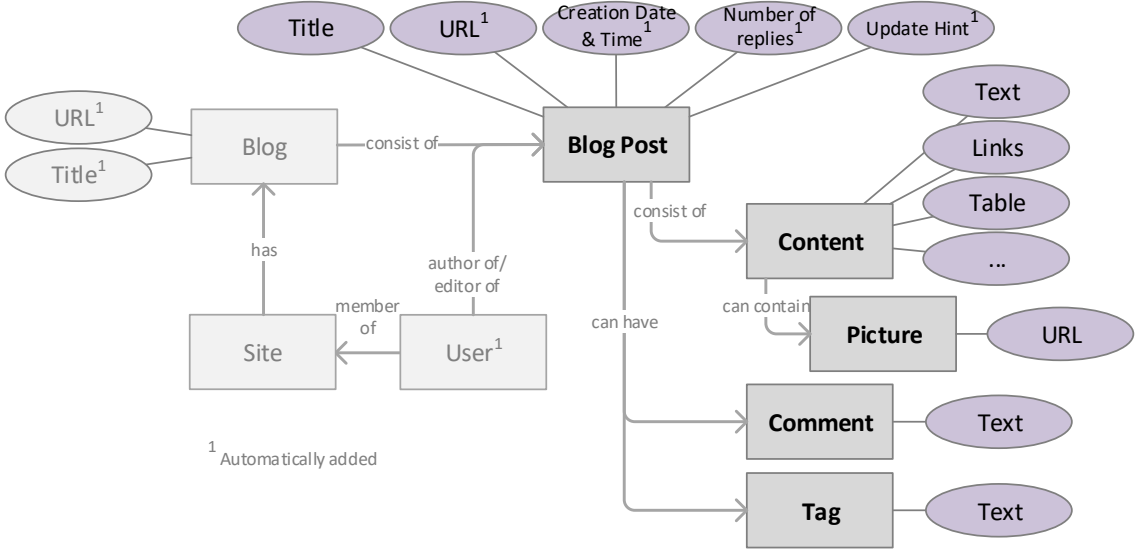


Figure 31: Alfresco Blog Post – ER Diagram User Perspective

Alfresco Discussion Post: ER Diagram

Discussion posts are called topics in Alfresco. Before a discussion post can be created, the discussion application needs to be added to the Alfresco site. Figure 32 shows the scenarios system example of the discussion post within Alfresco.

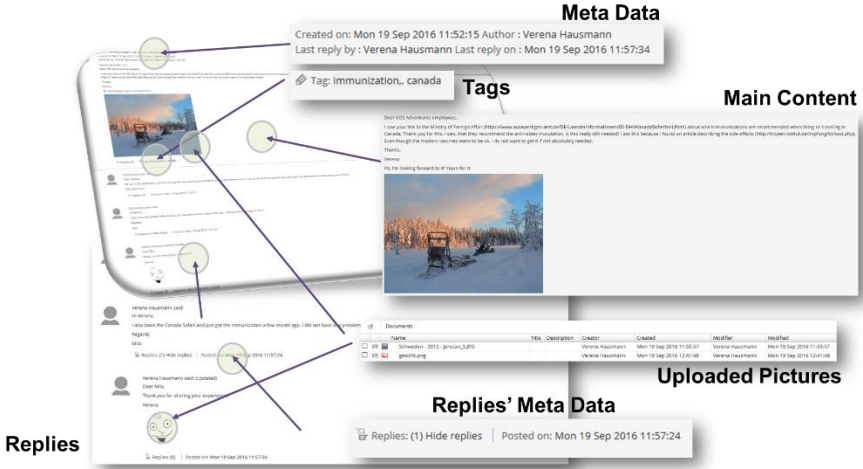


Figure 32: Alfresco Discussion Post – Document System View

The topic/discussion post has a similar structure as a blog post in Alfresco. The main difference between the blog and the discussion post is the way it can be commented/replied to. While the

blog post can only be commented with simple text, replies to discussion post can contain the same elements as the main discussion post content and it can be replied to a reply which brings a hierarchical structure to the replies (see Figure 33).

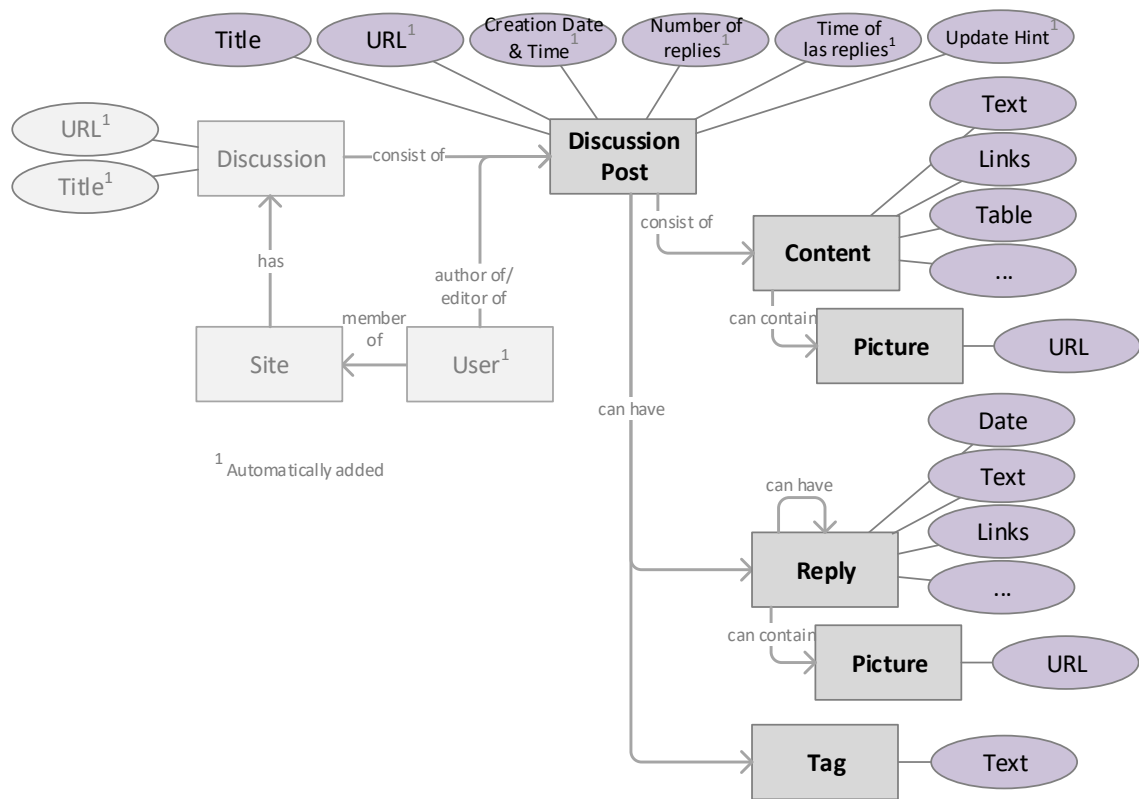


Figure 33: Alfresco Discussion Post – ER Diagram

5.4.1.2. Database Perspective

Alfresco supports a variety of operating platforms such as Windows, Linux or Solaris and can be used with a wide range of database system as for example Oracle, MySQL or PostgreSQL (Alfresco Wiki 2015). The analysed Alfresco system is installed on a Linux CentOS 6.7 server and uses a PostgreSQL database. The database contains the structure and the metadata of content and is stored within the '/alf_data/postgresql/' folder. The content itself is stored as files in the filing system (repository). The file names are represented through IDs.

Alfresco uses the CMIS domain model which allows the definition of different object types with dedicated properties. The type thereby represents objects of the real world. A document object for example represents an information asset which is managed by the repository. A folder object represents a logical container including 'fileable' objects such as document or folder objects. Each object has an object identity (ID) assigned to it through the repository which is stable and unique regardless of the object type (Gur-esh et al., 2009). Important in the scope of this dissertation are for example the object types document, post and topics as wikis entries and blog post are saved as document objects, discussion post as topic objects and comments as post objects. Some example properties of these object types are shown in Figure 34.

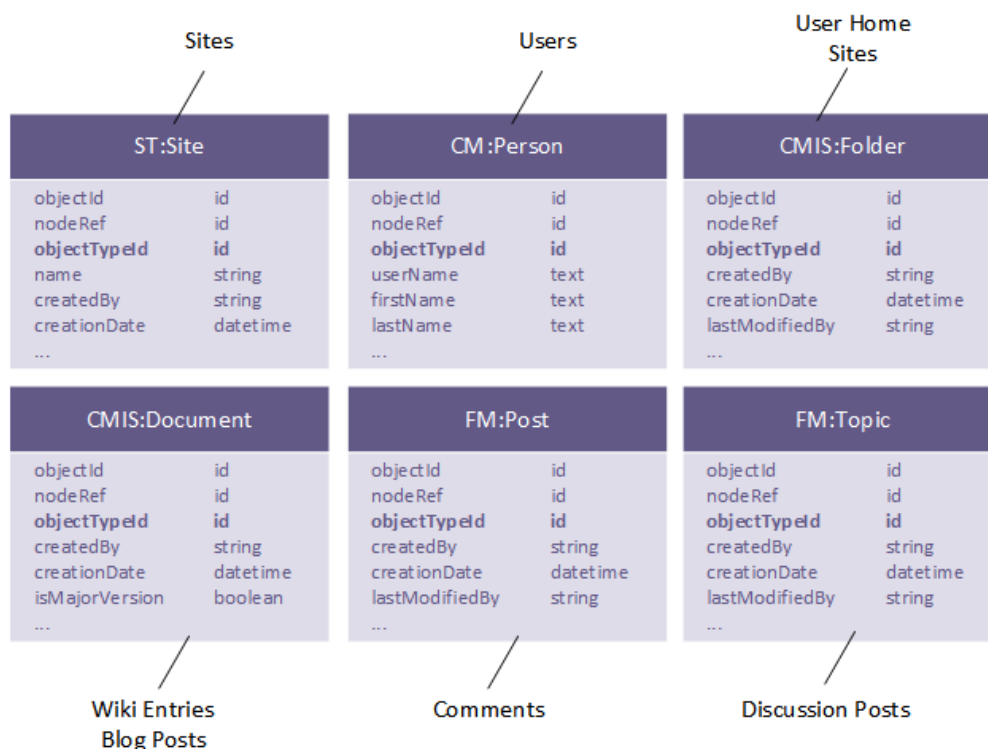


Figure 34: Alfresco Data Objects Examples

Even though Alfresco’s data is physically stored in a relational database, Alfresco uses graph models in which items are represented as nodes. The content model determines the structure of the nodes in the repository. Each time a node is created it is given an object type (Alfresco, 2016). The nodes are represented within nearly 100 different tables. However, not all of them need to be analysed for the purpose of this dissertation. The important ones, as well as their relationships to each other, are outlined within the UML class diagrams below (Figure 35).

The `alf_store` table describes where content is stored. Its IDENTIFIER outlines three different stores. Furthermore, the `ROOT_NOTE_ID` assigns the root node of the graph which can be the admin user, the site folder or others. All site information or document metadata is represented as nodes and stored in the table `alf_node`. The `UUID` represents the name of the corresponding file in the content store. The `ACL_ID` refers to the `alf_access_control_list` which manages the access lists for each object. The different properties of the different Alfresco nodes are kept with the help of the `alf_node_properties` table. Depending on the node type, different properties are saved in here. Therefore, not each column in the table is filled within each row.

The table `alf_content_data` connects the notes to their mimetypes and their URL which is the path to the content in the file system. The analysed version of Alfresco thereby lists 16 different mimetypes. Examples are `application/pdf`, `image/jpeg` or `text/plain`. The types and names of elements (nodes or properties) are stored within the `alf_qname` table. If the element is a node, it further refers to the `alf_namespace` which contains 27 different Alfresco node types such as `system`, `user`, `content`, `application` or `site`. Tags are defined through aspects in Alfresco. Aspects support similar capabilities as the data objects and thus supports properties.

*: Reference to other table in DB/also saved in other table in DB

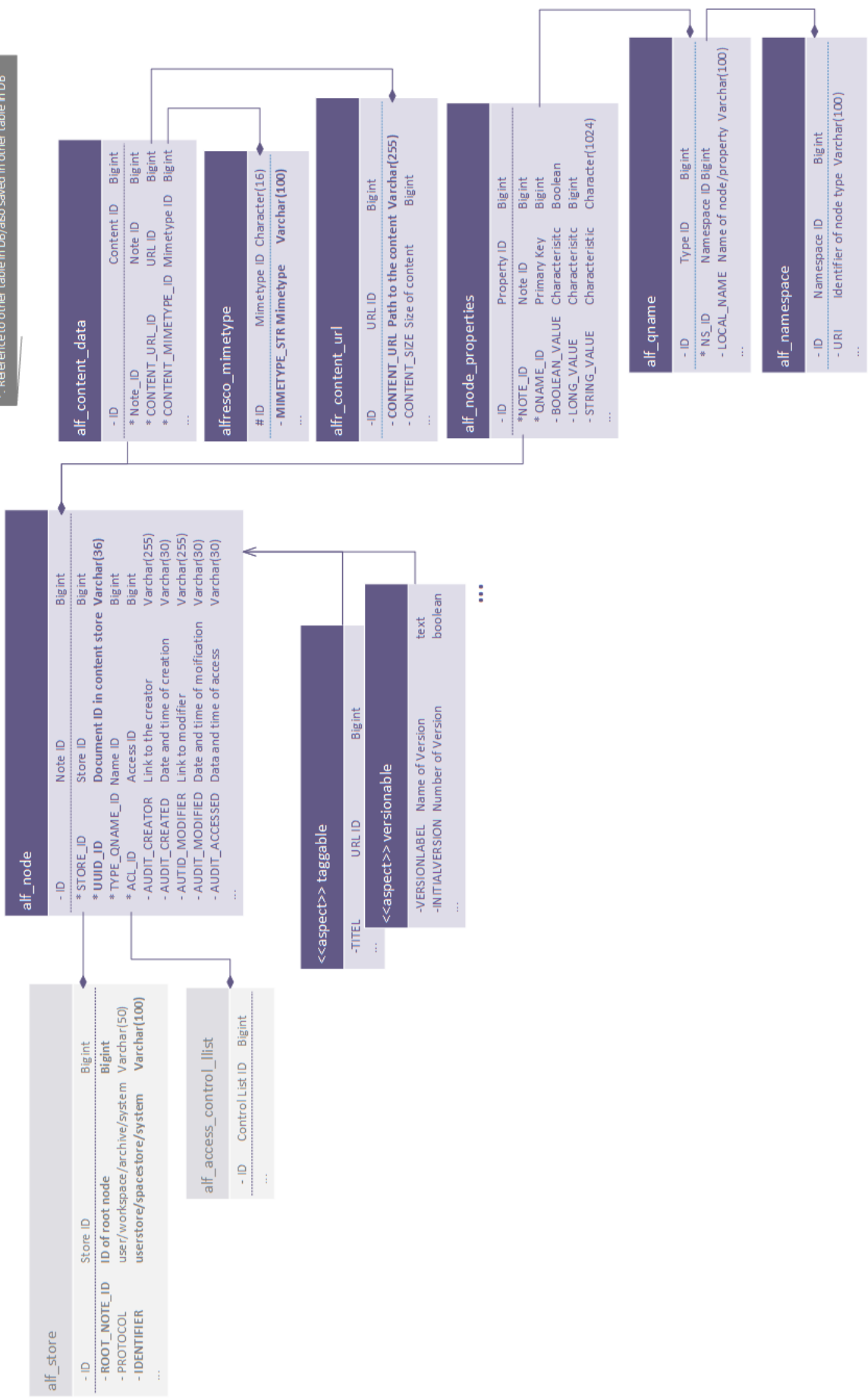


Figure 35: Alfresco Table Relations - UML Diagram

Because of the above outlined structure, no individual UML class diagrams are drawn for the Alfresco's wiki entry or the blog and discussion post as done within the analysis of IBM Connections' Social Business Documents. Important to notice from the above modelling is that the main content of Alfresco Documents are saved as files in the filing system and that the metadata is saved within the different database tables. Which metadata is captured thereby depends on the object type and their possible functionalities which are further outlined in the next section.

5.4.2. Alfresco: Functional Modelling

Within the following, the different functional maps of the different Social Business Documents in Alfresco are outlined and described.

Alfresco Wiki Entry: Functional Map

After the wiki application is added to a site in Alfresco, a first wiki entry can be created. Following the activities shown in Figure 36 can be performed. Most activities of the wiki entry can be located within the use phase of the lifecycle and are connected with the general functionality of viewing content and the typical wiki function of versioning. The only other social feature of the wiki, which can be added to the entry, is a tag. The lifecycle of the wiki entry ends if the entry itself gets deleted.

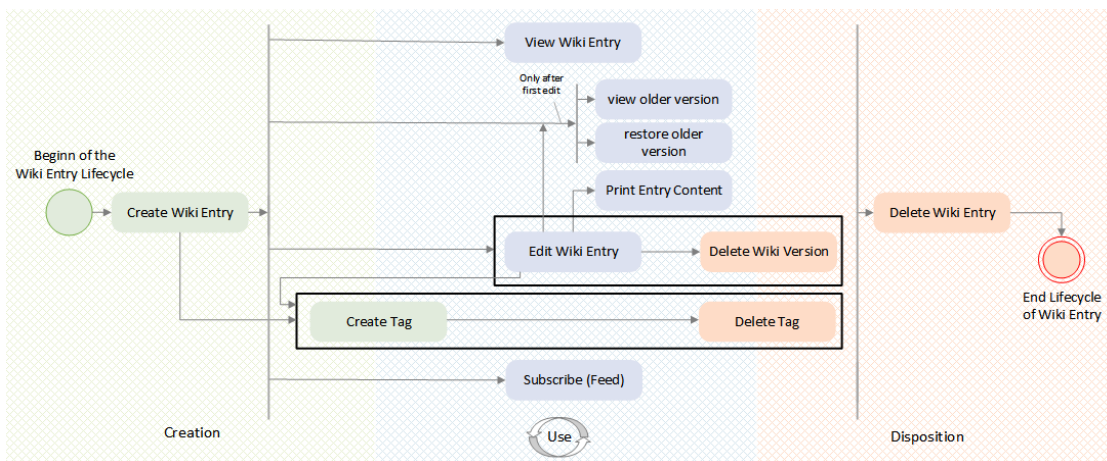
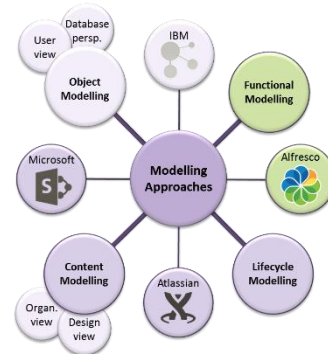


Figure 36: Alfresco Wiki Entry – Functional Map

Alfresco Blog Post: Functional Map

Figure 37 shows the functional map of a blog post in Alfresco. After a blog post is created, the post can be viewed, edited, saved as a draft or the main content can be printed. Furthermore, it can be enhanced through comment and tag components which itself have own lifecycles. Tags, however, can only be added and/or deleted if the blog post itself gets edited and comments will only show according to the time they were added. Comments do not have a hierarchical structure with Alfresco blog posts.

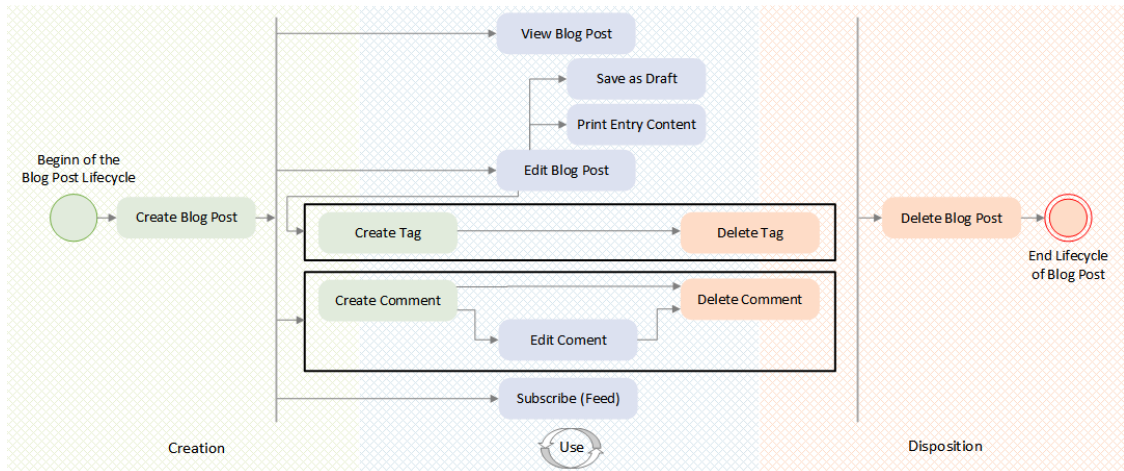


Figure 37: Alfresco Blog Post – Functional Map

Alfresco Discussion Post: Functional Map

The functions of the discussion application of Alfresco are similar to the blog application functions. As Figure 38 shows, the components are the same as with blog posts (Figure 37). The main difference lies in the structure of a reply (accordingly the comment in the blog) within a discussion as it can be hierarchically added as multi-threads of sub-replies.

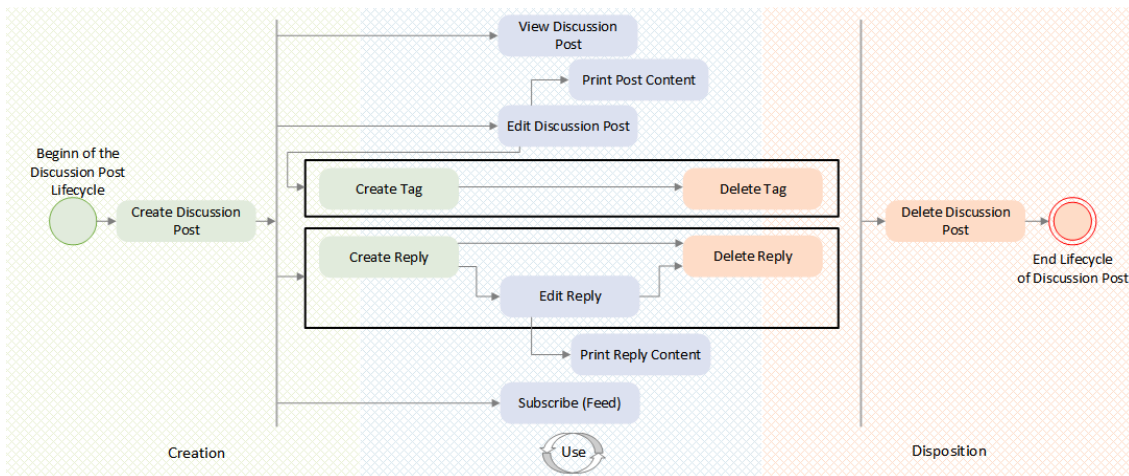
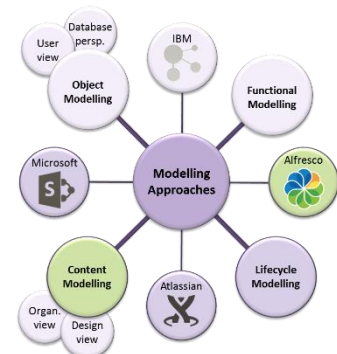


Figure 38: Alfresco Discussion Post – Functional Map

5.4.3. Alfresco: Content Modelling

Even though the different documents have different functions in Alfresco, they are all saved within the same structure and format. Therefore, only one design view is described below (section 5.4.3.1). However, dependent on the object type different database fields are filled/not filled. Consequently, the different sets of metadata kept within the system are outlined separately in the organisational views (section 5.4.3.2).



5.4.3.1. Content Modelling: Design View

The main Alfresco document content, including comment/reply components content, is saved as files within the filing system. Within the analysed system these files are saved in a folder named according to the date when the content was created (JJJJ/MO/DA/H/M) and within the path <Alfresco_Home>/alf_data/contentstore/. The files itself are binary (.bin) files containing non-textual/non-human-readable information if it represents, for example, a picture, but can also contain text in xml format. The encoding is dependent on the content that is saved. The file name maps to the document IDs within the database tables. Document metadata is saved directly in the database through the various data types such as bigint or varchar.

5.4.3.2. Content Modelling: Organisational View

Because of its structure of representing documents as nodes, the possible fields within the database to be filled with metadata are the same for all documents. However, depending on the object type, some attributes are filled with data and others are not. Furthermore, different aspects apply to the different data types. Table 15 shows the metadata that is available for all analysed SBD in Alfresco. Following, Table 16 shows wiki entries' specific and Table 17 blog and discussion posts' specific metadata.

Table 15: Alfresco General Metadata

Metadata Information	Description	A/M	D/U
ID	A unique identifier for a specific entry/post	A	D
Name	Heading of an entry/ a post	M	U
User (ID) (Creator/Author)	Reference to the user who created the entry/post	A	U
Creation Date/Published on/Create on	Date and time of the creation of the entry/ blog post/ discussion post	A	U
Mimetype	Mimetype (file identification) of the nature and format of the content	A	D
Size	Size of the content in the file system	A	D
Tags - name	ID of tag	A	D
	Name of the tag	M	U

Table 16: Alfresco Wiki Entry's Specific Metadata

Metadata Information	Description	A/M	D/U
Modified on	Date and time of last edit	A	U
Modified by	Reference to the user who last edited the entry	A	U
Linked Pages	Shows the pages which link from the current page	M	U
Version - title - date	Current number of version	A	U
	Title of the version	M	U
	Date the version was last edited	A	U

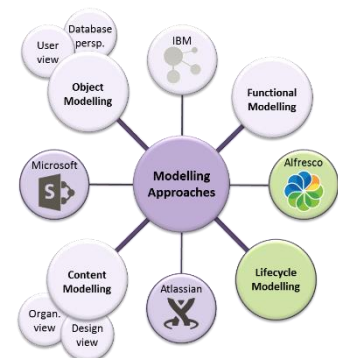
- modifier	Reference to the user who last edited this version of the entry	A	U
Attachments	ID of the attachment	A	D
...	As the attachments to a wiki are saved as files within the repository they have a whole range of metadata. However, this information is not visible form within the wiki application for the user. Saved as an own node, attachments are document objects which can be used through the Alfresco Repository application and have much more metadata available within the database.		

Table 17: Alfresco Blog and Discussion Post's Specific Metadata

Metadata Information	Description	A/M	D/U
Comment/Reply	ID of the comment/reply	A	D
- author	Reference to the user who created the comment/reply	A	U
- posted on	Date and time when the comment/reply was written	A	U
- Last edited by	Reference to the user who last edited the comment/reply	A	D
Only for Discussion Post:			
Last reply by	Reference to the user who last replied to the post	A	U
Last reply on	Date and time when the last reply was written	A	U

5.4.4. Alfresco: Lifecycle Modelling

The general idea of the lifecycle modelling has already been shown within the lifecycle figure of IBM Connections (Figure 26). Within the following, a reduced version is shown, outlining examples of a lifecycle for a discussion post in Alfresco (Figure 39). In general, the ideas are the same. Depending on the actions, different components and its metadata are added or deleted. A difference can be found when comparing the discussion post of Alfresco to the wiki entry in IBM Connections.



Thus, because of the implemented content lifecycle of Alfresco the metadata as well as the content of a SBD in Alfresco does not get deleted from the database, when the document is deleted in the front end. It will only be marked as deleted in the back-end and is not visible anymore for the user. In order to completely delete it, an admin user needs to delete it from the trash.

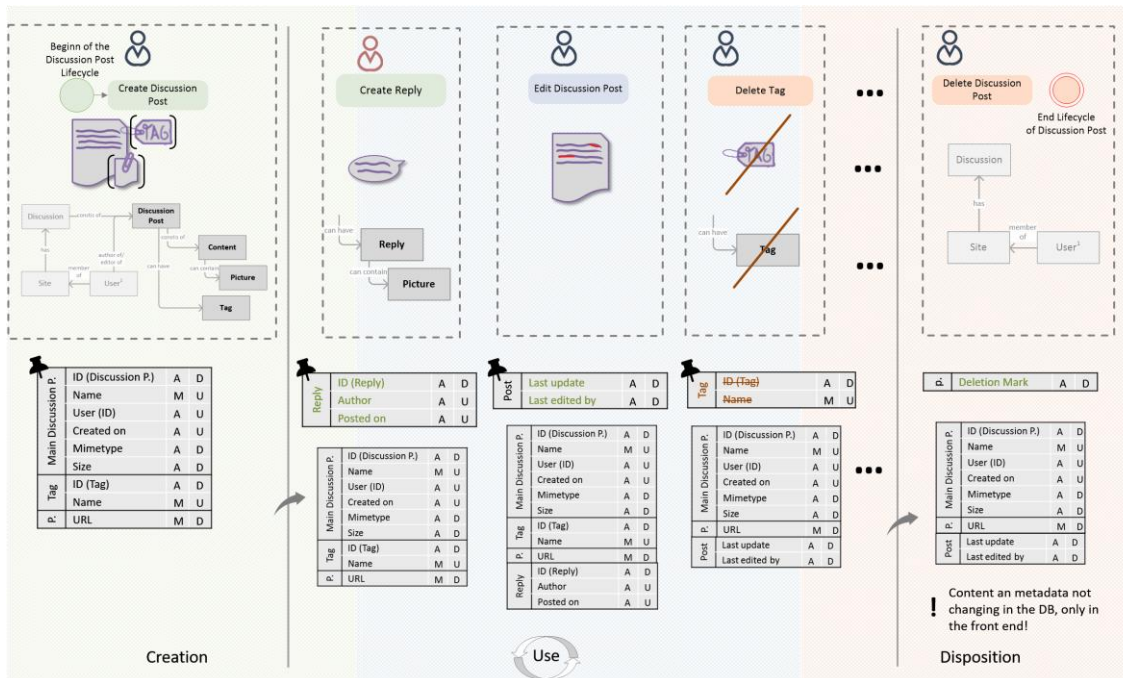


Figure 39: Alfresco Discussion Post: Lifecycle View

With the process of only marking content as deleted but not directly deleting it, Alfresco offers good possibilities in terms of providing an audit trail of what happened. However, as can be seen with the tags in Alfresco, these are directly deleted. Thus organisations need to be absolutely clear about what happens with which content in order to not lose anything.

5.5. Tool Analysis: Atlassian Confluence Modelling

Atlassian Confluence is the enterprise wiki software of the Australian company Atlassian. First released in November 2003, Confluence is now available in version 6.1.1 (status 04.2017). Using different kinds of predefined wiki pages, Confluence supports the knowledge management and collaboration of teams in organisations. Thereby every user has their own profile, can become connected with other users and can create personal as well as team/collaboration spaces. Spaces are made up of pages, whereas all content is saved within a page, even files which are uploaded are saved within a page. Figure 40 shows some predefined page templates which offer specific functionalities according to their purposes as for example blogs and tasks.

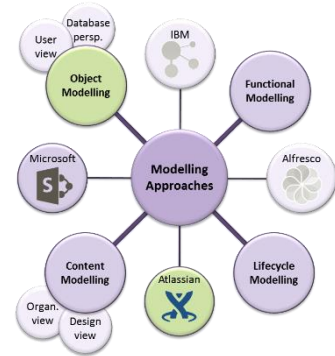


Figure 40: Atlassian Confluence Overview

Confluence is offered as a cloud and server version. Within this dissertation, the Atlassian Confluence server software in version 5.8.14 was analysed, taking into account the Confluence standard wiki pages as well as the blog templates. As Confluence itself does not directly support some kind of forum or discussion, this could not be analysed. In order to improve the readability of this dissertation, only the main and important aspects within the different modelling approaches are presented below.

5.5.1. Atlassian Confluence: Object Modelling

Even though the different SBD of Atlassian Confluence build upon different page templates, the user visible elements are still similar for each document type as the basis is the same. Therefore, section 5.5.1.1 only shows one example of the user perspective before section 5.5.1.2 outlines the general database construction.



5.5.1.1. Object modelling: User View

A page in Atlassian Confluence always belongs to a space and is connected to the user who created the page. A page can consist of the main content of the page, comments and replies to comments, labels (tags), likes and attachments. The main content thereby can include tables, normal text, links to users, tasks, files and more. As a blog post and all other ‘applications’ are only customized wiki page templates, the functionalities for all pages, independent of their purpose, have the same content and components possibilities. The collaboration scenario, including a blog post as simulated within Atlassian Confluence, is shown in Figure 41 below.

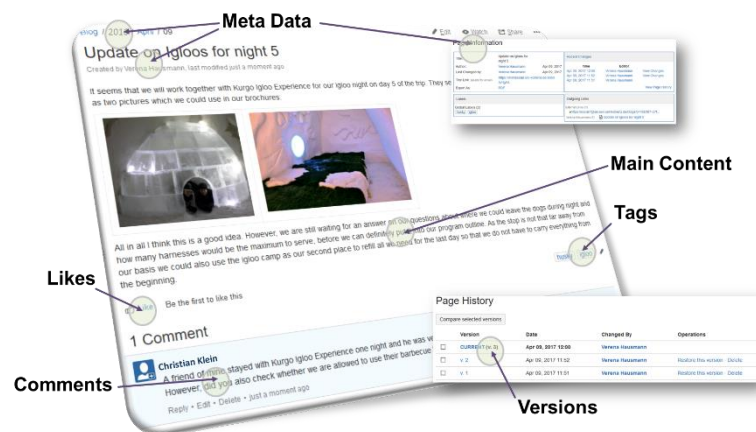


Figure 41: Atlassian Confluence Blog Post – Document System View

There is no direct file repository or similar available in Atlassian Confluence. Even traditional digital documents such as PDFs can only be saved through attaching them to a page. Thus, there is really only one kind of Social Business Document available in Atlassian Confluence: the page.

5.5.1.2. Object Modelling: Database Construction

Atlassian Confluence can be installed on different server operating systems such as Microsoft Windows (including 64bit) or Linux and can additionally also be used with an Apple Mac OS X user client. The application server in use is Apache Tomcat. In order to maintain the data, a database is used. Several different databases are supported: PostgreSQL, MySQL, Oracle, Microsoft SQL and HSQLDB. The here analysed Confluence software was installed on a Linux server using Apache Tomcat and the embedded H2 database.

All content, whether the user used a blog page template or any other template or if it is looked at attachments or comments, is saved within the same database tables. The differentiation is done through the content type column. By default Atlassian Confluence differentiates between five different content types: page, blog post, attachment, comment and mail.

Figure 42 shows some of the main database tables of Atlassian Confluence's relational database model. The main text of pages as well as comments are stored within the content table (bodycontent). The entry CONTENTYPE informs about whether the database entry belongs to a page or a comment. The page metadata is stored in a separate content metadata table. Furthermore, the metadata of attachments is saved within the attachments database. The default configuration of Confluence saves the attachment files within an attachments directory of the home folder. Additional Social Business Document components such as likes and tags are saved within their corresponding tables.

In order to be able to exchange documents with other systems Atlassian Confluence uses the REST (Representational State Transfer) API via URI paths.

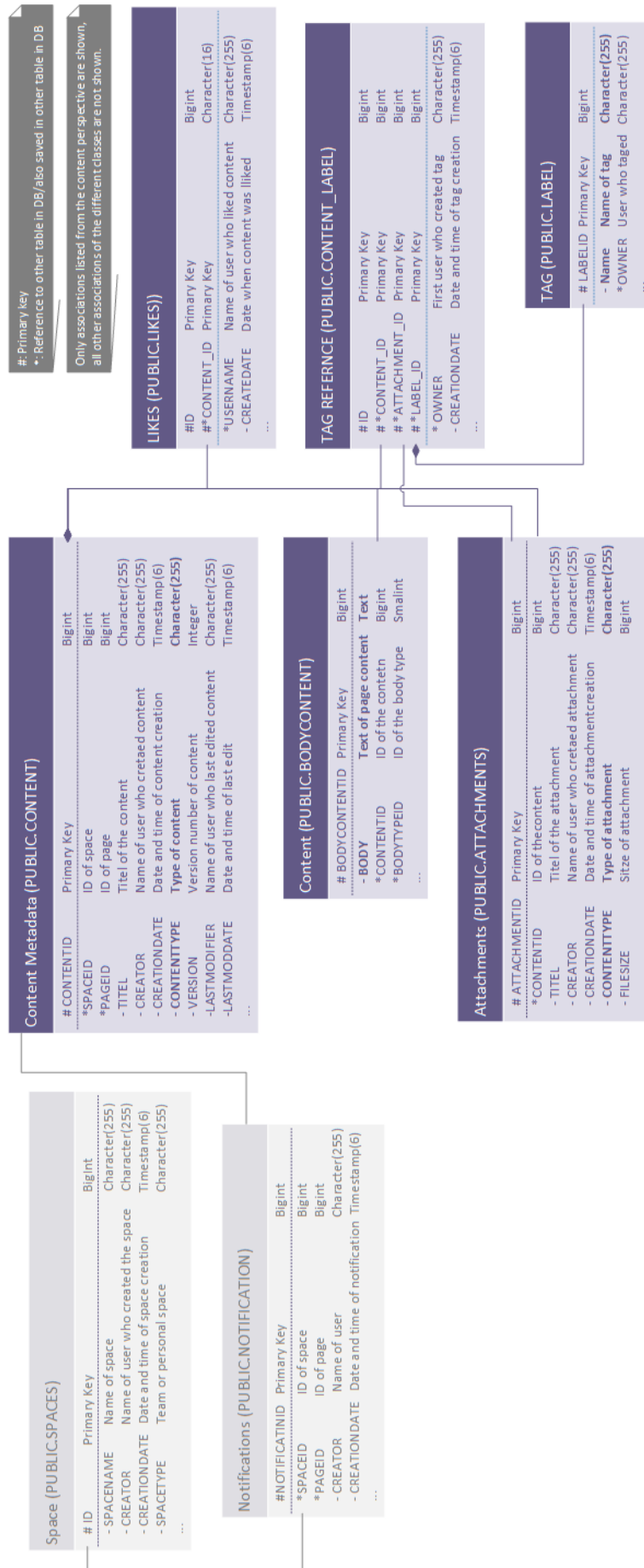


Figure 42: Atlassian Confluence Table Relations – UML Diagram

5.5.2. Atlassian Confluence: Functional Modelling

There are many different things that can happen with/to a page in Atlassian Confluence after it is created. Figure 43 shows the functional map of Atlassian Confluence pages. Besides adding document components such as comments, likes, attachments, tags and versions, a page can, for example, be shared or moved. Furthermore, a user can configure if he wants to receive e-mail updates if something is changed or added to the page (watch). There is nearly no difference between the functionalities between the different templates. Comparing the standard wiki page to the blog templates only shows differences in the function 'view in hierarchy', as blogs are not displayed in a hierarchical order, 'copy page', as this is only available for the wiki and the function of 'exported to/from word', as also only wiki pages can be exported to/from word.

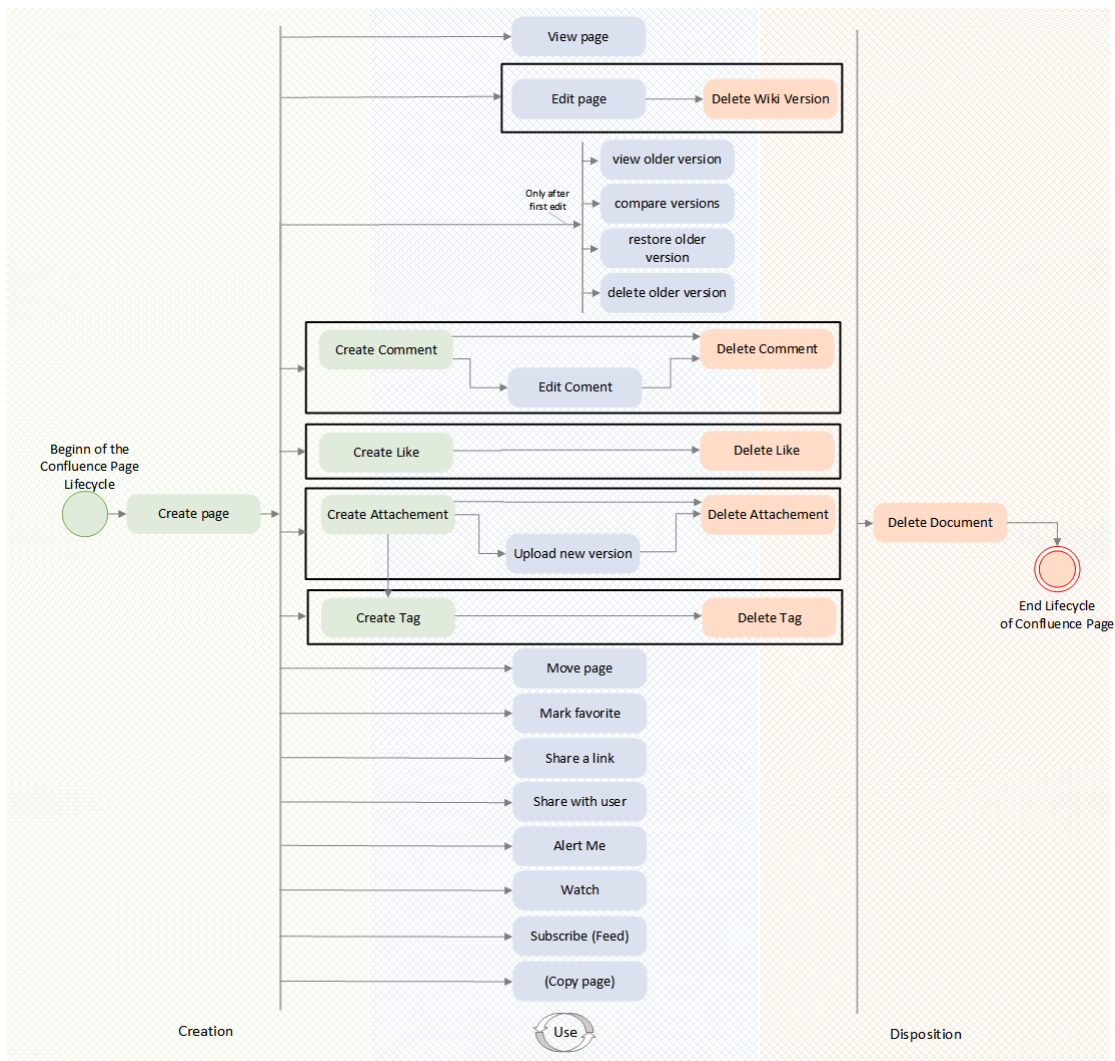
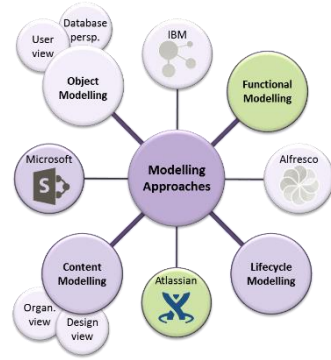
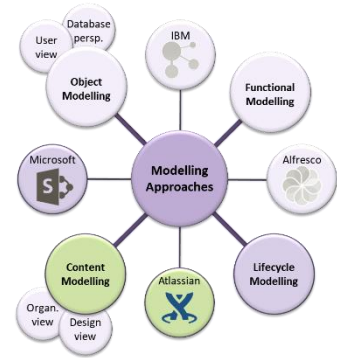


Figure 43: Atlassian Confluence – Functional Map

5.5.3. Atlassian Confluence: Content Modelling

Within the following the design view (section 5.5.3.1) outlining the format the documents are stored in and the organisational view (section 5.5.3.2) presenting the metadata kept for documents within Atlassian Confluence are described.



5.5.3.1. Content Modelling: Design View

The content of Atlassian Confluence pages, page templates, blog posts and comments is saved within the database using a XHTML-based storage format. Furthermore, Atlassian Confluence includes some custom elements in its storage format for the macros which can be used. Attachments are saved in their original file format as files within the filing system. The files thereby have several different identifying attributes such as the content id of the file itself, but also the content id of the page the file is attached to.

5.5.3.2. Content Modelling: Organisational View

As every document in Atlassian Confluence is saved as/together with a page in the same database tables, the possible metadata information available for each content type are the same. Table 18 gives an overview of some of the metadata information interesting in terms of document management.

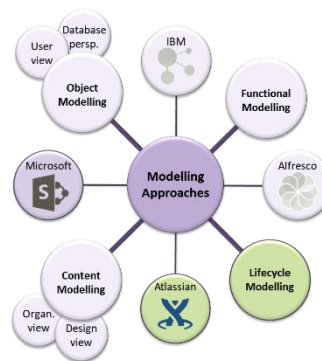
Table 18: Atlassian Confluence Metadata

Metadata Information	Description	A/M	D/U
ID	A unique identifier for a specific page	A	D
Title	Heading of a page	M	U
Author	Reference to the user who created the entry	A	U
Creation Date	Date and time of the creation	A	U
Content Type	Comment or page	A	D
Path	URL of the page	A	U
Hierarchy	Parent-child relationships of the page	A	U
Incoming Link	Lists other Confluence pages that link to the current page	A	U
Outgoing Links	Lists other pages (internal and external) the current page links to	A	U
Page-level-security	Outlines restrictions to access the page	M	U
Modified on	Date and time of last edit	A	U
Modified by	Reference to user who last edited the page	A	U
Like	ID of the like	A	D
- user	User who liked the page	A	U
- creation date	Date and time when user liked the page	A	D
Tags	ID of tag	A	D
- name	Name of the tag	M	U
- creation date	Date and time when tag was created	A	D
Version	Current number of version	A	U
- date	Date the version was last edited	A	U

- modifier	Reference to user who last edited this version of the page	A	U
Attachments	ID of the attachment	A	D
- name	Name of the attachment	M	U
- creator	Name of user who created the attachment	A	U
- creation date	Date and time of creation	A	U
- content type	Content type of the file (MIME type)	A	U
- file size	Size of the attachment	A	U
- tag	Tags given to the attachment	M	U
- comments	Comment/Note to the attachment	M	U

5.5.4. Atlassian Confluence: Lifecycle Modelling

Within the following no picture of the lifecycle view of the Atlassian Confluence pages is drawn, as the general behaviour is similar to those of IBM Connections (Figure 26) and Alfresco (Figure 39). Thus, if for example a comment is created, new database information is kept as well. However, especially the deletion seems to be different within the different systems and therefore should be mentioned here. As all Social Business Documents in Atlassian Confluence are based on the same idea of a page, also the behaviour is the same for all document types.



One peculiarity when deleting a page in Atlassian Confluence is that the page is not directly deleted, but only moved to a trash. In order to fully delete it, including all of its metadata, it needs to be deleted from the trash by a space administrator. If only one version of a page gets deleted, this version is directly deleted and the version number drops down accordingly, meaning a change in the metadata of the main page. If the main Social Business Document gets deleted (and not only a version of it), attachments to this document will remain in the database and are not deleted until explicitly done in the trash. Furthermore, if the page was in a hierarchical order and had child pages, the child pages are not deleted but moved to the root page of the space.

5.6. Tool Analysis: Microsoft SharePoint Modelling

Microsoft SharePoint is a server suite launched by Microsoft in 2001 which enabled teams to work together, organise work and share documents and ideas. Since April 2016 the SharePoint 2016 Server has been available, which is the most current version (status 04.2017). SharePoint is available as an on premise solution, but also available as a cloud version SharePoint Online and includes different services such as intranet, extranet, content management, document management, personal cloud, enterprise social networking, enterprise search, business intelligence, workflow management, web content management and an enterprise application store.

Everything in the SharePoint Web Application is built around sites. A user can create a website collection including many different sites and subsites as well as different Apps. Pre-installed standard templates for sites are for example team sites, blogs, project sites, document center or the search center. Furthermore, the different sites can include many different applications. Examples are shown in Figure 44. Besides the already available site templates and apps, SharePoint offers the possibility to use own created templates and apps, as well as content types, metadata fields and much more.

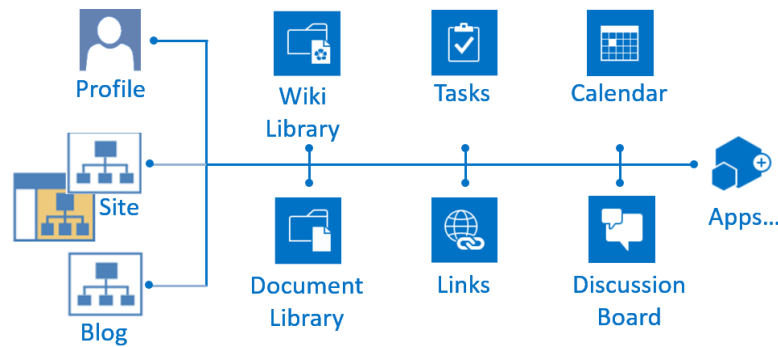


Figure 44: Microsoft SharePoint's Applications

Because of its origin from within Microsoft, SharePoint is heavily supported with and integrated to other Microsoft products such as the Microsoft Office Suite or the Internet explorer.

The version Microsoft SharePoint 2013 SP1 was installed and analysed within this dissertation. However, same as with the analysis of Atlassian Confluence, within the following only a high level analysis of wikis, blogs and discussions is outlined in order to keep the readability of this dissertation.

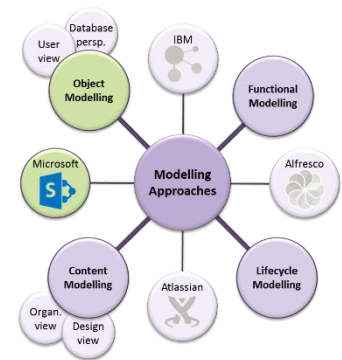
5.6.1. Microsoft SharePoint: Object Modelling

The object modelling for Microsoft SharePoint is separated into the organisational view (section 5.6.1.1) and the database perspective (section 5.6.1.2) which are outlined in the following.

5.6.1.1. Object Modelling: Organisational View

Every Social Business Document is somehow embedded in a site and connected to the user who created the document. Depending on the application which is used, there are different document components attached to the Social Business Document. A similarity that can be found is that they all have a name, a creation date and a creator. Furthermore, as they all work with the same content editor, they all have the same possibilities for the main content, including among other thing normal text, links, tables, etc. With all three it is also possible to add attachments, such as pictures or files. These in turn have own metadata and can be tagged.

However, while all three document types can be tagged with keywords and liked through the rating function, the comment/reply component is only available for blogs (comment) and



discussions (reply) and not for wikis. Additionally, SharePoint has the possibility to save information in a note board for each document type.

5.6.1.2. Object Modelling: Database Construction

The analysed Microsoft SharePoint installation was set up on a Microsoft Server using a Microsoft SQL database serving as the storage system for the data which are, together with the Microsoft .NET Framework, the required software components.

SharePoint uses content types in order to separate between different objects. Microsoft thereby defines a content type as *“a reusable collection of metadata (columns), workflow, behaviour, and other settings for a category of items or documents ... [which] are independent of file formats”* (Microsoft, 2010). These content types also go along with the CMIS model described within Alfresco which is also implemented in SharePoint but turned off by default.

Figure 45 shows some example content types. A wiki entry for example is child of the content type document, whereas a discussion is child of the type folder. Each content type has specific attribute columns to it in the database. However, within the relational database itself, the different items are saved within one document table in the database. SharePoint does not use a filing system for storing content.

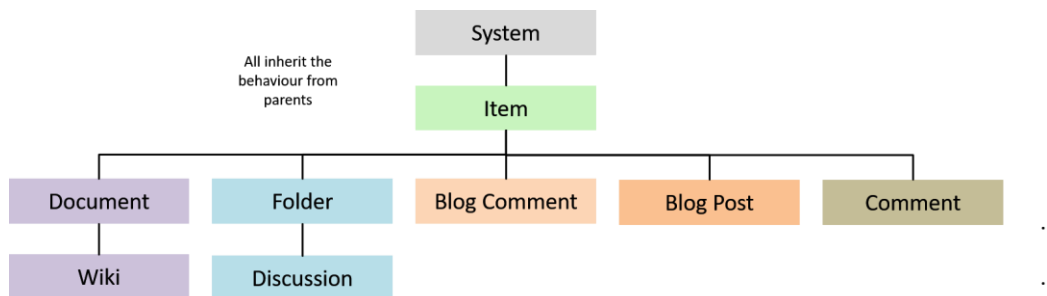


Figure 45: Microsoft SharePoint’s Content Type Examples

When setting up SharePoint 2013, the databases configuration central administration and content are automatically installed. The content database, which is by default called WSS_Content, is the most important one when managing SharePoint data because it stores all content of site collections. Furthermore, the different service applications have own databases. The User Profile Service Application_SocialDB, for example, keeps the data around the social functions of SharePoint. Figure 46 outlines some of these tables. The ALLDOCS table, for example, saves the metadata of all documents, whereas documents here refer to any SharePoint content. The content itself is stored in the DOCSTREAMS table. Any changes to SharePoint content is logged within the EVENTCACHE table. Tags to content in turn are saved within the Social Database. The same applies to ratings (likes) and comments which are written on the SharePoint note board available for content.

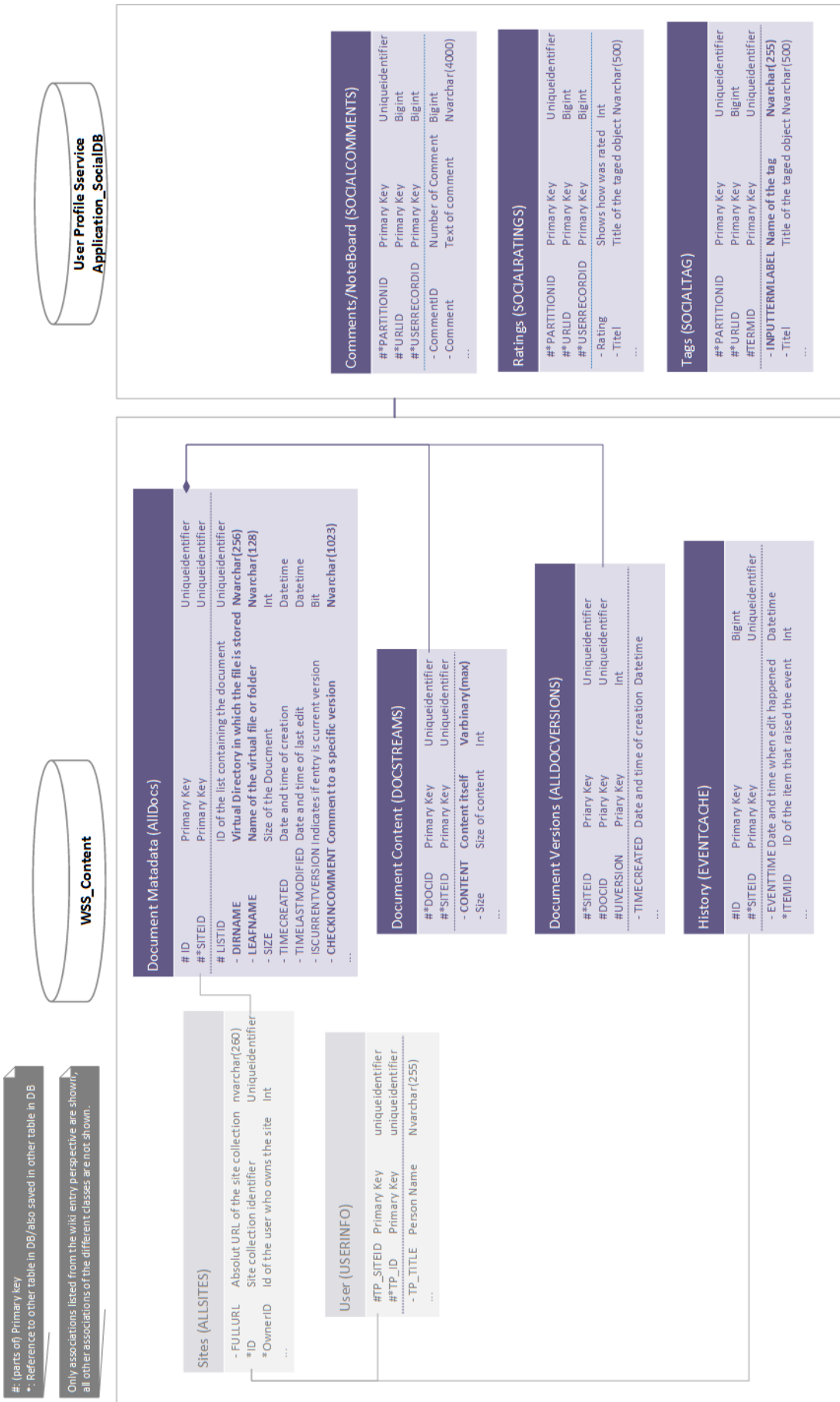
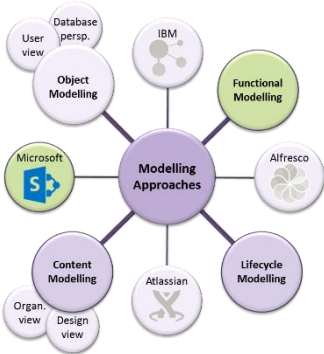


Figure 46: Microsoft SharePoint's Tables – UML Diagram

The Microsoft SharePoint’s UML diagram only gives a high level idea of the SharePoint data structure. In total, SharePoint uses many more databases and database tables which are connected to each other and only function together. However, this summary gives a first impression of the general nature and structure of Social Business Documents in SharePoint.

5.6.2. Microsoft SharePoint: Functional Modelling

Microsoft SharePoint offers a whole range of different functionalities. Most of them are the same for all three document types – wiki entry, blog and discussion post. The following list only gives a small overview of the common functions (functions selected according to the other analysed systems):



- View, edit and delete document
- Create and delete tag
- Like and unlike document
- Subscribe RSS Feeds
- Share with a person
- Share a link
- Alert me
- Follow
- Create, edit and delete entry in note board
- create homepage
- show incoming links
- create, edit and delete comment (only Blog)
- create, edit and delete reply (only Discussion)
- mark reply as best (only discussion)

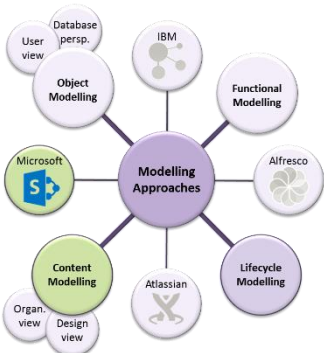
The two functions which are different to the other analysed systems are the functions around the notice board because no other system has such a board and the possibility of showing all incoming links, which is only limited available within the other system. However, the general possibilities to work with Social Business, including the components that can be added and the available nested lifecycle, are the same.

5.6.3. Microsoft SharePoint: Content Modelling

The following paragraphs briefly outline the format how Microsoft SharePoint saves its data (section 5.6.3.1) and which metadata is captured out of the box (section 5.6.3.2).

5.6.3.1. Content Modelling: Design View

The content of all document objects in Microsoft SharePoint is stored within the different databases. However, the main content of documents is saved as varbinary objects. A varbinary object thereby can store anything in any format. Tags, in contrast, are stored as unicode character string data in the nvarchar form within the database. The final displayed web page at the end is constructed through HTML and CSS.



5.6.3.2. ContentModelling: Organisational View

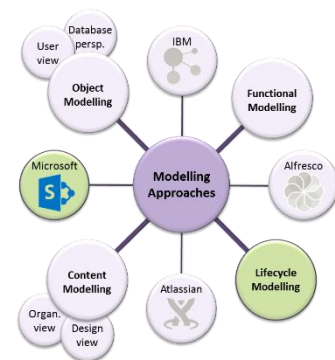
As outlined above, SharePoint has a built in content type system which automatically assigns a set of metadata fields according to the content type. Within the following only some of the metadata components are listed according to what has been described within the other systems.

- ID
- Name
- Author
- Creation Date
- Editor
- Likes
- Tag name
- Version number, date and creator
- Attachment name, title, description, keyword, created at, modified by, etc.

However, besides the automatically captured metadata, users can additionally modify each existing content type, create new content types and add custom metadata. Therefore, it is possible to include any information needed within the metadata of Microsoft SharePoint documents.

5.6.4. Microsoft SharePoint: Lifecycle Modelling

As with Atlassian Confluence, most documents in Microsoft SharePoint are not completely deleted when a user deletes the documents in the first place. Objects such as files, lists and documents, for example, are first moved to a site's recycle bin. It then stays within this recycle bin until they are automatically removed to a site collection or second-stage recycle bin after a predefined period of time.



However, Microsoft SharePoint offers many possibilities for adjustments and setting own preferences. Depending on the preferences, different time spans for how long objects stay in the trash can be set or the trash can be bypassed completely. Therefore, it cannot really be stated how SharePoint will behave with deletions. Each individual company needs to analyse its own installation and settings.

What stays the same is that also with Microsoft SharePoint the metadata belonging to a Social Business Document expands with the adding of components and some metadata is changed if the main document or its components get edited.

5.7. Summary of the Tool Analysis

The analysis of the four different tools presented above analysed the general structure of Social Business Documents, as well as their processing possibilities using four different modelling approaches. It thereby addressed research objective one to “Describe the nature and structure of Social Business Documents and examine how these change throughout their lifecycle”.

What can be seen is that ECS, as the systems where Social Business Documents are created, and ECMS as the systems generally concerned with the management of unstructured information, offer similar functionalities and structures when it comes to SBD. In recent times, both systems types spread in organisations more and more and each is taking up functions of the other. Within both system types content is created. This includes software which originally dealt with content management and integrated collaborative elements such as Alfresco as well as collaborative software which beside wikis and blogs, are also able to deal with traditional digital documents such as PDFs or text files and which also offer some document management functions. Therefore, ECS and ECMS should be strongly connected today (Diessner et al., 2015, p. 15).

Comparing the models of the different SBD types within one system, but also across systems, shows that they share many common aspects, but can also be quite different. For example, looking at the possible components that can be used with SBD shows that nearly all systems offer the possibility to comment and tag SBD. However, it is also outlined that some systems store the main content of SBD within database tables, whereas others store it as files in the file system. Taking the end-user perspective this might not be of interest at all, however, it is important if appropriate functions are in place for the long-term management of documents. Nevertheless, in order to develop the appropriate functions, such as moving documents to a long-term archive, we need to know where the content is stored in order to be able to address it.

The functional maps together with the lifecycle models, as another example, showed that even though the main SBD have their own and leading lifecycle, as soon as components are added we have nested and smaller lifecycles associated with each component incorporated within the overall lifecycle. These and further findings are brought together in the next chapter which outlines general SBD information models as well as SBD characteristics.

However, the information models and characteristics will only provide insights into the general nature and structure of Social Business Document. Even though these can support the better understanding of SBD and provide a starting point to SBD analyses by indicating the aspects which should gain special attention, the tool analysis also indicated the importance to have exact knowledge about the specific system. The particularities of the documents and the systems can create their own challenges which need to be addressed and which in turn influence the processes for their management.

The tool analysis only focusses on the technical aspects. Nevertheless, the decisions concerning which documents need to be managed and how is mainly dependent on the content of the document, which has not been part of the analysis up to this point. This is addressed in chapter 8 which examines the content of SBD.

Chapter 6.

Synthesis of the Nature & Structure of Social Business Documents

The different modelling representations in the previous chapter provided in-depth insights to the specifics of Social Business Documents within the different software products. Within the following gained insights are used to develop information models, representing more generalised SBD models which are independent of any SBD type and software (addressing research question 1(b)). Furthermore, the findings are transferred to derive SBD characteristics (addressing research question 1(d)).

6.1. SBD Information Models

In general information models are representations of things which are often abstract from the original things, but emphasise specific aspects of that thing. They can be found in different disciplines such as for buildings, electricity and IT. Within IT and more specifically in software engineering an information model can be described as *“a representation of concepts, relationships, constraints, rules, and operations to specify data semantics for a chosen domain of discourse”* (Lee, 1999). With the use of information models it is possible to outline structured information about a specific context. Whereas in software engineering information models are mostly described through formal syntax descriptions such as the entity-relationship model, the SBD information models developed in the following originate from the previous conducted modelling approaches and describe the different components as well as the structure and functions of SBD. Thereby four different generic models are developed: the conceptual information model (section 6.1.1), the structural information model (section 6.1.2), the functional information model (section 6.1.3) and the metadata model (section 6.1.4).

The different models do not match one to one with the four modelling techniques. Even though most aspects are heavily overlapping, the information models do incorporate the findings of the different techniques. Furthermore, the lifecycle views were not separately developed into an abstracted lifecycle information model at this stage. This is because the lifecycle of each individual SBD can vary greatly to the lifecycle of another SBD. For example, the possibilities which and how many components are added or deleted, or how often the SBD itself is edited can be quite different. Additionally, the different behaviours of the systems especially within the deletion of content, prevent the generalisability of behaviours.

6.1.1. Conceptual Information Model

A comparison of the components of the different Social Business Documents in the analysed systems (see the several object modelling diagrams) shows that the software offerings differ in the way how they implement Social Business Documents. However, even though the possibilities of which component can be used with which document differ, they all have in common that the document consists of more than just its main content and associated metadata (Hausmann and Williams, 2016). Therefore, building upon the analysis, the following conceptual information model of Social Business Documents can be developed, outlining their possible components (Figure 47).

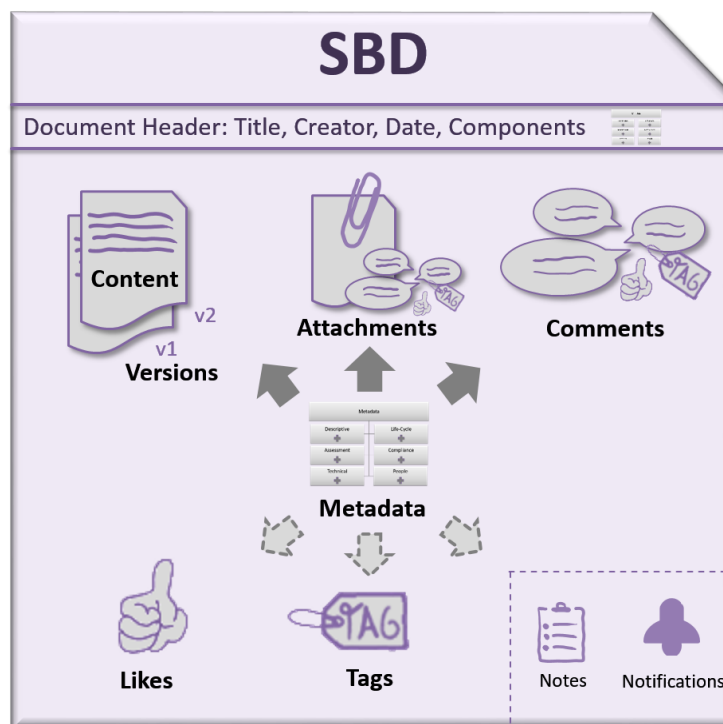


Figure 47: Conceptual Information Model of Social Business Documents (adapted from Hausmann and Williams, 2016)

As discussed before, Social Business Documents are compound documents. Beside the main content and the overlying metadata, Social Business Document can include the following components:

- Versions
- Attachments
- Comments
- Likes
- Tags
- Notes
- Notifications

Whereas versions, attachments, comments, likes and tags are available in nearly all systems, notes and notifications are only available in one system. However, each of these components has its own, even though partly reduced, metadata added to it and can be added several times to the main document. Additionally, what further adds to the complexity of Social Business Documents is the existence of nested compound documents (Hausmann and Williams, 2016).

Thus, it is possible, for example, to add the like or tag component not only to the main content of a document, but also to the comment or attachment component. This leads to a hierarchy of components which needs to be managed accordingly.

The conceptual information model shows the possible components of SBD. However, two instantiated SBD can still look quite differently, as the one might only have a comment attached to it, whereas the second has all of the above outlined components and therefore is much broader.

6.1.2. Structural Information Model

A great amount of organisations' knowledge is stored in documents. However, in order to effectively use documents, the information structure needs to be clear (Salminen et al., 1997, p. 644). Therefore the object modelling included the database perspective of Social Business Documents looking at the storage structure. Table 19 shows a comparison of the storage location of the different components within the different systems.

Table 19: Storage Location of Social Business Documents and their Components

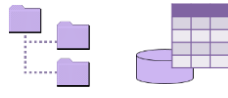















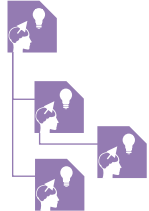









System	IBM Connections			Alfresco	Atlassian Confluence	Microsoft SharePoint
	Wiki	Blog	Forum			
Main content	FS	DB	DB	FS	DB	DB
Metadata	DB	DB	DB	DB	DB	DB
Attachments	FS	-	FS	FS	FS	DB
Comments	DB	DB	FS	FS	DB	DB
Likes	DB	DB	DB	-	DB	DB
Tags	DB	DB	DB	DB	DB	DB

DB = Database; FS = File system

The table shows that each software system, and with IBM Connections even for each Social Business Document, handles the way it stores content differently. Whereas IBM Connections has its own database tables for each document type, Alfresco, Atlassian Confluence and Microsoft SharePoint work with content/object types and use the same database tables for different documents indicating what it actually is with the help the content/object type. Hence, they also handle the different components in the same way for all documents. The table above should not imply that a comment is available for each document type in Alfresco, but if available, the table shows where it is stored. Thus, a comment is, for example, not available within wikis in Alfresco, but used within a blog post in Alfresco the content is saved in the file system.

The object modelling furthermore provides insights to the construction of Social Business Documents and the content modelling briefly outlines the design view of Social Business Documents, describing the format, the content it is saved in and how it gets displayed. The findings from the different document and system analysis are further summarised in Table 20.

Table 20: Structural Information Model

Storage location of content, components and metadata	File system + Database 	Database table 
DB Table construction for main document	Wiki  →  Blog  →  Forum/Discussion  → 	 →   →   → 
Classification	None	Object/Content types
Storage format	 .bin file, varbinary, Original file-format	 clob, text, nvarchar, ...
Displaying format	Web-based as XML + CSS	
Construction	Wiki   Blog   Forum/Discussion  	
Text editors	 +  = same editor	 one editor;  another editor
Attachments	Possible	
	Saved as real attachment	Saved as link to library
API/Model	None	CMIS
		REST

The displaying format of Social Business Documents is similar for all four systems. All analysed systems are web-based and accessible through a web browser. The way documents are presented are XML pages using CSS for the design. Furthermore, another similarity is that the metadata of content is stored within the database and that there are most often more information kept in the database than are visible for the user within the front end of the software system. However, the main content of a Social Business Document, as well as the content of comments and attachments are stored differently – in the database or as files in the file system – within the different systems.

Glushko and McGrath explained that it is easy to distinguish, for example, a novel from a restaurant menu *“because each document follows a characteristic structural pattern to arrange types of content unlikely to be found in the other”* (2005, p. 53). The same applies for the different document types in Enterprise Collaboration Systems. Even though the documents differ in their construction within the different systems, a general difference in the construction between the document types can still be identified. Whereas wiki entries are most often hierarchically structured with the possibility of having parent and child pages, blog post and forum post always are separated from each other, only linked through the overall blog or forum application. Moreover, the way comments can be structured differs among the different documents. Whereas comments in wikis and blogs most likely do not have a hierarchical structure and are only listed according to their creation dates, replies, which are the comments of forums, do have a hierarchical structure and it is possible to reply to another reply and not only to the main forum post. This also goes along with the text editors which are available for writing content and comments/replies. Whereas the text editors in Microsoft SharePoint and Atlassian Confluence are the same for the main content and comments/replies, IBM Connections and Alfresco have differences. In these two systems, the editor for the main content and replies has much more functionalities as the text editor for comments which only allows to write plain text.

Finally, the way attachments are dealt with differs as well. It is not possible to attach files with some Social Business Documents. For those which offer the possibility to attach a file the file is either uploaded as a ‘real attachment’ including an attachment database table or as a separate document which is only linked to from the actual document. Thus, as the UML Class diagrams show, Social Business Documents are no longer stored in one single file. They are constructed through several database tables and are instantiated at the time of viewing through their applications.

The structural information model shows that even though the different document types might have the same components, it is possible to separate them based on their structure. However, it also becomes visible that the differentiation does not really make a big difference from the technical perspective as the different document types are often even saved together in the same database tables, just differentiated through the object or content types and the corresponding database columns that are filled. Thus, in order to address the different SBD types, the same technical processes can be used.

Furthermore, some systems already support or use the APIs/models such as REST or CMIS which represent already established interfaces for the communication with other systems in terms of document management and can be used as a starting point if document management functions of or within other systems should be used.

These and further insights, which influence the management of SBD, are further outlined and discussed in the following chapters.

6.1.3. Functional Information Model

The different functional maps of the Social Business Documents outlined above show the functions that can be performed with and to a Social Business Document form within the normal user interface. They enhance the understanding of the modification possibilities of Social Business Documents. Comparing the different documents and systems, several functions can be identified, which can be used with nearly every document. Therefore, Figure 48 shows the functional information model for Social Business Documents, developed from the before conducted individual analysis.

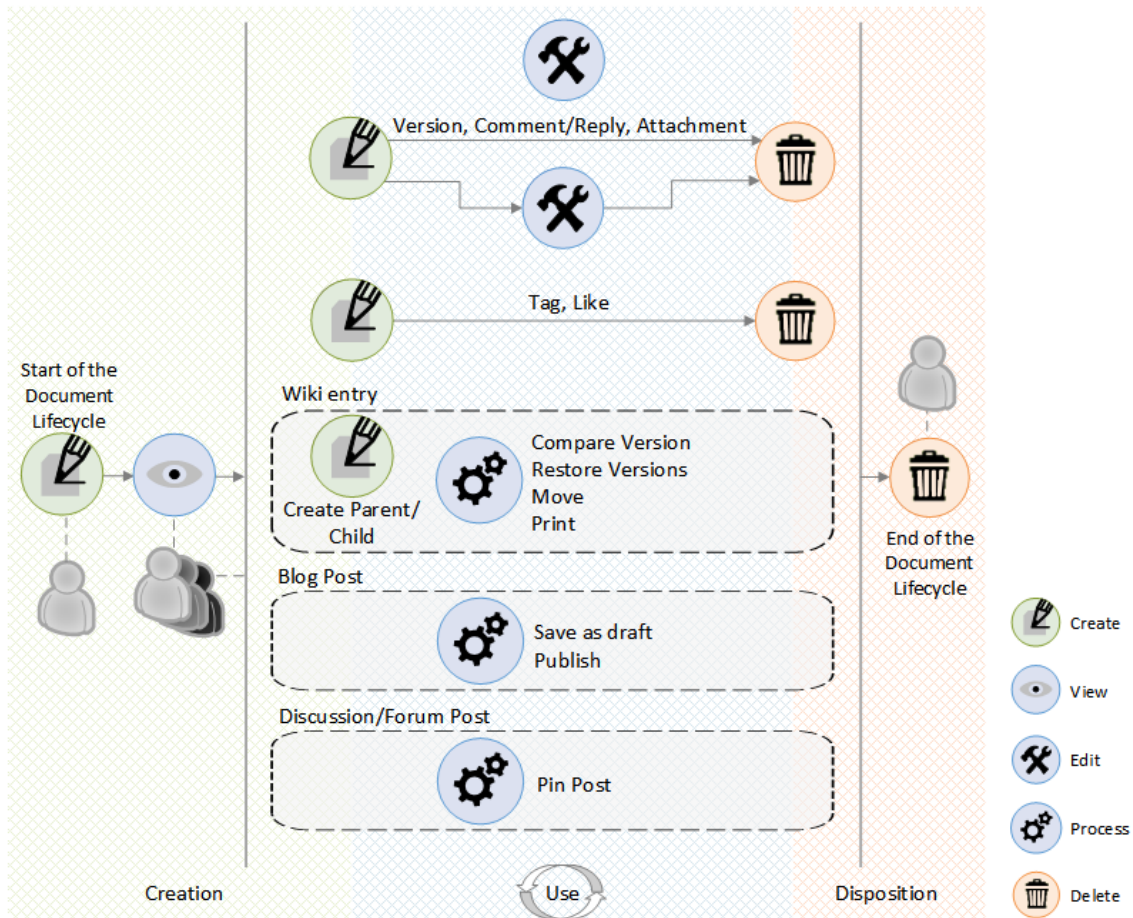


Figure 48: Functional Information Model

The functional model thereby is constructed along the lifecycle of documents and separated into the phases of creation, use and disposition. Each document lifecycle begins with the creation of the main document such as the creation of a wiki entry before the use phase starts. As these different components have their own lifecycles within the overall lifecycle, the separation between the different phases is not clear cut. It depends on the perspective, if the creation of a component, for example, belongs to the creation phase or the use phase. Furthermore, the use-phase can completely vary between each individual document, as there is no order in which the functions need to be performed and many function can even be applied at the same time. Concerning the end of an SBD lifecycle, the scenarios already showed that it is typically not planned to delete an SBD at some point in time. Therefore it needs to be further analysed if people are deleting SBD and if it is even necessary to delete them.

Table 21 gives a short explanation of what each function in the model means.

Table 21: Description of Functions to and with Social Business Documents

Function	Description
Creation	Produce a new document or a component of it
View	See/look at a document
Edit	Make change to a document or a component of it
Delete	Remove a document or a component of it
Compare versions	Look at the similarity of two versions of one document
Restore versions	Set an old version to the current version
Move	Change the place where something is stored/hierarchically structured
Print	Print the document (mostly only the document main content) to e.g. a PDF document
Save as draft	Store a written document, but do not publish it yet
Publish	Make a written document available for viewing and editing
Pin/Stick	Mark something as important for easier findability

While the initial creation of the main SBD is done by one person, all other functions, except the final deletion, can be performed by the same or other people, as far as the access and edit rights allow this. Furthermore, for most SBD the creation goes along with the sharing or publishing step outlined in many document lifecycles. Once created, the documents are visible for all users of a group. An exception are blogs. As outlined above, blogs mostly have the functions of first saving the blog post as draft before publishing. Besides, there are some more functions which are special for a particular document type. A forum post, for example, can be pinned so that it appears at the top of a forum post listing. These specific functions are visible through the dashed-lined boxes within the model.

The functional information model represents a generic model combining the functions available in several systems. However, with most documents it is possible to create a new version by editing the existing version. This is not possible with blogs in IBM Connections. These can be edited, but the changes are not saved in a special version. The document is simply overwritten. This shows the limitation of the functional information model. Nevertheless, the model gives insights into changes which can be performed to and with a Social Business Document and which should be kept in mind when managing the document.

6.1.4. Metadata Model

Olsen et al. (2012) outline that systems designers rely on non-technical aspects as addressed in human-computer-interaction (HCI) or computer supported cooperative work (CSCW) as well as technical aspects. The same applies for the management of documents. Thereby metadata is able to capture both, technical aspects such as the size or file format of a documents, as well as non-technical aspects such as responsibilities or categorisation of integrity. Salminen et al. (2014) even point out that metadata is a requirement for adequate document management.

The organisational view of the content modelling therefore outlines the metadata information given by the different systems for the different types of SBD. Bringing together these findings

with common classifications and suggestions of metadata which should be kept for the management of documents a Social Business Document metadata model is developed. This model takes into account the different aspects and classifies the metadata according to their common characteristics/uses.

Within his research on an information asset register for Enterprise Social Software, Schneider (2015) developed a metadata classification and outlined many aspects which should be included in such a register. Adapted through insights from literature and the accomplished modelling, six different categories of metadata could be identified in this dissertation, which focus on the purpose of the long-term management of Social Business Documents (see Figure 49).

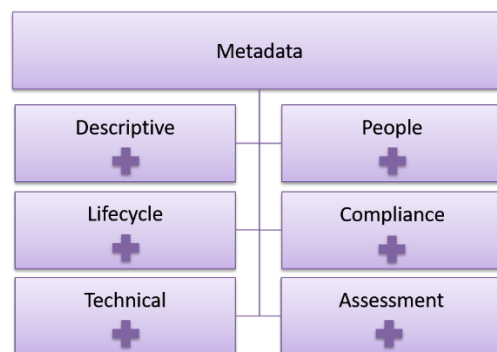


Figure 49: Metadata Classification
(based on Schneider 2015)

Each category includes different aspects of metadata, which on the one hand are already kept automatically in some or all systems, but on the other hand are often completely missing at the moment in other systems. Within the following, each category is shortly described before Table 22 describes the different metadata individually.

Descriptive Metadata includes the basic information of the document. It includes information needed for its identification in terms of what kind of document is at hand and a unique number to distinguish documents from each other.

People Metadata outlines the persons who created and worked on the document. Furthermore, it specifies responsibilities for managing and controlling the document.

Lifecycle Metadata collects the data needed for managing the document according to its current state/condition.

Compliance Metadata outlines metadata which is related to protecting the document, its accuracy and satisfying legal requirements.

Technical Metadata focusses on the underlying technology of the document and thus the system-side information of a document.

Assessment Metadata is the category which is currently not addressed by any system and which needs a human being to fill in. Besides compliance reasons, there are other reasons which determine how the document should be managed. The value, for example, is dependent on the

observer. Even though a document is somehow a physical product, it is mentally configured and socially understood (Olsen et al., 2012, p. 113). Therefore, the value is dependent on the person who values the document and this in turn is dependent on its mental and social influences. However, if not legally specified, the value of a document influences its time for storing and needs to be clearly specified by someone.

Table 22: Metadata Information for Social Business Documents
(based on Schneider 2015)

Metadata Category	Metadata	Description	Source
Descriptive	ID	Unique and mandatory identifier of a document. Mostly automatically assigned by the system.	InfoMap, System
	Social Business Document type	Grouping of documents: Wiki entry, Blog Post, Discussion Post, etc. Dependent on the application the document is created.	InfoMap, Own
	Name	Name of the document. Often mandatory in the systems.	TAHO, System
	Description	Short text about the content of the document.	TAHO, System
	Components	Listing of components (what kind and ID) which are added to the document. Needed in order to identify the metadata information of the components.	Own
People	Creator	Person who originally created the document.	System
	Owner	Person or institution who has the copyright of the content.	TAHO
	Manager	Person or role who is accountable for the document.	InfoMap
	Custodian	Person or role who is responsible for the technical support for the document.	InfoMap
	User	Persons or departments using (editing, viewing, etc.) the document. Goes along with the access metadata.	TAHO
	Editor	Persons who change the document.	System
Lifecycle	Creation date	Date and time when the document was originally created within the system.	TAHO, System
	Update date	Dates and times when the document was updated.	TAHO, System
	Disposal date	Date and time and/or status when the document should be deleted/archived. Dependent on the retention periods.	TAHO
	Version	Indicating how often the document was edited and which version is the current version.	System
	Status	E.g. Active, worked on/Active but not updated anymore/inactive or published/not published. Important for the disposal process.	TAHO, (System)
	Review Cycle	Time period when the document should be updated.	TAHO

Compliance	Access	Describes which persons or departments have which access rights (e.g. read vs write) to the document on the system level.	TAHO, System
	Confidentiality	Outlines the protection requirements needed for the document.	ISO27000
	Integrity	Shows the level of integrity needed for the document.	ISO27000
Technical	System	Name of the software system the document is stored in.	System
	Format	Format the document is saved in.	InfoMap, System
	Size	Size of the document within the system.	System
	URL	Path how to reach the document.	System
Assessment	Value	What is the value of the document? E.g. in financial aspects or as contribution to the organisational objectives.	TAHO
	Costs	Acquisition and Maintenance costs of the document.	ITIL
	Task support	Which Business processes are supported with this document?	InfoMap
	Risk	Which risks are connected to this document?	TAHO

Furthermore, what needs to be kept in mind and what is already implied in the conceptual information model (Figure 47) is that on the one hand we have the metadata for the compound document, which includes the metadata of the first version of the main content plus the references to the different components. However, on the other hand each component of a Social Business Document has its own metadata as well (see Figure 50). This metadata will not be as detailed as outlined above, however, information such as creator or creation date etc. are kept within the system and should be taken into account. Further, there is metadata listed in the table above which might not apply to each document. A blog post for example might not have a review cycle to update it and might also not have different versions saved and a like cannot be edited. However, these things are dependent on the concrete software system in use.

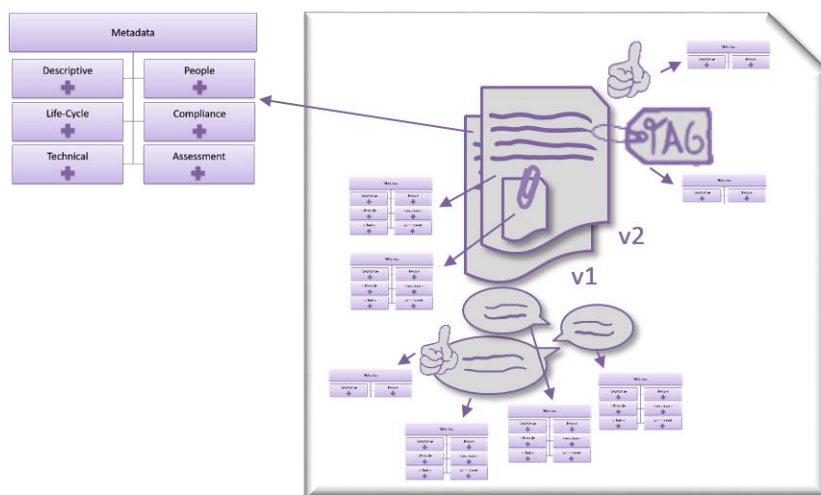


Figure 50: Metadata for the Components and the Compound Document

In summary, the metadata model as well as the conducted analysis show that:

- there is only a limited amount of metadata automatically saved within the systems.
- many systems do not directly offer the possibility to capture more metadata.
- some metadata is only visible from the back end, not the user perspective.
- metadata is scattered throughout the different places where the components are saved.

A further discussion about what this means for the management of SBD can be found in section 9.1.2.

6.2. Characteristics of Social Business Documents

Within the literature review the characteristics of digital documents in general have already been outlined (section 2.1.1). Based on these, Hausmann and Williams (2015, p. 364f) described some characteristics of Social Business Documents within their conference paper. These include the following aspects:

- Technology
- Storage
- Accessibility
- Location independent
- Changeability
- Duplicability
- Originality
- Preservation
- Structure
- Content
- Content connectivity
- Metadata
- Format
- Authoring
- Lifetime/Durability/ Closing and
- Variability

Salminen et al. (1997, p. 651) outlined that *“In studying the creation of current documents, we are able to identify the main characteristics of the documents”*. By conducting the different modelling approaches within the different Enterprise Collaboration and Content Management Systems and through the summary into the information and metadata models outlined above some of the characteristics of Hausmann and Williams (2015) can now be described in more detail and others can be added.

By presenting each characteristic with the help of a tile, the above derived findings are summarized below. Thereby each characteristic is further described, examples from the different systems are presented and its derived source is indicated. The structure of the tile is exemplified in Table 23.

Table 23: Example of Characteristic Tile

Name
Description
System/Document Examples
🔗 Source

The characteristics have been classified into five different groups, each focussing on another aspect: Components/Content characteristics (section 6.2.1), Storage/Exchange characteristics

(section 6.2.2), Functional characteristics (section 6.2.3), Metadata characteristics (section 6.2.4) and Lifecycle characteristics (section 6.2.5).

6.2.1. Components/Content Characteristics

Social Business Documents consist of different components which together form the complete document. The most striking and most frequently occurring components are versions, attachments, comment, likes and tags. However, the construction of being compound documents lead to the characteristics outlined as tiles in Table 24.

Table 24: Components/Content Characteristics

Components/Content Characteristics	
Social Business Documents consist of different components which together form the complete document. This leads to many deriving characteristics:	
	↓
Components Differences	Nested Components (Hierarchy)
Depending on the software and the application, the components which can be added to an SBD differ.	SBD components themselves can have own components. This leads to a hierarchy of components, nested in each other.
A wiki comment cannot be liked in IBM Connections and in Alfresco the wiki entry cannot even be commented on.	Forum replies in IBM Connections can have an attachment. Comments in Confluence can be liked.
☞ Conceptual Model	☞ Conceptual Model
User Generated	Text Creation
Social Business Document are created and extended through the user. Most become visible/public directly with the creation.	The different documents and components can have different text editors for content creation.
Each component of an SBD is explicitly added by a user. When creating a wiki entry, there are, for example, no likes or comments until a user adds them.	Within Alfresco, the editor for the main content and replies has much more functionalities as the text editor for comments.
☞ Functional Information Model	☞ Structural Information Model
Ambiguous Component Assignment	Interactive
Is it not always visible for a user which component was added to which version of an SBD.	SBD are constructed, edited and used by different users. Each processing by a user influences what the other users see.
In Alfresco it is not visible to which 'version' of a blog post a comment was written.	Person A can leave a comment on a discussion post of person B.
☞ Functional Information Model	☞ Functional Information Model

6.2.2. Storage Characteristics

The way Social Business Documents and their components are stored in the backend of their systems differs between systems and applications. This leads to several different storage characteristics which are addressed with individual tiles in Table 25.

Table 25: Storage Characteristics

Storage Characteristics	
The content of Social Business Documents is stored and constructed differently. Addressing or exchanging documents can lead to challenges because of the following characteristics:	
↓	
Storage Differences	DB Construction Differences
SBD including their components are stored either in database tables or as files in a filing system.	The main content, same as components might be stored in different or the same database tables.
Within Alfresco all main content is stored in files, whereas in SharePoint everything is stored in database tables.	Each wiki component in IBM Connections has its own database table. In Alfresco all SBD, including its components, are stored in the same table.
🔗 Structural Information Model	🔗 Structural Information Model
API	Object/Content Types
APIs can be used as interfaces to exchange data with other systems and to structure content equally/similar.	Documents can, for example, be classified according to their possible structure through object or content types.
Connections does not use an API whereas Alfresco uses CMIS (can also be activated in SharePoint) and Confluence uses REST.	Confluence and SharePoint use own content types for grouping SBD. Alfresco uses the object types of CMIS.
🔗 Structural Information Model	🔗 Structural Information Model
Picture Integration	File/Attachment Storage
Pictures in the main content of an SBD can be integrated into the SBD or only be linked to as files stored somewhere else.	Files attached to an SBD (including pictures, if attached directly) are stored in different places by the different system.
Alfresco stores pictures used in the main content as files in the repository and only links to them in the main SBD thus creating another component.	In Connections, Blog attachments are linked from 'My Files'. In Confluence an attachment always 'belongs to' the site it was uploaded to. The access rights and the owner thus can differ to the main SBD.
🔗 Object Modelling	🔗 Structural Information Model

Compiled SBD	Export Information
An SBD, with all its components, is not one file saved somewhere, but compiled from the different database tables at the time of viewing when a user asks for the document.	The amount of information, including the components and the available metadata, which can be exported or downloaded, differs between the systems; often not everything is exported/downloaded.
All systems use some kind of database to capture information and use XML, HTML and CSS to visualise the compound SBD when, for example, a wiki entry is opened.	In IBM Connections, downloading a wiki creates a HTML file which only contains the main content. In Confluence, exporting a page to a PDF only saves the main content.
🔗 Structural Information Model	🔗 Functional Information Model

6.2.3. Functional Characteristics

The functional information model already outlined the main functions which are available for SBD (see section 6.1.3). The characteristics which emerge through these functions and the way they are implemented are outlined in Table 26. Many of these characteristics are linked to the lifecycle of Social Business Documents through the challenges which can occur from them.

Table 26: Functional Characteristics

Functional Characteristics	
The following characteristics emerge because of the different functions which are available for SBD and the way they are implemented:	
↓	
Hidden Functions	Order in Functions
Not all possible functions are directly available from the main SBD view.	There is no sequence in performing different functions (except embedded lifecycles).
If a Wiki entry in Alfresco is accessed through the repository, more functions are available.	A page in Confluence can be edited, then tagged and then liked, or the other way around.
🔗 Functional Modelling	🔗 Functional Information Model
Repeating Functions	Parallel Functions
Most functions can be performed several times by one or more users over the lifetime of an SBD.	While one user is performing a function, another user can perform another or the same function at the same time.
All users who have access to an SBD can like the document and add more than one comment.	While one user is commenting on a wiki entry, another user can simultaneously comment the entry or also like the entry.
🔗 Functional Information Model	🔗 Functional Information Model

Continuity of Functions	Nested Functional Processes
Availability of functions throughout the different Social Business Documents.	There are self-contained process flows within the overall process of the SBD.
In IBM Connections, comments in blogs posts can have likes, comments in wiki entries cannot.	Tags, for example, can only be deleted if they have been created before. This, however, is an own process within the overall SBD lifecycle.
↶ Functional Modelling	↶ Functional Information Model
Multiple Authors	Shareability
Different people can edit a document and extend it with further components.	Multiple people can see and extend a Social Business Document through components.
A wiki entry can be started by a first person and supplemented by a second person.	After a blog post is published it can be seen by everyone in the community/site.
↶ Functional Information, Metadata Model	↶ Functional Information Model

6.2.4. Metadata Characteristics

The high level classification of metadata that needs to be known for the management of Social Business Documents seems to be similar as for other digital documents. However, the even higher collaborative usage from different users and editors of SBD add to their complexity. Furthermore, as each component has its own metadata, Social Business Documents have several metadata sources. The metadata characteristic peculiarities of SBD are described with the help of the tiles in Table 27.

Table 27: Metadata Characteristics

Metadata Characteristics	
Social Business Documents consist of many metadata and entail several metadata sources. This results in the following metadata characteristics:	
	↓
Encapsulated Metadata	Hidden Metadata
The main SBD, but also each component independently, has its own metadata.	Within the backend more metadata information is available as visible for the user in the frontend.
There are authors for each main SBD, but there is also always an author kept of the comment writer.	In the backend of Confluence the date when a user liked a page is captured, but not visible from the front end.
↶ Metadata Model; Conceptual Model	↶ Structural information Model

Missing Metadata	Customizable Metadata
Much metadata information is not kept for SBD within the systems.	Possibility of adding own metadata information.
In IBM Connections, users only see how often a blog post was viewed, not who viewed it.	In SharePoint, it is intended to add own metadata fields in the user interface. This is not the case for IBM Connections.
🔗 Metadata Model	🔗 Metadata Model
Nature of Metadata	Metadata Creation Method
Some metadata information are static (not changing) and others are dynamic.	Some metadata is created automatically, others manually by the users.
The ID of a document stays the same for its whole life, its name, for example, can be changed.	The creation date of a document is always automatically assigned by the systems, whereas the title is given by the user.
🔗 Functional Modelling	🔗 Content Modelling

6.2.5. Lifecycle Characteristics

The different steps within the lifecycle of Social Business Documents cannot be clearly separated as there are different possibilities of what and when to add which components and because of nested functional processes. The use phase partly extends into both, the creation and the disposition phase. These and further characteristics are described within the tiles in Table 28.

Table 28: Lifecycle Characteristics

Lifecycle Characteristics	
The lifecycle of an SBD mainly consist of three stages: creation, use and disposition. However, especially the way the different functions work lead to the following characteristics:	
↓	
Disposal	Status Information
Depending on the system, different information is getting deleted when an SBD is deleted.	The possibility of separating between active and passive SBD or closing an SBD for further edits.
Deleting a wikis entry in IBM Connections only moves the entry to a trash. In Alfresco, all pictures and documents attached to an SBD are still available as they are only linked from the repository.	In general, it cannot be indicated if an SBD is at the end of its lifecycle. In IBM Connections, a forum post can be locked. However, community owners can still edit and comment the post.
🔗 Lifecycle views	🔗 Metadata Model, Functional Models

Nested Lifephases	Overlapping Lifephases
The lifecycles of SBD components are embedded within the lifecycle of the whole SBD.	There is no clear separation between creation & use and use & disposition when taking into account the SBD components.
A tag, for example, is created, edited and deleted within the use phase of the whole SBD.	Is the deletion of a comment within the use phase of the compound SBD or within the deletion phase?
🔗 Functional Information Model	🔗 Functional Information Model
Edit Traceability	
Not all edits of an SBD or its components are completely visible to a user.	
In IBM Connections and Alfresco it only gets visible that a blog post was edited, not what was edited. Edits in tags are mostly not visible at all.	
🔗 Lifecycle views	

6.3. Summary

This chapter outlined the key findings in terms of the nature and structure of Social Business Documents, including their characteristics. This has been possible through the previous modelling investigation of chapter 5 which analysed four different systems and the comparison of the results. Four different information models as well as typical characteristics of SBD in five different areas have been developed. Each of the above outlined structures and characteristics thereby influences the way Social Business Documents are constructed and the possibilities to work with them.

As these findings represent general insights to Social Business Documents, they can now be used in order to progress the theory of documentary practice (see chapter 10). Furthermore, these insights are also of great importance for the management of Social Business Documents as they trigger different challenges. These are further described in the following part of this research study.

Chapter 7.

Challenges Identified through the Tool Analysis and the Concept of Records

As identified in the previous chapters, Social Business Documents occur in a wide range of types and formats and are created in systems that are constantly changing. These factors, along with the unique characteristics of Social Business Documents, bring new challenges in the area of information access and information use in the day-to-day business of employees (Salminen et al., 2000, p. 624), as well as for traditional information management methods (Burke and Horton, 1988, p. 19).

Analysing existing documents can assist in identifying and understanding the challenges for managing documents which arise in different systems (Olsen et al., 2012, p. 107). Therefore, four different ECS/ECMS were analysed in the previous part of this study. Within the following, the challenges identified in the tool analysis are outlined (section 7.1) and an analysis of the records management capabilities of the same four systems is presented, revealing additional challenges for the management of SBD (section 7.2).

7.1. Challenges Arising from SBD Characteristics

Section 6.2 outlined the characteristics of Social Business Documents. Many of these characteristics, such as the possibility to easily share documents or being able to work on them with multiple authors lead to positive opportunities when working with Social Business Documents. However, many characteristics also bring challenges and risks (Hausmann and Williams, 2015), especially when considering their long-term management and the value they can have for an organization. Chapter 2 and 3 addressed the general document management challenges such as undefined retention periods or challenges of missing metadata, which also apply to Social Business Documents, and section 3.4 gave preliminary insights into the challenges for the management of social content as reported in literature. In the following, the specific challenges of Social Business Documents arising from their specific characteristics are outlined. Some challenges are not new and have already been reported previously. However, special reference is made to these challenges in the context of Social Business Documents.

Identification of **components**: The fact that Social Business Documents are compound documents is one of the main characteristics that leads to many different challenges. The compound nature of an SBD means that all components and metadata need to be looked at and managed together not just the core content. However, SBD in different systems or applications

can have different component and structural variations, for example encapsulated metadata and different functions. This leads to the challenge of identification of all components that belong to a specific document, both visible in the front end and available in the databases and file system in the back end.

Exporting/Transferring SBD with all its components: Depending on how and where SBD should be managed, there might be a need to export or transfer the SBD to another system. However, due to the different file formats, the different locations where the individual components are stored, as well as the challenge of identification of the components in general brings the risk that information can become lost or unaccounted for.

Assigning **ownership** and **responsibilities**: One of the major advantages of SBD is their user generated and interactive nature. However, this in turn means that different people are involved in the creation of a document. Each component, for example, can be created by a different person. Therefore, the assignment of ownership and responsibilities for documents can become problematic.

Unclear **lifecycles** and **document status** (fixity): There is no distinct order of functions for how SBD can be processed and therefore it is not clear what will happen next with or to an SBD. The lifecycle is not fixed. Furthermore, since everyone who has access to an SBD can also usually further edit it, it remains unclear, when a document is finished/terminated and thus, in which state it currently is in. If not locked for further editing, new comments or more likes, for example, can emerge years after the document was created. The lifetime/durability is not defined which makes it difficult to decide on the appropriate management measures to be taken.

Compiled and **linked** documents: The different components of SBD are often stored in different databases or files and are only linked through references to the individual IDs. When a user is looking at a Social Business Document it is compiled for viewing at the time it is requested. This can lead, as with all logical things, to the appearance of different arrangements of one document depending on the views and uses (Bearman, 1996). This in turn can add to the challenge of defining what the **original** document is.

Distortion of information: The availability of nested lifecycles can lead to missing information. For example, it is possible to create a comment to a discussion post and delete it afterwards. Depending on the time when the SBD is viewed, the deleted comment will not be visible anymore. However, the question arises, does it still belong to the document and whether the existence of the comment needs to be recorded somewhere? Furthermore, due to the ambiguous content assignment, it is not always visible to which version of a wiki entry a comment is referring to when it has been written. These are challenges in addressing the requirement of integrity.

Needed **Metadata** not available: Many different metadata aspects can and must be kept for documents in order to be able to manage them. Examples are retention periods, record classifications or the document status. It needs to be decided what metadata should be kept for

which document, however, it is often not possible to record this metadata for SBD in the current systems.

Missing information and identifying history: Due to the possibility of editing some SBD without any kind of version control, information might be lost, which bears the challenge of maintaining the history of an SBD in terms of an audit trail.

Adding to these challenges that were derived from the tool analysis are further challenges which could be identified through empirical studies. These are outlined in section 9.1.2.

7.2. Records Management Challenges of SBD

Section 2.1.1 defined the term record and section 3.1 discussed records management. Both sections outlined the special requirements for records. Especially when looking at the long-term management of documents, records management and archiving are two important fields. It can be questioned whether Social Business Documents are or should become records as well. As outlined previously, SBD can have the same legal and organisational value as other business documents. Thus, the National Archives and Records Administration in the USA (NARA, 2010) as well as the State Records of New South Wales in Australia (State Records Authority of NSW, 2013) recognized the need to archive social documents as records of evidence and declared social documents as possible records which need to be maintained.

There are special software offerings for records management and archiving available on the market and many claim to be able to manage Social Business Content (Dayley et al., 2015). Furthermore, some ECS and ECMS offer certain record management functions. However, as their capability is often limited and SBD often stay within their creating software system as they are, different challenges concerning records management can emerge (Miles, 2011a).

Within the following, the challenges for records management of SBD arising from their characteristics are outlined first (section 7.2.1). Then the ECS/ECMS records functionalities of the previously analysed four systems are briefly discussed (section 7.2.2). Following, a discussion on records managements of other new content types are outlined (section 7.2.3) before a conclusion is presented (section 7.3).

7.2.1. Challenges Resulting Through the Record Definition and Functions

One of the main characteristics of records, which is also stressed in its definition, is their purpose of functioning as evidence and/or as an asset of an organisation. Notwithstanding that SBD can function as evidence for business activities, this is usually not their main purpose (Hausmann and Williams, 2015). ECS primarily support the communication and collaboration of employees through the use of SBD. As has been shown within the characteristics of SBD, they are user-generated, interactive documents with nested and overlapping life phases within one document. However, according to Goodman (1994, p. 134), records are work completed, which is fixed and should no longer be editable. This brings various challenges. First, it is difficult to decide when a Social Business Document is **completed**, as different employees might for

example comment or like a document long after the main document was created. Second, within most systems, SBD are editable as long as they are in the system and can therefore be changed and thus are not **fixed**. Therefore, we are facing problems of declaring an SBD as a record as it can still be changed (Clarke, 2012a). As Stuart and Bromage (2010, p. 219) correctly asked: *“how can a records manager maintain and manage a record when it is constantly changing?”*. Therefore, SBD cannot be records by this definition. However, stepping back from this rather restrictive description of documents, Clarke (2012a) suggests to ask the questions, whether we would declare the content a record if it was created through another medium. At this point in time the differentiation between Social Business Documents and other Social Business Content (see section 2.3) as well as the real content of an SBD is also important. It also needs to be questioned whether a like or a status update with only a small **amount of characteristics** provide enough information to be a record (Wilkins and Baker, 2011, p. 23) on their own, or only within the context of the main document. Furthermore, Dearstyne (2007) outlines the problem of assigning **responsibility** for managing and being a custodian of such live, organic documents with multiple authors. All these are challenges which are not yet addressed in research literature.

Another group of challenges arises from **retention periods**. Retention periods address the context of documents, but they do not outline how to deal with specific document formats. Issues around managing word processing files and emails have been discussed within records management in the 1990s, and it was concluded that changes in technology must also lead to changes in **policies** (Barker et al., 2009, p. 177f). The changes should not necessarily mean changes in the times of retention, as these might stay the same as the content if the document is the same. However, if new content types emerge, there might be specific requirements which need to be fulfilled. Therefore, if retention periods outline how long a specific document should be retained, policies should also outline how it should be retained and how it will be disposed at the specific point in time (Barker et al., 2009, p. 179). Especially with SBD it needs to be decided at what point in time which retention period starts as it is difficult to determine the **status** of a document and thus to know when to take which action.

The records management lifecycle suggests a classification of records shortly after or even during the creation of records. Kampffmeyer (2012) also argues to start with the records management activities at the beginning of a records lifecycle. Therefore, it might be helpful and already required to start some activities such as adding additional metadata at the creation of an SBD, because often SBD become proof of something later in their lifetime (**recognised important**) and then need to be managed properly (Hausmann and Williams, 2015).

7.2.2. Current Record Management Functions for SBD

Within the following, the capabilities in terms of records management of the four systems previously analysed are described and discussed. Most systems have additional add-ons/plugins available due to third parties or the vendors themselves, which extend the built-in functionalities. For example, IBM offers the content collector and content manager for IBM Connections. However, as these are essentially separated, major server installations they could

not be tested. Alfresco as an ECMS offers a free records management plugin which easily integrates with the main Alfresco system and has been analysed. Atlassian does not have a tool or any functions for records management. However, there is a plugin called 'Archiving Plugin for Confluence' from a third party vendor, which was examined. SharePoint includes two different records management options. The following list summarises which systems have been analysed:

- IBM Connections: main system
- Alfresco Community: records management plugin
- Atlassian Confluence: external archiving plugin for Confluence
- Microsoft SharePoint: main system including record center and in-place records management

It is not the aim of this dissertation to completely outline the process of how to use the records management functionalities in the different systems, however, an analysis was undertaken in order to be able to understand the issues arising from these possibilities. Parts of the analysis of Alfresco and SharePoint were initially conducted by Gottwald (2015) as part of a Bachelor thesis supervised by the author.

IBM Connections itself does **not offer records management functions**. It is not possible to assign customised metadata, retention periods cannot be specified and the only possibility for classification are tags. Furthermore, IBM Connections, for example, does not include functionality for indicating finalised documents or differentiating between active and inactive documents. If SBD should be kept as records they need to be exportable/transferable to another system. However, IBM Connections does not support any **document standard** for exchange and by using the export, print or download functions of the system itself, lots of information gets lost (see section 8.2.3). Therefore, a workaround is needed for records management functions of SBD in IBM Connections, potentially by including other IBM software, in-house development or third-party plugins.

The official records management plugin for Alfresco offers many records management functions, such as declaring a record, a file plan, retention periods, automatic workflows, freeze records or vital records. Once installed, a special records management site can be set up. Traditional digital documents can either be uploaded directly into the records management file plan or can be declared as record from within any other Alfresco site. Once declared as a record, Alfresco also creates audit logs, which save every activity since the record was added to the file plan and which can be viewed afterwards. However, it is not possible to see the activities which have been performed before the document was declared a record. Having in mind the old way of creating documents by, for example, writing a text file, which is stored on the own file system, this might not be a big issue. However, taking a blog post, which is declared a record, as an example, the blog post does not have a version history in Alfresco. If someone comments on the post and the post is edited afterwards, the original text is not available anymore. If the blog post is declared a record afterwards, the changes of the comment are not visible in the audit log leading to **missing parts of the audit log** which can become a risk.

All in all, the records management capabilities for traditional digital documents such as PDFs of Alfresco is good. However, the SBD in Alfresco are not yet directly addressed with the records management plugin. Thus, a wiki entry, for example, cannot be declared a record from within the wiki application itself. The wiki HTML file needs to be opened from the repository and can only be declared a record from there. Furthermore, images used in the wiki are not automatically declared a record as well when the wiki is declared a record. The references to images are stored as HTML tags in the wiki entry. Changing the image itself, thus what the tag links to, will also change what is visible from within the wiki entry, even after the wiki has been declared a record (**functions do not work as expected**). Furthermore, after declaring a wiki entry a record, only the wiki name without any content is visible in the original site and even this can be edited subsequently. Thus there is no real **connection** anymore between the record and the original file because the record is stored at **another location** without a linkage.

As stated above, Atlassian does **not have any functions** for records management itself. However, the page history of Atlassian is quite comprehensive and logs the changes of an Atlassian page. It could thus be seen as some kind of audit log. The archiving plugin, as the name suggests, only offers archiving, but no actual records management functionalities. The plugin enabled the user to define clear archiving rules. The documents can then be tagged with the term 'archive' and are considered when the archiving process is started. However, Atlassian Confluence has the same or similar issues in terms of records management as outlined above with IBM Connections. The archiving plugin does not include linked attachments and when exporting documents for external software, some information gets lost. However, as Atlassian Confluence supports the REST API, it should be analysed whether this would be an option for transferring SBD into a record management system.

Microsoft SharePoint seems to be the most comprehensive system in terms of records management of the four analysed systems. SharePoint includes a 'record center', which can be used as a central repository for an organisation's records and is used by creating a record sub-site which is linked to. Beside the manual upload to the record center, Microsoft SharePoint allows the creation of information management policies and workflows for automatic movement into the center. Furthermore, Microsoft SharePoint also offers in-place records management. With the in-place records management the documents stay at their storage location and are not sent to another location (as with the record center). Once a document has been declared a record it depends on the system setting what can be done with the record, for example, whether it can still be edited or deleted and who can do what. Audit logs, not only for records, but for all documents, are automatically captured if not set up differently. However, whereas digital documents such as PDFs can be declared a record in both available ways, Social Business Documents such as wiki entries cannot be sent to the record center and only be declared a record through the in-place function leading to two **different places where records are stored**. Similar to the other systems Microsoft SharePoint only declares the main wiki entry a record. Media files, added to the wiki entry, are not declared a record together with the wiki

entry. Changing an embedded image, for example, will change the appearance of the wiki entry itself and thus the captures record.

7.2.3. Similar Record Management Challenges with other New Content Types

Compared to text files, as an example, many new content types emerged within the last years. Even though Social Business Documents are the main topic of this study, other newer content types and their challenges with records management are briefly described within the following in order to possibly identify solutions from other areas.

E-mail systems are an early example of collaboration environments which are extremely widespread and support ad hoc communication (Waugh, 2014, p. 217). For the management, e-mails mainly remain in their e-mail system and are addressed as records in there. However, this brings along different challenges. First, it is often possible to edit e-mails even after they have been sent or received leading to problems in arguing their integrity. Second, all incoming and outgoing e-mails can easily be deleted at any time and last, the access to e-mail records aside from the sender/receiver is hard, as most e-mails are stored in personal inboxes (Waugh, 2014, p. 215). These challenges partly have been addressed through software which is copying all incoming and outgoing e-mails to another location at the time of transfer. The challenge of setting retention periods or deleting e-mails, however, remains.

With the creation of voicemail or text messages, as well as images, videos and cell phones can create records of historic value. However, only a few archivists have addressed the issue of how to preserve cell phone material. In his article Caswell (2009) even argues that he could only find two authors, Barry (2005) and Cox (2007), who dealt with cell-phone-generated documents in archiving literature. The major challenges of archiving cell-phone material derives from the widespread availability over the Internet and the accompanying possibilities of manipulation. Thus, as with other electronic records, authenticity and reliability are a major concern for cell-phone records. A difference lies in the speed and anonymity of cell-phone records which *"pushed the boundaries of traditional archival understanding of authenticity"* (Caswell, 2009, p. 141). Another challenge remains in the format of cell phone records. Many documents are in compressed formats such as .jpg or .mp3 where valuable details could be lost and new challenges arise in acquiring, appraising and describing records. However, also here *"preservation technology has not yet caught up with communication technology"* (Caswell, 2009, p. 143). Therefore the question is whether a new record paradigm is necessary in order to adapt the current challenges of the new kind of documents or whether the existing archival notion including its different methods can change in so far to fit the new kinds of records (Caswell, 2009).

Another example of new content types are addressed by Henninger and Scifleet (2016). Within their paper they focus on short messages of social networking services (SNS) and investigate how they are shaping social history. They also asked the questions of the characteristics of short messages, how they are different to traditional records and if and how SNS communication

should be preserved. They argue that these questions are just starting to be asked and are not yet well addressed.

Furthermore, within an interview by Caswell (2009), participants thought about content visible on Flickr.com and argued: *“We either have to encourage Flickr to become an archive or convince archives to become more like Flickr—and then convince ordinary people to use these services to help preserve the materials they are producing”* (Caswell, 2009, p. 142). He therewith discusses pictures available on the Web, but does not provide solutions for the challenges.

Finally, websites themselves should be addressed as documents which encounter similar challenges as SBD. The volume of web pages is growing rapidly and already in 2002 seven million pages were added each day. However, at the same time when there are pages added, others are also deleted. On average, a web page only has a life-span of about 44 days (Lyman, 2002). Thus, *“much of today's Web will have disappeared by tomorrow”* (Lyman, 2002), meaning that we need to act immediately, otherwise we will lose information which might be of value, even if we do not see the value today. Adding to this challenge of availability of web pages is their connected nature. Each web page in general contains 15 links to other pages or objects and includes around 5 objects from other pages (such as images) meaning that the boundaries of web pages are hard to define. In terms of archiving this further means that theoretically not only the main web page someone is examining needs to be archived, but also all related/linked pages and all added and linked objects (Lyman, 2002). Lyman concludes with four different kind of challenges, archiving web pages brings along:

- Cultural: not recognizing the historic value in the very pace of technical changes leading to the questions of *“how much to save, what to save, and how to save it?”*.
- Technical: preserving storage media including the hard- and software necessary to read old documents.
- Economic: finding a business model to support new media archives leading to the question of *“who has the responsibility for collecting and preserving the Web and the resources to do so?”*.
- Legal: creating laws and agreements to protect copyright material and allow for archiving.

All these different examples show that the challenges identified for SBD so far already partly exist with other documents and need to be addressed somehow.

7.3. Conclusion

Barry (2005) argues that *“it remains to be seen whether text-messaging mobile phones, multi-authoring “wikis,” “podcasts” or other new technologies will rise above hype and hip to become serious generators of business records”*. *“The Web is not only changing the way we work, it is also changing the way we interpret records and organisational documentation”* (Stuart and Bromage, 2010, p. 217) and each new emerging business solution will further extend the possibilities of how we create and use documents and records (Barry, 2005). Henry (1998) argues that as with other new types of documents, solutions for all kinds of new emerging problems such as with cell-phone records will arise. However, *“archivists’ first examining what*

they know and the extent to which it is applicable, before dismantling archival theory and practice” (Henry, 1998).

As can be seen from the previous sections, there are significant challenges for the long term management of SBD arising from their characteristics, as well as from the concept and functions of and for records. Document and records management questions of SBD have not truly been addressed yet and there are still major issues with the systems where they are implemented. Besides the legal necessity to maintain and archive Social Business Documents, they maintain evidence of contemporary actions of interpersonal communication and thus, in the future, could have historic value as corporate memory (Henninger and Scifleet, 2016, p. 277). The question is how to maintain this value. The current functionalities of ECS and even of ECMS are not sufficient for adequate record or long-term management of SBD. However, it should not be argued that each ECS/ECMS should have full records and/or archiving possibilities. It might be very useful to have specialised systems for that. It needs to be ensured that, if the system offers some functionalities, these work as expected, and if they do not have records management and/or archiving functionalities it needs to be ensured that the documents can be exported to another system without losing any information. Furthermore, Jones (2012, p. 4) argues that the connection between the Social Software system and content management repositories *“need to be searchable, sharable, and secure”*.

Chapter 8.

Empirical/Industry Insights

In addition to the system view, which was investigated through the analysis of the nature and structure of SBD in chapter 5 and 6 of this dissertation it is also important to understand which roles the documents play within the working processes of organisations (Salminen et al., 2000, p. 624) in order to be able to evaluate the documents' value and the required document management processes. Therefore, the following chapter investigates the long-term management of SBD from the practitioner's perspective. Chapter 4 outlined the different research phases and Figure 8 showed how all the different data sources used in this dissertation come together. Within the following, Figure 51 shows the three empirical research activities involved in the practice perspective, including their main goal and the number of companies and individual participants that were involved.

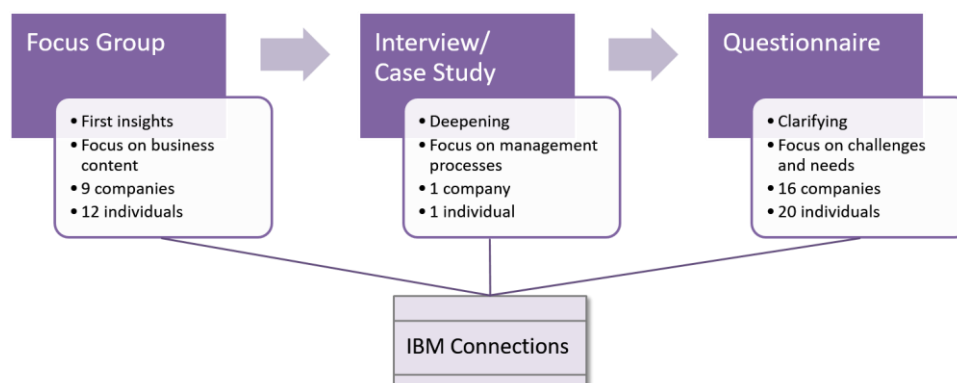


Figure 51: Empirical Research Activities

The common denominator of all three activities is IBM Connections as one of the main ECS used in the participating companies. The focus group, which is outlined in section 8.1, provides the start of the empirical investigation and provides first insights into the content of Social Business Documents that is being saved in an organisational ECS, the challenges organisations face with SBD, and the needs they see for SBD management. This is then followed by the in-depth interview and case study in section 8.2 which deepens the findings of the focus group and further outlines document and SBD management processes, issues and challenges on a very specific and deep level. Finally, the questionnaire presented in section 8.3 clarifies the previously gathered insights by verifying the findings by surveying 16 ECS user companies. Although the results of each activity is presented separately below, the final results from the three studies are discussed together in Chapter 9.

8.1. Focus Group

An introduction to the theoretical background to focus groups has already been outlined in section 4.2.1. The focus group in this dissertation was conducted in December 2015 involving 12 representatives of 9 different companies from various industries such as production, services and consumer goods and different sizes of businesses between 85 and 300.000 employees. They all share the common interest in Enterprise Collaboration Systems and use IBM Connections in their companies. Furthermore, the participants are involved in the management of IBM Connections within their companies. Therefore, the whole discussion was based around Social Business Documents in IBM Connections. During the course of the focus group, different question types were used by the researcher which participants answered in different ways, including written responses, interactive activities and discussions.

The focus group was conducted as part of an industry workshop and was guided by two major aims. First, to raise the awareness of the need for long-time Social Business Document management, and second, to deepen the understanding of current Social Business Document management practices applied in Enterprise Collaboration Systems.

The moderator was represented by the researcher herself. Besides the main researcher, two other researchers supported with notetaking and discussion structuring.

8.1.1. Focus Group Objectives

The main aim of the focus group was to identify the content of SBD as well as the kind of SBD content that is stored in IBM Connections. In a second step, these insights help in addressing research objectives two and three of the dissertation by identifying and investigating current requirements, challenges, strategies, policies and processes for Social Business Document management. The research objectives of the focus group were broken down into smaller-scaled objectives, guided along three main building blocks: what, where and how (see Figure 52).



Figure 52: Focus Group Building Blocks

Each building block was accompanied by corresponding research objectives, which are outlined in the following.

Building Block 1: What – type

Requirements for long-term document management as well as a process for managing documents are dependent on the content and context of information. Dependent on its content a document might be of legal or historic value, for example, and therefore should be managed for long-time archiving. Consequently, it is necessary to know what kind of Social Business Documents and information are stored within the collaboration systems before management practices can be established. Therefore, research objective 1 addresses the types of content stored in Enterprise Collaboration Systems:

FG-RO1: To examine what kinds of valuable and most frequently occurring content types are stored and used within IBM Connections.

Building Block 2: Where – location

Within documentary theory literature it is often stated that the content and not the format of a document is important and decisive for the needed management processes. With examining the types of documents (RO1), the content is analysed and different content specific requirements such as legal retention periods can be derived. However, even though the format might not be crucial for the requirements, it influences the way it can be managed. Dependent on the location or application a Social Business Document is stored in, its nature will be different, including different components attached to it. Different database structures also influence how it is stored (Hausmann and Williams, 2016). In order to address requirements and the management process for Social Business Documents it is therefore necessary to identify the location, where Social Business Documents are stored. This is addressed through the following research objective:

FG-RO2: To identify which applications of IBM Connections are used for which types of content and why the documents are kept where they are stored.

Building Block 3: How – management process

Research objective 3 investigates the current challenges when managing Social Business Documents faced by participants:

FG-RO3: To examine current challenges and needs with the management of Social Business Documents in IBM Connections.

Finally, research objective 4 addresses current management processes of Social Business Documents in order to provide an overview of best practices currently applied by companies:

FG-RO4: To examine current practices for managing Social Business Documents in IBM Connections.

8.1.2. Focus Group Outline

The workshop was structured into two parts. First, a presentation by the researchers and second, the main focus group. The purpose of the presentation was to provide background information on the topic of Social Business Document management. The following themes were outlined: (1) performance and conformance objectives of Social Business Documents, (2) information lifecycle, (3) enterprise-wide content management, (4) construction of Social Business Documents and (5) risks of unmanaged Social Business Documents.

Following the introduction, the workshop was further structured along the three building blocks which formed the main focus group and combined questions, interactive activities and discussions.

Building Block 1: What – type

The focus group itself started with two introductory questions:

- 1) What are your most critical types of information stored in IBM Connections?
- 2) What are your most used/most common types of information stored in IBM Connections?

As a supporting question which assisted participants to address these questions, the question

“What content would you miss, if IBM Connections is not available for one or two days?”

was asked. The purpose of limiting the question about the content to the categories ‘most critical’ and ‘most used’ were developed, because an open question about what kind of content the whole organisations store within their ECS would have been too broad.

Participants were provided with examples and were asked to write down their most critical and most used information on post-it notes within five minutes time. Two colours of notes were used: pink for the critical and blue for the most used information. The post-it notes remained with the participants and a short discussion within the group about the content was conducted. Mentioned answers were collected on a whiteboard.

Building Block 2: Where – location

Followed by the introduction questions, a transition question asked:

- 3) Where (storage application) do you store these documents?

Therefore, participants were asked to pin their post-it notes from the ‘What’ activity to the different posters provided, which showed the different storage locations: wiki, blog, forum, files, library and others. The following discussion was guided and asked participants to outline:

- 4) Why are these documents stored in the particular places/applications?

Building Block 3: How – management process

The last block of the focus group addressed the management of Social Business Documents and the problems and issues participants have to deal with and/or see in the long-term management of Social Business Document as well as possible solutions, strategies and best practices.

A force-field analysis exercise was conducted. Participants worked in teams of three for 10 minutes and were asked to write down their thoughts on Social Business Document's management on sticky notes according to the following questions:

- 5) What issues and challenges do you currently face with the management of your Social Business Documents?
- 6) How do you address these issues and challenges and what additional management activities do you perform?
- 7) Do you have additional ideas for future strategies?

Three different colours of post-it notes were used: orange for problems/issues, green for solutions/strategies that are already in place and yellow for ideas for possible future solutions/strategies.

The results were shown by pinning the notes on a wall confronting the problems with the solutions and discussing them all together.

As outlined above, the data of the workshop was captured in different forms: audio and video recordings as well as field notes were taken. Furthermore, each building block provided individual outcomes through posters and/or notes by the participants, which were captured and photographed. The data analysis is presented in the next section and further discussed in chapter 9.

8.1.3. Focus Group Data Analysis and Findings

In line with the research objective, different analytical frameworks as described by Krueger and Casey (2014) are used to analyse the focus group data. With the help of the constant comparative framework, patterns and relationships between ideas can be identified. Therefore, gathered data is grouped and categorised in order to find relationships. Furthermore, the frameworks of critical incidence and key concepts are used together in order to identify critical content and processes and identify possible answers to the open issues.

The focus group was initiated through the question of participants' own content within their ECS IBM Connections. Thus it started with a simple and factual question as Litosseliti (2003, p. 59) suggests in order to start in a relax manner and gain the willingness of participants to collaborate and discuss the questions. Within the following, the analysis is outlined, based on the focus group research objectives.

RO1: Examine what kinds of valuable and most frequently content types are stored and used within IBM Connections

The first objective aims at addressing the types of content stored within IBM Connections. It is clear that much of the most valuable content was also named as the most used content. Furthermore, participants had problems in differentiating between the content types and the applications the content is stored in. Thus, some answers were quite precise, identifying single document examples and others rather broad, naming the different applications such as wiki, tasks or even communities and rather describing the usage instead of the documents themselves. Table 29 presents a classification of the answers which was developed according to the purpose that the documents are used for and gives examples for each category named in the focus group.

Table 29: Categories of Documents within the Focus Group

Category	Description	Examples
Communication	<i>“Communication involves people exchanging messages with people”</i> (Williams and Schubert, 2011, p. 4). This category includes documents whose main goal is to spread information to people to inform them and/or the documents which are used for the communication.	<ul style="list-style-type: none"> ▪ Weekly updates for employees ▪ Announcements ▪ Expertise information ▪ Support forms
Compliance	Documents in the Compliance category are those which need to be taken into account in order to be in accordance with legal and organisational requirements and those which have a legal binding.	<ul style="list-style-type: none"> ▪ Governance information ▪ Standards ▪ Guidelines ▪ Regulations ▪ Contracts
Coordination	Williams and Schubert (2011, p. 4) define Coordination as <i>“the functions and activities that support the orchestration of work and tasks”</i> . Documents in this category support these activities.	<ul style="list-style-type: none"> ▪ Workshop material ▪ Project information ▪ Task management ▪ Event management
History	The category history includes those document which report about past events and can serve as evidence.	<ul style="list-style-type: none"> ▪ Meeting minutes ▪ Protocols

The categories above should not be seen as discrete. Most documents can be assigned to more than one category as their purpose is diverse, but the categories show the frame, for which IBM Connections is used in the participating companies.

Project or event management information, for example, which where both named several times by participants as most valuable content, include different aspects such as meeting minutes, tasks which need to be performed or project specific knowledge information. The rather broad answers given by participants, such as ‘project management’, thereby are not really one document alone, but include several documents. Project management is the domain they are used in, for instance. This example shows that participants had problems in naming the exact

Social Business Documents. They rather think about the domains in which they use documents instead of the documents itself. The activity stream was mentioned among the most frequently used documents and represents another example of the problem to name the actual document. The activity feed is a function and no document itself, as it just represents what has happened with/to the different documents within the system.

RO2: Identify which applications of IBM Connections are used for which types of content and why are the documents kept where they are stored.

Section 5.3 gave an introduction to IBM Connections' applications. Not all of the applications are used in each participating company. However, the applications that are used by the majority of participants for the most used and most valuable content are wikis, blogs and activities. Which content is thereby stored in which application/content type strongly differs between participants. One example is compliance information such as guidelines, which are stored as wikis entries by some participants and stored as blog post with links to files by others. Two different reasons could be identified as to why things are kept in different applications. First, because the information to be stored requires special functionality or, second, because the functionality offered by a particular application best suits the purpose of the information. Concrete reasons for special storage location were only given for the use of activities as they allow for the breaking down of work into small pieces and can be worked off, as well as for the library as it offers the possibility to create nested folders and offers document management capabilities (which is also possible with the file application from Connections Version 5.5). However, in general no concrete statements can be given about which content is or should be stored where, as also the two reasons to decide where to store outlined above depend on the perspective on purpose of the individual user.

The focus group revealed that even though it is sometimes hard to decide where to store the content it is not important for participants. The storage location depends on the purpose, argumentation and requirement each individual associated with a specific document and therefore strongly differs.

These findings have several implications for the long-term management of Social Business Documents. The answers indicate that the information stored in SBD, such as project information or meeting minutes, are valuable business information and therefore should be kept and managed. However, it cannot be clearly said in which format/document type the information is stored. Even though the format should not matter in terms of retention periods, it needs to be taken into account for the technical perspective, as the tool analysis has shown that each tool and each Social Business Document type has its own peculiarities.

RO3: Examine current challenges and needs with the management of Social Business Documents in IBM Connections.

Not only through the activity in which the participants were explicitly asked to write down and discuss management challenges and needs, but also through the previous discussions, many

different aspects about Social Business Document management could be identified. Thereby, challenges can often be mapped to specific needs. The challenges are briefly described in Table 30. Table 31 presents the needs.

Table 30: Challenges with the Management of SBD in IBM Connections

Challenges	Description
Different systems	If different systems are in use, which offer similar functionalities, it is hard to decide which system to use for what.
Missing DM functions	Especially for files, but also for all other documents in IBM Connections participants lack sufficient document management functions such as audit trails or archiving.
Status of documents	There is no possibility to differentiate between active and passive documents or active and passive communities, as for example for finished project communities, which could be passive communities.
Community management	This includes the possibility to address all documents within a community with functions such as freeze or archiving documents and the possibilities to copy and merge content between communities.
Knowing what to manage at all	Often people do not even know which communities are available and which content already is present within the system.
Ownership	The ownership of documents cannot be changed, it is always the person who uploaded a file or created a document.
Awareness	People are not aware of the need to somehow manage SBD.

Within the discussion about what and how to manage content within IBM Connections general thoughts about content management in IBM Connections and the differences between ECS and ECM/DMS emerged. Many companies are using three or four competing systems in the area of ECS and/or ECM. Participants argued that it is often difficult to decide which system to use and that there is a need for a strategic decision, which system is the main and leading system and how content is organised between them.

In particular, when it comes to share files such as Word or PDF documents the issue of which system to use became apparent. The majority of participants argued that a file upload in IBM Connections is needed, but one participant argued that *“we have to distinguish between the pure need of file sharing and the need for document management capabilities, because it is a misbelief that one system can serve for both”*. He even argued for outsourcing files from IBM Connections to OneDrive. However, in general the participants agreed on the importance to manage files appropriate directly within IBM Connections. This became particularly clear through the following statement of one participant: *“Through the use of file sharing applications different requirements in terms of document management emerge. If I do not want to work on these requirements, because I cannot implement them, I should not use IBM Connections any longer.”*

Table 31: Needs with the Management of SBD in IBM Connections

Needs	Description
Leading system	If more than one ECS and/or ECM system is in use a strategic decision needs to be made, which the leading system is.
Integration	The organisation and exchange of documents between different systems need to be possible.
Audit trails	Especially when working with external partners audit trails become a required function.
Automatic deletion possibilities	Sometimes information is only valid or interesting for a certain amount of time and can be deleted after this time to not overload the system. There should be a possibility to set automatic deletion times
Archiving function	It should be possible to archive documents and communities in a way that they are still visible, but clearly marked as archived/passive.
Freeze documents	Possibilities are needed to freeze documents so that they are not changeable. This goes along with archiving documents.
Recovering content	It should be possible to recover documents or versions of documents after they have been deleted.
Turn off comments	It should be possible that comments can be turned off for specific documents, not only for whole applications.
Merge and exchange content	It should be possible to merge content from different communities and to exchange content between application and communities.
Export of content with all components	Export functionalities should not only export the main content of a document, but also the content of all components added to the document.
Transparency in responsibilities	Often it is not clear who is responsible for a document. This is an organisational problem that needs to be addressed in clear and separated guidelines.

The discussion outline above was particularly concerned with files. However, during the course of the focus group participants realized that the need for some kind of DMS functionalities not only applies to files, but can also emerge for all other content in IBM Connections such as wiki entries or blog posts. The main functionalities discussed thereby were the existence of audit trails and the possibility of deleting content and archiving content for long-term management. However, two different questions have to be kept in mind when thinking about these functionalities. First, do we have to apply document management functionalities to IBM Connections content because of certain regulations? Or second, do we want the functionalities, because we want to sustainably manage our information in terms of knowledge capture, risks minimisation, information overload, etc.? Depending on the company and the industry, some participants argued that they are not really required to keep any content from within their IBM Connections. However, others, especially those working together with external users on their

platform, have requirements as the company who runs the IBM Connections installation is responsible for the content. One participating company currently is even trying to depict GDPDU requirements and auditability within IBM Connections.

Following the discussion whether participants have a need to manage the content within IBM Connections at all, a discussion about which content needs to be managed emerged. As participants currently only occasionally have the need to manage individual documents, the focus in this discussion was less on special documents, but rather on the possibilities to manage applications and whole communities. Especially the wish to be able to archive whole communities was mentioned by all participants. However, for the participants archiving does not mean to store the content on a different physical location, but have content fixed and outside the everyday view. Communities, for example, are among other purposes used to manage projects. When a project is finished, the information should be kept and be searchable. However, the content should not be changeable anymore and the communities should be outside the normal community overview marked, for example, as active, passive or pending.

Besides this, the need for managing activities was discussed as well, as activities were mentioned among the most used and most valuable documents within IBM Connections. One participant argued, that he does not need to keep activities, after he has worked on them. However, the general consensus was that all activities should be kept in order to keep track processed tasks and for knowledge management purposes. Similar to communities it should be possible to freeze them. Furthermore, a discussion about the possibility to delete individual documents or versions of documents automatically lead to a further need of participants and also demonstrated the current challenge of recovering content that was deleted. Another need, which is not related to specific documents, but required for all kinds of documents, is the possibility to forbid comments. Currently, in IBM Connections this is, if at all, only possible for whole applications within a community and not for individual documents.

Aside from the above outlined needs a general issue arose, which is independent of IBM Connections, but applies for all content in ECS: the question about who is responsible for certain content and its management; whether it is the user him-/herself, the owner of a community or the system owner needs to be addressed.

RO4: Examine current practices for managing Social Business Documents in IBM Connections.

Participants were also asked to discuss current practices they have for managing their IBM Connections content and to address the challenges and needs outlined above. Thereby it became apparent, that most challenges and needs have not been addressed yet. Predominantly content is not archived or deleted at all at the moment. If something is deleted it is done manually.

However, one participant addressed the major need for archiving communities in such a way that all users are deleted from the community and only one admin user, who is especially created for all passive communities, gains access. This procedure results in the fact that the

content cannot be changed anymore. However, it also excludes all users from finding and reading the content. Thus, this is no appropriate practice.

In addition, one participating company addressed the issues of forbidding comments on individual documents. They are currently programming an additional feature to IBM Connections themselves.

Beside the structural and technical practices some companies have usage guidelines which outline the general handling with IBM Connections. They often include aspects such as the ownership of content, responsibilities, confidentiality, data protection and etiquette. However, they are missing content management aspects such as how long to keep files, when to delete and what to delete and are rather high level, not outlining the real process. Furthermore, *“guidelines are often seen as universal remedy and only describe what is not possible within the system and what should not be done by the user”* (statement of one participant). They *“address the staff level, are getting longer and longer, but are mostly not read and wanted by the users”* (statement of one participant) and seen as irritating. Further, guidelines need to be updated, managed and read by all employees.

However, with the development of guidelines certain questions needs to be thought of and described. Therefore, they can be very useful in a first step leading to management activities. It is important is to differentiate between legal guidelines, etiquette and data protection guidelines, which describe how to use a system. These are often mixed up.

8.2. In-Depth Interview & Case Study

Two interviews have been conducted within this study which were used in two different ways. First, they enabled the development of a case study on the implementation of ECS and provided insights into document management in general and SBD management in particular. Second, it offered the possibility for an in-depth coding, building categories and facets, which give insights into the document management landscape and especially into challenges and actions of managing SBD. Even though both outcomes partly used the same data, different objectives were addressed.

8.2.1. Interview & Case Study Objectives

The case study aimed at creating a broader picture of ECS in use as well as comparing traditional digital document management practices with those used for Social Business Documents. The case study therefore was separated into two parts. The objective of the first, base case part was to:

CS-RO1: investigate the bigger picture of ECS in organisations including the questions of how ECS are integrated in the organisational day-to-day business, what the aim of the introduction of an ECS is and how it is used in order to understand the environment of Social Business Documents.

The objective of the second, document management case part was to:

CS-RO2: identify general digital document management practices in comparison to Social Business Document management practices.

CS-RO3: investigate requirements, challenges and actions for managing Social Business Documents.

Furthermore, the coding of the second, in-depth interview aimed at:

I-RO1: classifying the different document management aspects to build a landscape showing the areas of document management.

I-RO2: identifying Social Business Document management facets outlining the origin and purpose of document management.

I-RO3: investigating requirements, challenges and actions for managing Social Business Documents.

The interviews were conducted with Mr. Ralf Ortner of the KDZ (Kommunales Dienstleistungszentrum) Wiesbaden, who represents the case study site. He/his company was selected, as they belong to the early adopters of ECS and thus are already in a stage where they have recognized the need for managing Social Business Documents. Furthermore, they are interested in the document management domain per se as they are working in a highly regulated business field. A detailed description of the company and its characteristics can be found in the basic case study description in appendix A. Because of all these characteristics, the KDZ and Mr. Ortner build a perfect key case example with enough knowledge in the document management and ECS area for getting deep insights.

8.2.2. Interview & Case Study Outline

The interviews were mainly based on the previously outlined research objectives. However, they further took into account the findings of the focus group conducted previously. The first interview took place on 18th September 2015 and lasted for about 4 hours. It built the basis for the first part of the case study, the base case. The second interview took place on the 17th June 2016 and lasted for a bit more than 5 hours. This second interview first clarified open issues from the first interview, but mainly focussed on document management aspects, which were then used for writing the second part of the case study focussing on DM, as well as for the coding. Figure 53 outlines the different steps of the two interview phases and their outcomes.

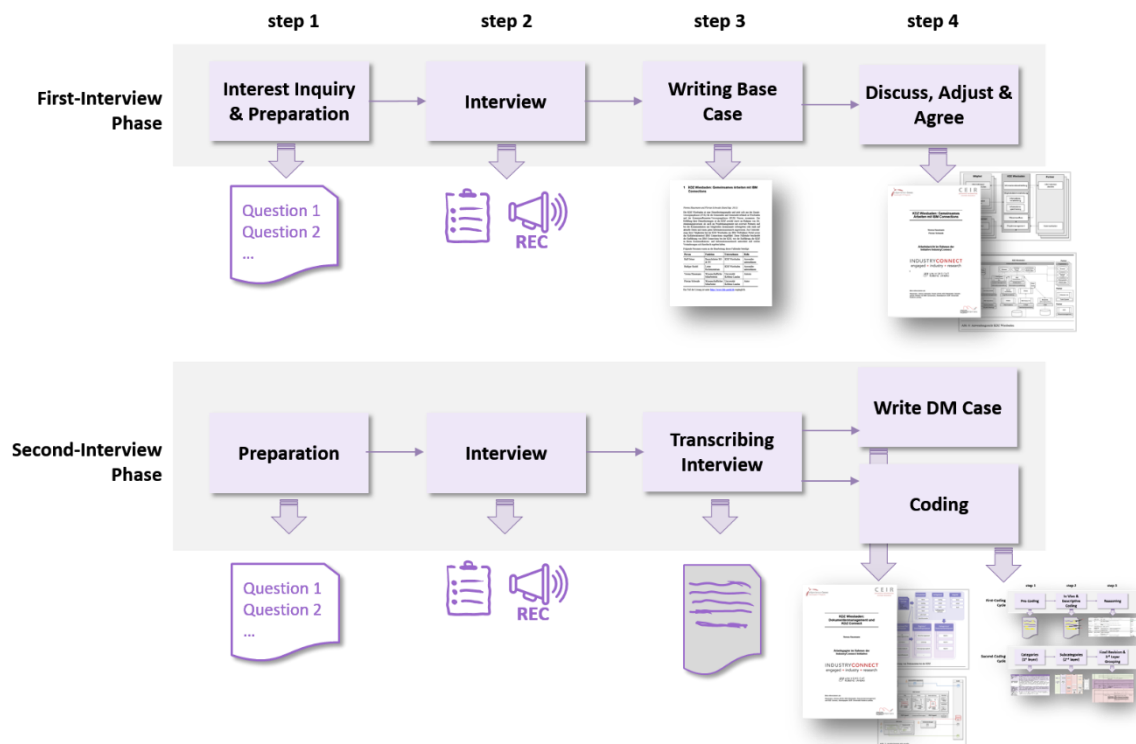


Figure 53: Interview Steps

Both interview phases started with the preparation of questions that were used to guide the semi-structured interviews. Furthermore, both interviews were audio recorded and field notes were taken for the later analysis. With the data of the first interview, the base case was written, discussed with the case company and adjusted accordingly. In order to analyse and code the second interview, it was fully transcribed by the researcher, the document management case was written and the coding conducted. The coding was done by hand and no coding software was used.

Coding itself is a method (Weston et al., 2001, p. 382) which can be described as a transitional process within the analysis of a research investigation. It is one possible step to connect the data collection and the more extensive data analysis (Saldana, 2009, p. 4; Weston et al., 2001, p. 381). The general idea behind coding is to analyse text and from this analysis identify themes. A code, within qualitative investigations, is often a word or short phrase which represents an attribute for an expert of language-based data (Saldana, 2009, p. 3). Saldana (2009) separated the process of coding into two major phases, the first coding cycle and the second coding cycle. Processes around the initial coding of data are assigned into the first coding cycle. Within the second coding cycle, the codes are reorganised and further classified, prioritized, integrated, etc. Thereby more accurate words for the initial codes can be identified, some codes might be dropped and others merged together. This process, each including several steps and iterations, was also followed in this study (see Figure 54).

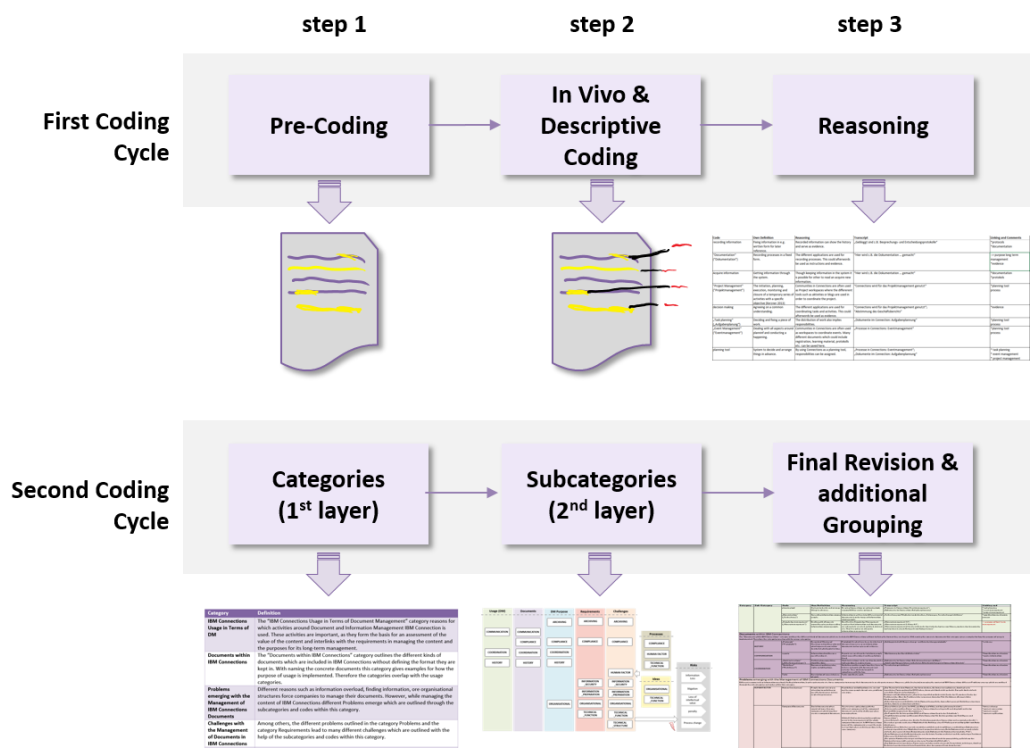


Figure 54: Interview Coding Process

First Coding Cycle

The first coding cycle can be divided into two different steps, starting with the pre-coding. By conducting the pre-coding the researcher went through the transcript for the first time, marking all words, sentences and whole paragraphs of the transcript which seemed to be of interest for the research in general. This also included aspects which are not directly related to the long-term management of documents and its challenges. However, this already reduced the text which had to be analysed and gave the researcher the possibility to better focus on the main aspects of the interview.

Within a second step the highlighted statements, including their context, were further analysed, now focusing on the topic of documents and their management. At this point two different kind of codes were written as comments into the transcript: in vivo and descriptive codes. In Vivo Coding (also called literal coding or verbatim coding) develops codes that are taken one to one from the direct speech of participants. They are highlighted in quotation marks and should represent the actual language used by participants. Within descriptive coding (sometimes also called topic coding) basic labels are assigned to data in order to create an inventory of topics covered in the text. At this point some codes were still rather unprecise, at different levels and partly mixed.

Therefore, the researcher conducted a third step within the first coding cycle and revised the codes of the second step respectively to improve and/or develop more precise codes. A coding table was established which included the names of the code, the transcript excerpt, a definition of the codes and a reasoning why the code is important. Furthermore, additional thoughts of the researcher were kept in the table as additional comments.

Second Coding cycle

The second coding cycle was conducted through pattern coding. Within Pattern Coding meta-codes are created in order to group and summarise codes and to establish themes (Saldana, 2009). Therefore, as a first step, the codes were sorted and categorised according to the areas they address. This resulted in the main categories which reflect the main goals of the interview to identify which documents are in IBM Connections and for what they are used, which issues and challenges their management entail and what is or should be done in order to address these challenges.

Following, a second step of the second-coding cycle was conducted in order to add a second category of codes, now focussing on the origin and/or the purpose the codes describe (facets). At the same time, further affiliations between codes could be identified leading to an additional grouping of some codes. The codes as well as the categories are further described in the next section and are further discussed in at the end of this chapter.

8.2.3. Interview & Case Study Data Analysis and Findings

As outlined above, there were two main interviews which resulted in two main outcomes: First, the case study documents and second, the codes. The first interview provided the data for the basis case study (see appendix A). The base case builds the foundation to understand how and why the collaboration system was introduced in the case company and also gives insights about how the system is currently used. There are no deeper insights into document management aspects. However, this case study provides background information, and validated the company to be a fitting and valuable company for further investigation with respect to document management as, for example, project management with external partners and knowledge management were their primary objectives when introducing IBM Connections and these objectives are highly connected to document management. The base case is not further described in the following.

The second in-depth interview was specifically focused on document management and provided the possibility to, first, write a separate document management case study (see appendix B) and, second, to derive codes for different aspects of document management. The codes could then be classified and give further insights into the issues and challenges of managing Social Business Documents as well as consequences for non-management.

Document Management Case Study

As described in the “KDZ Wiesbaden: Dokumentenmanagement und KDZ Connect” case study (appendix B), there are document management processes and a special system for document management and archiving in place at the case company. Traditional digital documents get classified within the three categories confidentiality, availability and integrity and are kept within a DMS. Different guidelines and instructions are in place, outlining what has to be done with documents. Furthermore, concepts for deletion and archiving have been developed and

are applied to traditional digital documents. However, the Social Business Documents kept in the collaboration system are nearly not managed at all. An additional tool is in place which offers the possibility to export Social Business Documents of the collaboration system into a PDF document so that the PDF can be transferred into the DMS. However, firstly, this tool does not work with/for all Social Business Documents. Secondly, not all components of the Social Business Document get exported to the PDF (see Figure 55). Thirdly, the export has to be done manually and people forget about it/are not aware of this and finally, the export only shows a special status as one point in time, not accounting for any changes that are done afterwards.

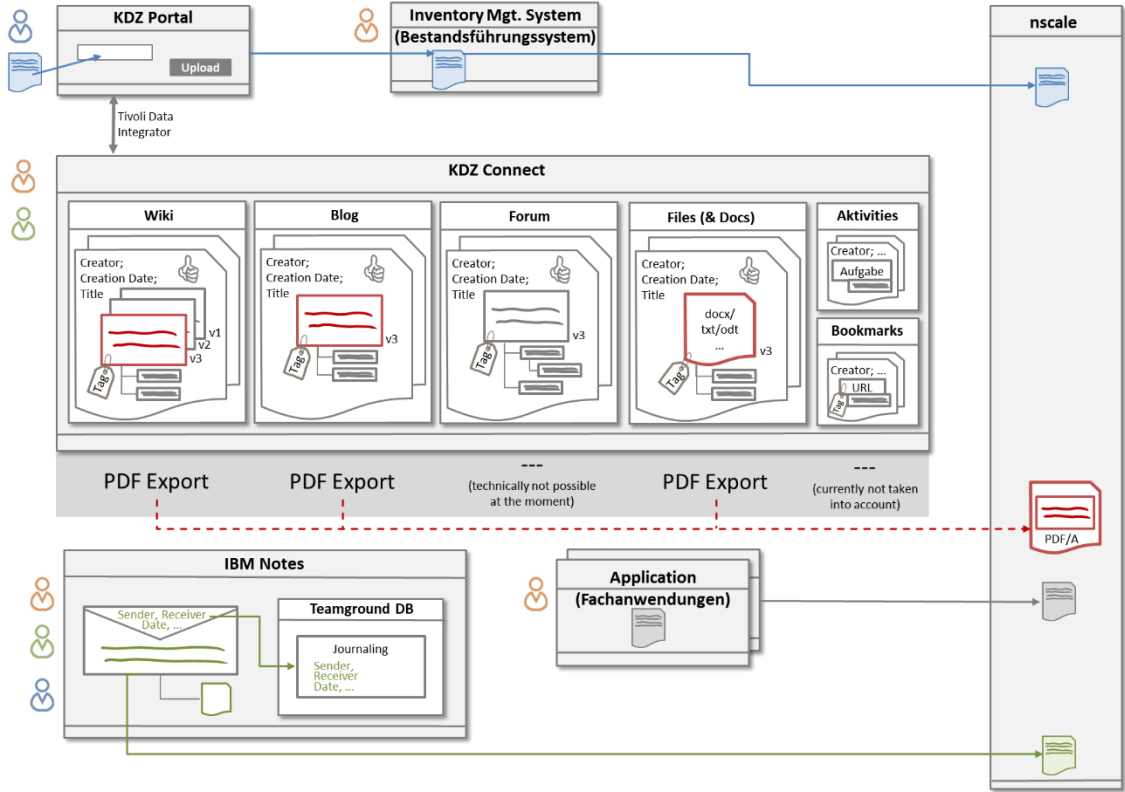


Figure 55: Archiving with nscale at the Case Company
 (adapted from the KDZ Document Management Case Study)

The case study also describes the value of the documents which are created and kept within the collaboration system. It is estimated, that the monetary value of the documents amount to a 6 or 7 digit amount and is represented by 20 to 30 man years within a system that has been in place for a bit more than one year.

The case company is aware of the value that is kept within their collaboration system and the need to manage Social Business Documents. However, the collaboration system should not become a document management system itself. As said by the participant: *“these are two different kind of systems, which both have their strengths and rights to exist”*. However, it should be possible to manage the content of the collaboration system without loss, if using a DMS. Within the case presented here, the company already started first action for the management (export to PDF), but they are facing several challenge further outlined in the coding below, which

they address with own ideas of what is needed for the adequate management of their Social Business Documents. These ideas are further described in Table 32.

Table 32: Interview Ideas for Managing SBD

Idea	Description
Subordinated Indexing	If every document in the collaboration system has a unique index, it would be possible to directly address the documents and this index could also be reused within a DMS.
Classification	Traditional digital documents are classified through confidentiality, availability and integrity. This should also be possible with content in the ECS so that they can be directly transferred into secure physical storage areas.
Keyword	An additional meta data item, the keyword, should be added to social documents. Different from tags, which can only be written in small letters and only consist of 1 word, keywords could be pre-defined and help within the classification.
Interface	The use of standardised interfaces for document exchange would help in transferring the ECS documents into the DMS.
Community Management	It should not only be possible to export a single document into a DMS, but also to address a whole community as an explorer folder which can get archived.
Management Dashboard	There should be an overview to see which communities are present, who is a member of them and which documents are not in use and/or should be managed.
Employee Training	Employees need to be trained in order for them to understand the need to manage documents adequately.
SBD Guidelines	SBD should be address in (separate) document management guidelines to make clear what needs to be done with them.

The case company expects that the longer and the more intensively they use their ECS the more needs they will have for the document management of their Social Business Documents. As there will be changes in law, such as coming with the EU Privacy Policy (GDPR), also new challenges will emerge. Thereby *“many questions still remain open”* (interview participant) and new questions will come, which all need to be addressed in the future.

Coding and Categories

Beside the direct insights/statements of the in-depth interview outlined above, the interview was transcribed and coded. This helped in identifying the individual aspects, which were addressed in the different areas, and in developing different classifications, which outline the broader area of managing SBD and also a classification of aspects which need to be addressed.

The first step of the first coding cycle resulted in 82 different codes with some statements being assigned to several codes (simultaneous coding). Refining these through the processes in the second and third steps resulted in a coding table, which comprises 101 individual codes, their descriptions and the corresponding transcript for verification. With the help of the second cycle, eight different main categories as well as eleven subcategories and five further groupings could be identified. These are further outlined below. The coding table including all aspects can be found in appendix C.

Table 33: Main Interview Categories – Document Management Areas

Category	Definition
IBM Connections Usage Reasons	This category contains reasons for which activities around Document and Information Management IBM Connections is used. These activities are important, as they form the basis for an assessment of the value of the content and interlink with the requirements for managing documents and the purposes for its long-term management.
Documents within IBM Connections	This category outlines the different kinds of documents, which are included in IBM Connections without defining the format they are kept in. By naming the concrete documents this category provides examples of how the usage reasons are implemented.
Purpose of long-term Management	The reasons why organisations should manage their social documents are summarized here.
Requirements for the Management of Documents in IBM Connections	Aspects of Document Management, which are needed to conduct a legally compliant, efficient and effective business are listed in the category requirements.
Challenges with the Management of IBM Connections Documents	While trying to manage SBD and to address the different requirements, different challenges emerge which are outlined through the subcategories and codes within this category.
Management Processes	Actions that have been taken in order to address challenges of managing SBD are listed here.
Management Ideas	This category outlines the ideas the participant has in how requirements, challenges and problems can be addressed.
Risks of not Managed Content	Negative consequences, which might occur through unmanaged content, are listed in this category.

Table 33 shows the main interview categories that outline the areas of Social Business Document management, which have been addressed throughout the interview. The areas thereby outline the aspects of SBD Management, which together creates a landscape-like picture (see Figure 56).

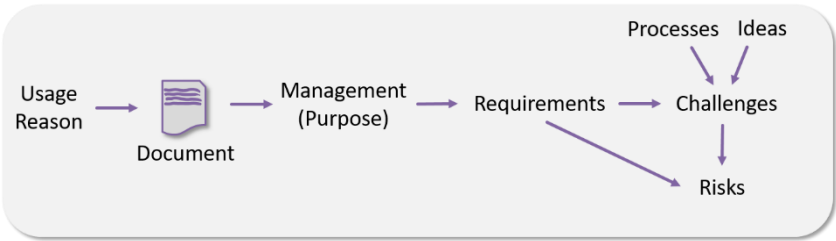


Figure 56: SBD Management Aspects Landscape

First, there are reasons, why an ECS is in use. These are brought together within the category Usage. Documents provide the medium, to support the goal of the usage. Because of different Purposes and Requirements, there is a need for the long-term management of Social Business Documents. However, while attempting to manage the documents, different Challenges emerge which are partly addressed through different management Processes already today and further Ideas are at hand, which could further support the management and address the challenges. Not managing the SBD and not addressing the challenges can lead to different Risks.

Even though first insights to the connections between the different areas/categories can be shown, they might not all be visible through the codes. This means that the codes can include a code within the category requirements without direct resulting in the stated challenge.

The category risks was not further classified. All other categories identified within the interview codes were further classified according to their origin and/or purpose they describe, building the facets of DM. These lead to 11 subcategories outlined in Table 34 below.

Table 34: Sub-Interview Categories – Document Management Facets

Subcategory	Definition
ARCHIVING	Storing documents for long-term retention.
COMMUNICATION	<i>“Communication involves people exchanging messages with people”</i> (Williams and Schubert, 2011, p. 4). This subcategory implies the goal to spread information to people to inform them and/or the documents which are used for the communication.
COMPLIANCE	Aspects which need to be taken into account in order to be in accordance with legal and organisational requirements.
COORDINATION	Williams and Schubert (2011, p. 4) define Coordination as <i>“the functions and activities that support the orchestration of work and tasks”</i> . The codes in this subcategory reflect these activities themselves and/or the documents that support these activities.
HISTORY	The History provides information about past events and can serve as evidence.
HUMAN FACTOR	Challenges and problems which arise though people.
INFORMATION_SECURITY	Activities and aspects to protect information from unauthorized access and use and protect it from danger and threat.
INFORMATION_PREPARATION	Adding additional information and/or aligning information.
ORGANISATIONAL	Challenges and problems which arise through the conditions of the company as well as aspects of the purpose for managing SBD.
TECHNICAL_FUNCTION	Challenges, problems and requirements with the operation of the system itself.
TECHNICAL_STRUCTURE	Challenges, problems and requirements with the system setup and/or its construction.

Beside the document management areas and facets outlined above, further affiliations between some codes have been identified (see Table 35). These groupings can be found within the aspects. They should not further classify the codes, but show additional connections between codes.

Table 35: Additional Grouping of Interview Codes

Grouping	Definition
Regulations, Guidelines and Specifications	Guidelines etc. need to be taken into account when thinking about the management of content. On the one side they outline legal obligations (law) and on the other side they can assist users in an adequate handling of the system.
Protect Documents	Keeping information of people safe from harm.
Classify Documents	Groups documents which have shared characteristics and classify them in order to be able to address them.
Content Transformation	Different activities to transform documents to another system or into another format.
Responsibility	Having a duty to deal with something.

The following picture (Figure 57) summarises the codes and shows which aspects emerged within which area and outlines the risks-codes.

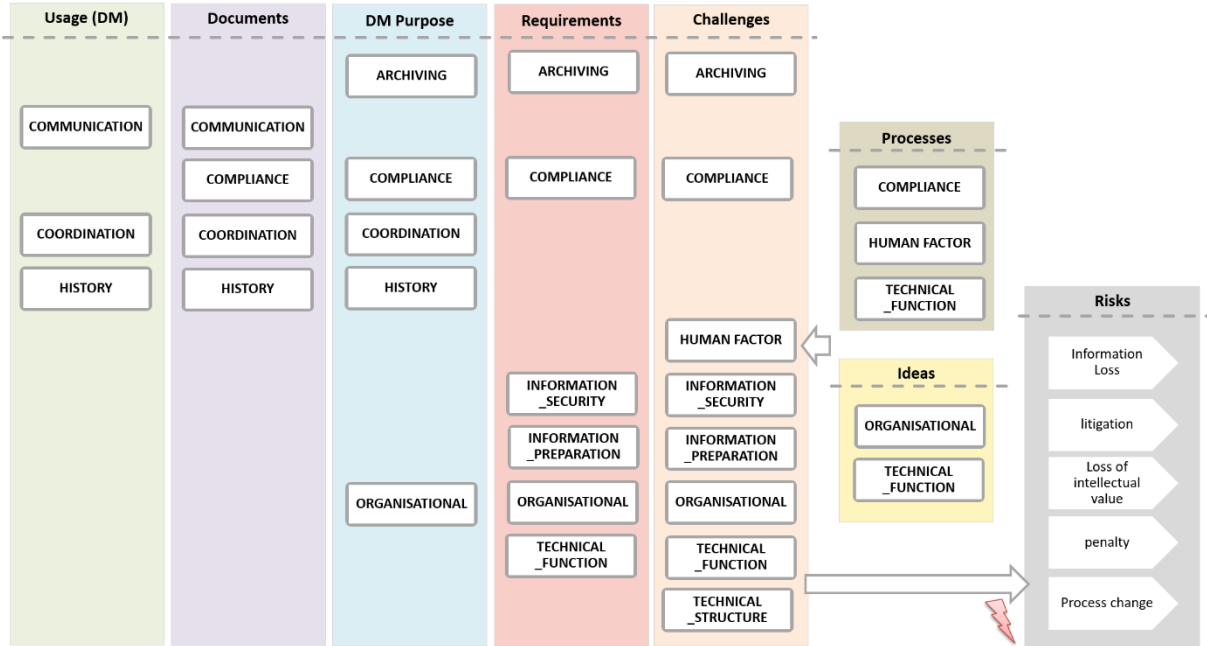


Figure 57: Areas (categories) and their Facets (sub-categories) Occurrence

The listings of areas and facets above are only the results derived from the in-depth interview and are not seen as complete for the whole domain of the long-term management of Social Business Documents. All aspects are expandable.

As the focus of this dissertation is on the challenges and how to address them, within the following the codes and/or groupings of the requirements as the source for challenges, the

challenges itself, as well as the current processes and ideas as solutions to address the challenges are listed:

Requirements:

- Data access/rights management; user management
- Compliance and legal conformance
- Preservation
- Deletion obligation
- Regulations, guidelines and specifications
- Indexing
- Auditable
- Sensitive data management
- Information security; content protection
- Availability
- Confidentiality
- Integrity
- Findability
- Risks management

Challenges:

- Human carelessness
- Acceptance
- Compound documents
- Inflexible system structure
- Technical consistency
- Storage location
- Data storage structure
- Reorganisation of content
- Content re-use
- Content transformation
- Software interface
- System integration
- Insufficient functionality
- Data exchange
- Information consistency
- Currentness
- Responsibilities (liability, ownership, stewardship)
- Transparency
- Duplicity
- Durability
- Business complexity
- Capture metadata
- Implementing document life-cycle
- Implement retention periods
- Classify documents (availability, integrity, confidentiality, document type and class,...)
- Legal adjustments

Processes:

- NDA (Non-Disclosure Agreement)
- Usage policies
- Removing users
- Standardisation
- Content conversion
- Content export

Ideas:

- Holistic view
- Guidelines
- Dashboard
- Indexing
- Assigning key words
- Capturing metadata

The requirements for SBD reported in the case study mostly match with the requirements identified for other digital documents. However, what can be seen is that the number of challenges is quite high and the challenges themselves are quite diverse, leading from human-facing aspects (e.g. acceptance) over technical aspects (e.g. system integration) to information-facing aspects (e.g. capture metadata) confirming, but also expanding the previous gathered findings from the literature.

In terms of current processes conducted within the area of Social Business Document management, only few initiatives could be identified. However, especially through the content conversion and export into a DMS a major step to SBD management is performed.

A further discussion of the case study and interview findings can be found in section 9.1.

8.3. Questionnaire

As the final and broader data collection method of this dissertation a questionnaire is used in order to consolidate and deepen the findings of the previously conducted literature analysis, focus group, case study and tool & document analysis. Therefore, each question of the questionnaire itself is derived from earlier findings of this study.

8.3.1. Questionnaire Objectives

The modelling identified the nature and structure of SBD and revealed first challenges associated with the management of SBD. However, these impressions only come from the system perspective. What is missing is the organisational viewpoint. Therefore, the overall aim of the survey was to get further insights into current challenges and processes within the management of Social Business Documents from the organisational perspective. While the focus group and case study already identified preliminary aspects, the questionnaire now verifies whether the identified system issues are more widely relevant in practice and further deepens the SBD management view by practitioners.

Therefore, the following research objectives were developed for the questionnaire:

- Q-RO1: Value
Identify if companies store 'management worth/needed' documents in their ECS.
- Q-RO2: Management
Investigate current processes and practices for managing Social Business Documents.
- Q-RO3: Challenges
Investigate current challenges in managing Social Business Documents.
- Q-RO4: Needs (actions)
Identify which information and processes are needed for the management of Social Business Documents.

The participants who answered the survey represent individuals of different companies with responsibility for the ECS IBM Connections within their corresponding companies. With most questions, participants were asked to answer the questions from the perspective of their whole company. However, more than one response from each company was welcomed, to account for the fact that the respondent would not always know the answers for the company as a whole and some questions asked for the personal perspective as it was expected that different people might know different procedures in their company and that they might face different challenges.

8.3.2. Questionnaire Outline

The three-phase process including the 10 different steps, which were needed to accomplish the questionnaire, are shown in Figure 58.

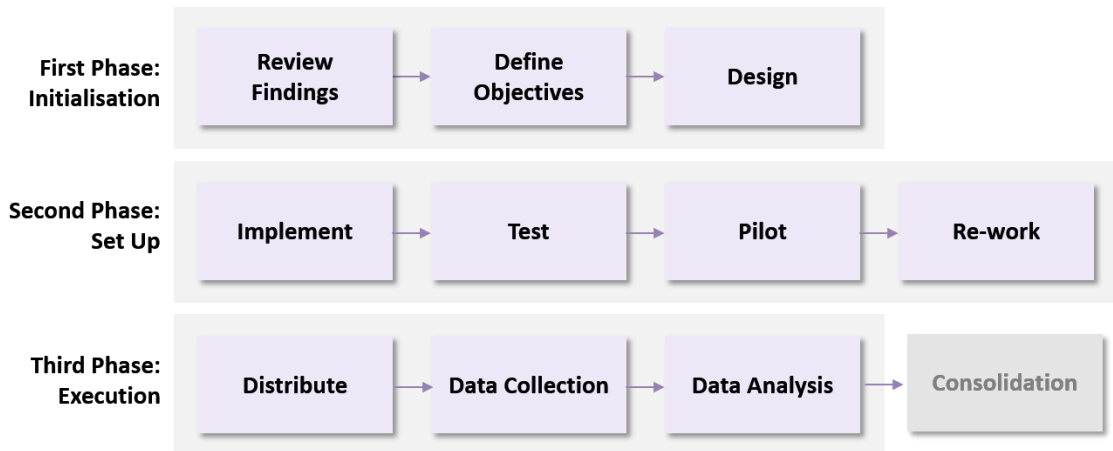


Figure 58: Questionnaire Steps

First Phase: Initialisation

Within the first phase, the logic for the survey was developed. Therefore, the findings of the previously conducted data collection methods were reviewed in order to extract relevant issues, as well as open questions around the long-term management of Social Business Documents. Following, the objective of the survey were defined, mapping the research needs. Finally, the questions were developed accordingly and the questionnaire itself was structured and designed.

Second Phase: Set Up

After the questionnaire had been developed, it was implemented using the open source survey application LimeSurvey® and was tested by the researcher. As different questions only appear according to the answers that have been given before the testing was mainly aimed at the technical implementation. The practical and content testing has been conducted through a pilot survey among ECS researchers within the University of Koblenz-Landau. The results of the pilot round have then been analysed in order to verify if the question structure and answers give the possibility for an understandable and valuable outcome. According to the findings, the survey was partly re-worked and finalised.

Third Phase: Execution

The link to the questionnaire was sent to participants via a collaboratively used community in IBM Connections. Therefore a blog entry was written and a notification to the participants was sent via email from within IBM Connections. Several weeks of data collection followed in which the researcher send one reminder to answer the questionnaire. Finally, the collected data was exported to Microsoft Excel and then analysed by means of graphs and written text in this dissertation. The final consolidation and discussion of all gathered data follows in the next chapter.

As the survey was targeted to German speaking organisation, the questionnaire was also in German. The full questionnaire is attached to this dissertation in appendix D. In total, the questionnaire comprised a maximum of 18 questions, dependent on the answers given in between. The questions thereby are structured according to the research objectives and are thus organised into the following four thematic and one demographic sections (Table 36).

Table 36: Questionnaire Structure

Question Groupings	No. of Questions
Value of Social Business Documents	6
Document Management Processes	5
Challenges	1
Needs	3
Participant Information	3

Furthermore, the questionnaire started with an introductory text, outlining the background of the survey, its aim and condition as well as contact details of the researcher.

Table 37 provides an overview of the questions translated into English and indicates, where the different answer possibilities derived from/ how they are mapped to the previously consolidated findings. More details about the different sections, as well as each question is outlined within the analysis in section 8.3.3.

Table 37: Survey Questions and their Origin/Reasoning

Question	Origin/Reasoning
1 Do you, among others, save the following information in your IBM Connections?	Answer possibilities derived from literature, focus group and interview.
1a Is the information just selected ONLY saved in IBM Connections?	If the information is also saved somewhere else, it might be managed there.
1aa Is the information critical for your work so that you would not be able to work without it for a longer time?	Further clarifies the importance/value of the information.
4 Do you have a business continuity plan in your organisation?	Addresses, for example, if the company is facing risk in general.
4a Is the content of IBM Connections included in this plan?	Shows how far ECS content is included in the organisation’s strategies.
6 Do you exchange information with external partners through IBM Connections?	Further pressures the importance for SBD management, if the answer is yes.

7	Are or have the following activities been conducted with the documents and information stored in your IBM Connections?	Answer possibilities derived from general reported DM activities in the literature.
7a	Where do these “rules” that trigger these activities derive from?	Classifies SBD management into the overall DM practices. Answers from literature insights and interview.
7b	How are the conducted activities implemented in your system?	Open question deriving from the previous question.
10	Do you conduct any further/other activities to manage SBD or do you know of others who do?	Open question to give participants the possibility for further elaboration on the topic, if anything was missing in the questions before.
10a	What kind of activities are these?	Open question following from the previous question.
12	In the just outlined situation, do you see any of the following statements as challenges? If you have not thought about one of the points, just do not answer it.	Answer possibilities derived from tool analysis as well as focus group and interview.
13	Through the different discussions in IndustryConnect different aspects appeared which represent needs in the management of SBD. Which of the following aspects is required, desirable or not needed for your work and the management of IBM Connections content? This question is independent of whether the need is already addressed somehow.	Answer possibilities derived from tool analysis as well as focus group and interview.
13a	From your perspective, which of the following aspects should be included or not included in Document Management guidelines?	Answer possibilities derived from literature and guideline analysis.
15	Finally, is there anything else you would like to tell us in terms of Document Management in IBM Connections?	Open question to give participants the possibility for further elaboration on the topic.
16	For which company are you answering the questionnaire?	Gives the researcher the possibility to map the answers to the company size and time of IBM Connections usage which is already known.
17	What is your name?	Possibility for inquiries
18	Do you know any other person who should speak with us about the SBD management?	Further possibility for data gathering

At the end of the data collection phase all data was transferred to a spreadsheet and organised for analysis. The results are shown in the next section.

8.3.3. Questionnaire Data Analysis and Findings

The survey itself was conducted between the 19th of December 2016 and 23rd of January 2017 addressing participants of a wider research project around Enterprise Collaboration Systems. This included 22 different companies represented by 33 individual persons. Of this, 20 people from 16 different organisations completely answered the survey. This accounts for a response rate of 61% in terms of people and 73% in terms of companies which have been reached.

Participant Information

Even though participants were asked to submit their contact details for inquiries (see question 16 and 17) as well as contact details of employees they might find appropriate to be asked as well (question 18), all data was anonymised in the analysis so that no individual persons or companies can be identified from the results.

The main target country was Germany, but two Swiss companies were also contacted of which one responded. The responding organisations are located in different industry sectors ranging from manufacturing over financial to other service activities and employ between 85 and about 300.000 people. Their common denominator is the usage of IBM Connections as an Enterprise Collaboration System. The respondents are individuals with a primary job responsibility for IBM Connections.

Value of Social Business Documents

The section 'Value of Social Business Documents' included a maximum of six questions. Respondents were asked to identify which of the presented documents they capture in IBM Connections. The given answer possibilities are selected according to the previously gathered findings and were limited to those documents that should be managed because of legal reasons or organisational value.

Therefore, the first question in this section asked participants if they save any of the given information in their ECS. As can be seen from Figure 59, nearly all respondents save reports, work instructions, meeting minutes and guidelines within IBM Connections. However, documents such as contracts or employee-related documents, which represent more formal documents, are less often saved within the system. Furthermore, the highly regulated financial tax documents are not included in IBM Connections at all in any of the responding companies. Especially this last finding is not surprising, as tax and employee-related documents, for example, often are assigned to standardised workflows and are handled through other systems such as ERP or HR systems. Reports or meeting minutes in contrast are often used for getting information or build the basis for emerging tasks. They are not as standardised as bills, for example, and therefore can easily be saved through a Social Business Document.

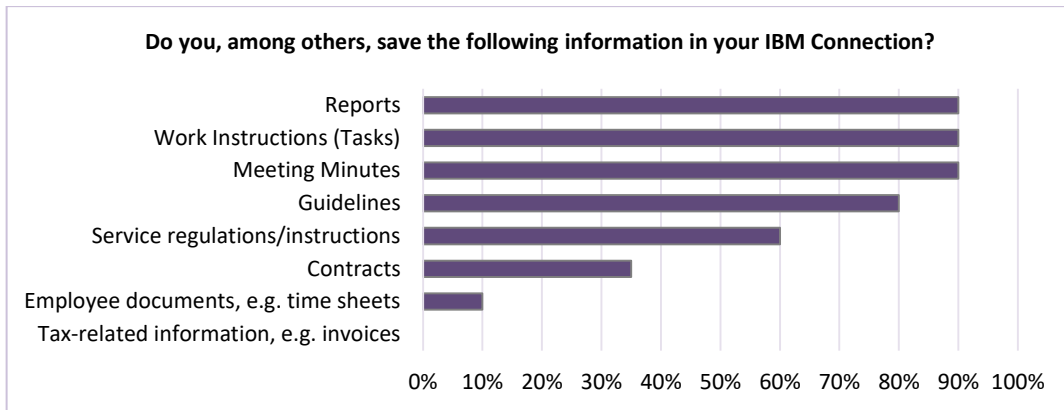


Figure 59: Documents saved in IBM Connections
(N=20)

In order to understand the need for the management of documents saved in IBM Connections it was further asked whether the selected documents are only saved in IBM Connections. All the documents in question need some kind of management processes, for different reasons such as regulatory compliance. Therefore, if also saved in another system, it might be possible that the documents are managed there. If only saved in IBM Connections, they need to be managed in the ECS accordingly.

As can be seen from Figure 60, most documents are not only saved in IBM Connections. In particular contracts and other employee documents, which represent legally binding documents and are connected to information protection aspects such as data security and privacy, are not exclusively stored in IBM Connections. In addition, evidential documents such as reports and meeting minutes are largely duplicated somewhere else. Only service instructions (45%) and guidelines (33%) are often only at hand within the collaboration system.

However, nearly every company has one of the questioned content types only saved in IBM Connection which leads to the need to identify these documents and address them with appropriate document management processes and activities.

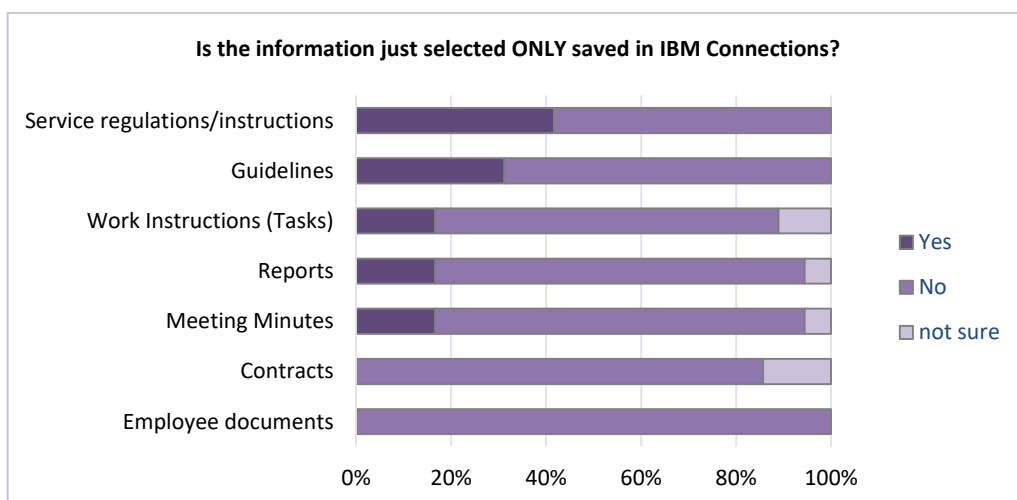


Figure 60: Exclusive storage of documents
(N=20)

The question in Figure 60 reveals another document management problem. It shows, that much information is stored in two different places which can lead to issues in terms of originality, actuality (versions), etc. Taking a meeting minute saved as a wiki as an example, the wiki entry is created and saved within an ECS. Over time, the entry is edited and different versions develop. Furthermore, people comment the entry. As some point in time, the entry is seen as finished and is transferred as a PDF into another system (as with the case company). However, what happens, if the entry is edited again in the ECS or new comments emerged? This question was not further investigated in this study, but should be analysed in future research.

Besides the legal necessity to manage Social Business Document, participants were asked whether the content which is only saved within their ECS is critical for their daily work, in order to also assess the operational necessity. The answers revealed, that especially tasks are important for all (100%) participants. Additionally, reports and meeting minutes are seen as critical for the daily work by 60% of the participants. Thus, if the ECS would not be available for some time, or the document of the ECS would be lost, not all employees could go on working. This again shows the importance of SBD.

In terms of the integration of social content into the overall organisational strategies and procedures respondents were asked whether or not their company has a business continuity plan and if yes, whether the documents of IBM Connections are included in this plan. The answers revealed that even though more than half of the organisations have a business continuity plan, only 12.5% address IBM Connections documents in there. These findings support earlier findings of Hausmann and Williams (2016) stating that SBD are not yet included in organisational-wide strategies, even though the earlier questions revealed their importance.

Finally, the section ended with a question about the internal and external usage of the participants' ECS, as the usage with external partners would indicate a further need for document management. Thereby 81% of the organisations indicated that they exchange information with external partners through IBM Connections. However, the cases where more than one person from one organisation answered the questionnaire it further showed different answers for the same company. This indicates, that even the persons in charge or highly connected to the ECS do not fully know what is done with the system and the amount of managing-worth documents could even be higher.

Document Management Processes

Section two, included a maximum of five questions and built on the fact that there are SBD within the ECS which need document management processes. In order to answer this question block participants were asked to think about two typical organisational use cases 'team organisation' and 'project organisation' (Schubert and Glitsch, 2016). They further had to think about what they do over time with their information in communities created for these purposes and what happens with the information at the end of a project lifetime.

Following this, respondents were asked about the conducting of specific SBD management activities for their documents in IBM Connections. The activities were selected through a literature review of document management functions, as well as through the practical experience of the author with DMS. The answers in Figure 61 show that the function of versioning, which is directly supported by the system for some documents, is used by the majority of respondents. However, activities which need to be done manually such as adding additional metadata or deleting documents or activities that need additional technical support such as transferring the documents to another document management system are less often conducted. Analysing the answers per company reveals that 3 of the 16 companies do not conduct any document management processes.

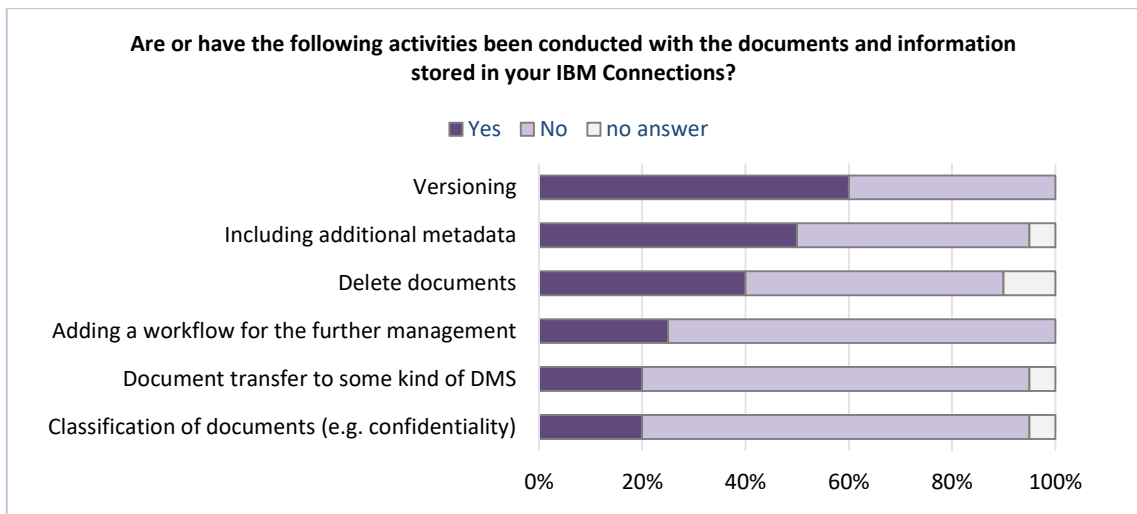


Figure 61: Performed activities
(N=20)

Those respondents who conduct any of the above outlined activities were further asked about the origin of the rules which trigger the activity. Figure 62 shows that most activities derive from individual's own initiatives or departmental rules and concepts (67%). For less than half of the respondents (47%) some activities are also addressed through the general document and archiving rules and concepts and only 20% have specific guidelines for social content implemented.

The high number of own initiatives and departmental rules and concepts, together with the fact that this survey was completed by specialists in the field of social collaboration, who have an increased awareness on topics relating to the use of the ECS could indicate, that most ECS users are unlikely to perform any document management activities.

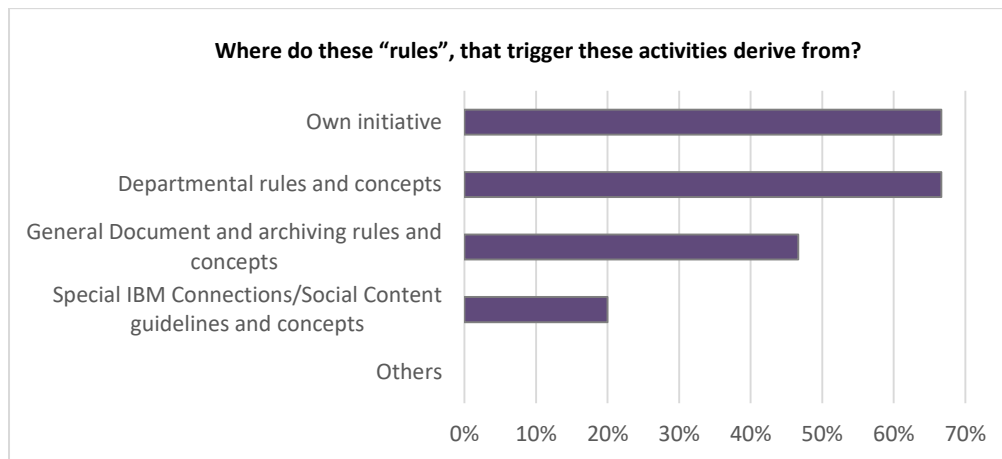


Figure 62: Origin of document management activities
(N=15)

As many of the activities asked for above include some kind of people activity and/or because the specific function is not implemented in IBM Connections per se, respondents were finally asked through open questions how the conducted activities are implemented and if they conduct any further activities. Thereby the following answers were given:

- *“Workflow: Via commenting or wiki entries.”*
- *“The projects groups and their leaders are using communities as storage for all kinds of projects and documents. By now it does not make sense to save the data somewhere else additionally. We as the users need to assume that project data will be available for the long term.”*
- *“No central management or control. Information anarchy”*
- *“Versioning as the standard functions, Metadata as tags”*
- *“Completely different”*
- *“Instruction. No technical implementation.”*
- *“Filing in folders and folder structures; allocation of rights on the folder and document level.”*
- *“We have a central community management which addresses the following topics: community clean-up (inactive communities), community gardening, training about community management,...”*

The different answers show that there is no uniform approach for the conduct and implementation of document management activities. Every company has, if at all, its own approach and within a company there does not seem to be any continuous processes for SBD management.

Challenges

Besides the currently conducted Social Business Document management activities and in order to understand the current challenges organisations are facing with Social Business Document management respondents were asked, if they see any of the given statements as challenges.

Figure 63 shows the results of this question. Combining the responses for “big challenge” and “challenge” it becomes clear that, besides the fact that when downloading or printing SBD some information gets lost (Export), all other statements are challenges for more than half of the respondents. More precisely, as also illustrated in the response possibilities in the questionnaire, these are:

- *End of lifecycle*: With Social Business Documents, it is, for example, very difficult to determine when a document is "finished" or "completed", and thus can be archived.
- *Awareness*: Employees do not think about the fact, that documents of IBM Connections should be managed.
- *System integration*: It is not possible to simply transfer the documents to another system.
- *Status information*: Documents and communities cannot, for example, be classified into active and passive.
- *Responsibility*: The responsibilities for different documents are not clear.
- *Missing metadata*: People do not have all the information to decide what to do with a document.

The creation of awareness for the management of Social Business Documents is considered a challenge by 90% of the participants. One reason for this can be the social character of the documents, which often makes them seem more informal. In addition, SBDs are often not directly integrated into workflows, even though they are becoming more and more important for them, and are therefore not considered as worth managing. With 76%, the second most often ticked challenge is the determination of the life cycle of an SBD. In order to delete a document, for example, it must be clear when the document reached the end of its life cycle. However, this provision is very difficult for SBD, and is a major challenge since it can theoretically be worked on or commented on for an indefinite length of time by different users.

The lack of metadata as well as the integration with other systems are also seen as a challenge by 71% of respondents. As described in the previous paragraphs, tags are partially used to add additional metadata. However, tags are freely selectable and it is not possible to specify which additional data should be captured. System integration, which sometimes get difficult through missing interfaces, can also be helpful in the management of SBD, since the documents could then, for example, be managed through a DMS. However, the problem of exchange or communication between the systems outlined previously must be considered.

All in all, this question shows, that there are both challenges in the organisational area, such as the creation of awareness or the definition of responsibilities, as well as in the technical area in which interfaces and functions have to be created.

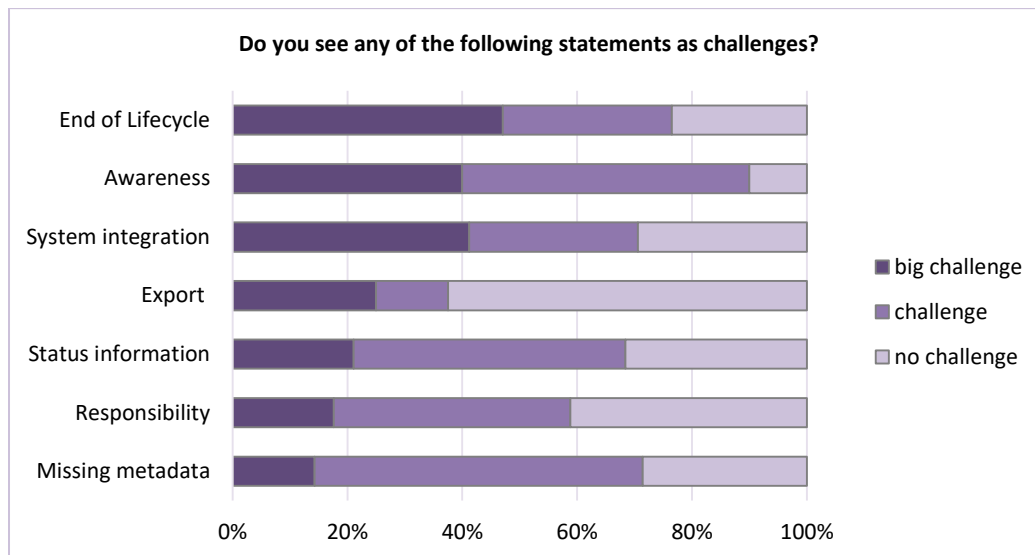


Figure 63: Document management challenges
(N=20)

Needs

The last question block addressed further actions for the management of IBM Connections documents, which have been named by individual companies in the previously conducted research steps and have now been questioned to all addressed companies. Respondents thereby had the possibility to select whether they see the following statements as required, desired or not needed:

- *Integration*: It should be possible to exchange documents between different systems.
- *Community management*: It should be possible to manage (for example, archive) entire communities.
- *Determine the leading system*: If several collaboration and/or DM systems are in use, it should be decided which the leading system is.
- *Restore documents*: Deleted documents should be recoverable.
- *Export of documents with all components*: It should be possible to create a document for exportation which includes all its components, (e.g. a wiki entry with all comments and attachments).
- *Responsibilities*: Responsibilities should be clearly defined.
- *Guidelines*: There should be guidelines for managing social business documents.
- *Combine and exchange documents*: It should be possible to exchange and link documents between applications (for example, a wiki and a blog) and between communities.
- *Audit trails*: The history of the documents should always be saved (e.g. who created, when, what was changed, etc.).
- *Freeze documents*: It should be possible to mark documents as no longer editable (not editable and not expandable, e.g. by comments).
- *Employee training*: Training should take place with regard to the duties and the process of management with SBD.
- *Status functions*: It should be possible to, for example, categorise documents and communities into active and passive.

- *Classification*: A classification of documents in, for example, confidentiality, integrity, and availability should be available.
- *Keywords*: It should be possible to use predefined keywords which can be used for classifying (unlike tags, keywords can also be capitalized and pre-defined).
- *More metadata*: It should be possible to create and save more metadata for documents within the systems.
- *Shutoff social features*: For individual documents it should be possible to switch off commentaries, likes, etc.
- *Automatic deletion*: It should be possible that documents can be deleted automatically (for example after a certain time).

As shown in Figure 64 the only aspect that is only requested by some participants, but not needed by many at all, is the functions to shutoff social features. Because ECS software supports collaboration this is not surprising. However, all other aspects supporting document management are either desired or even required by most (over 75%) respondents. Thereby especially the integration in terms of document exchange between different software systems as well as the decision for a leading system are the most prevailing actions together with the community management. What can also be seen is that four aspects – integration, combine & exchange documents, audit trails and the possibility for keywords (different to tags) – are marked as required or desired by all participants.

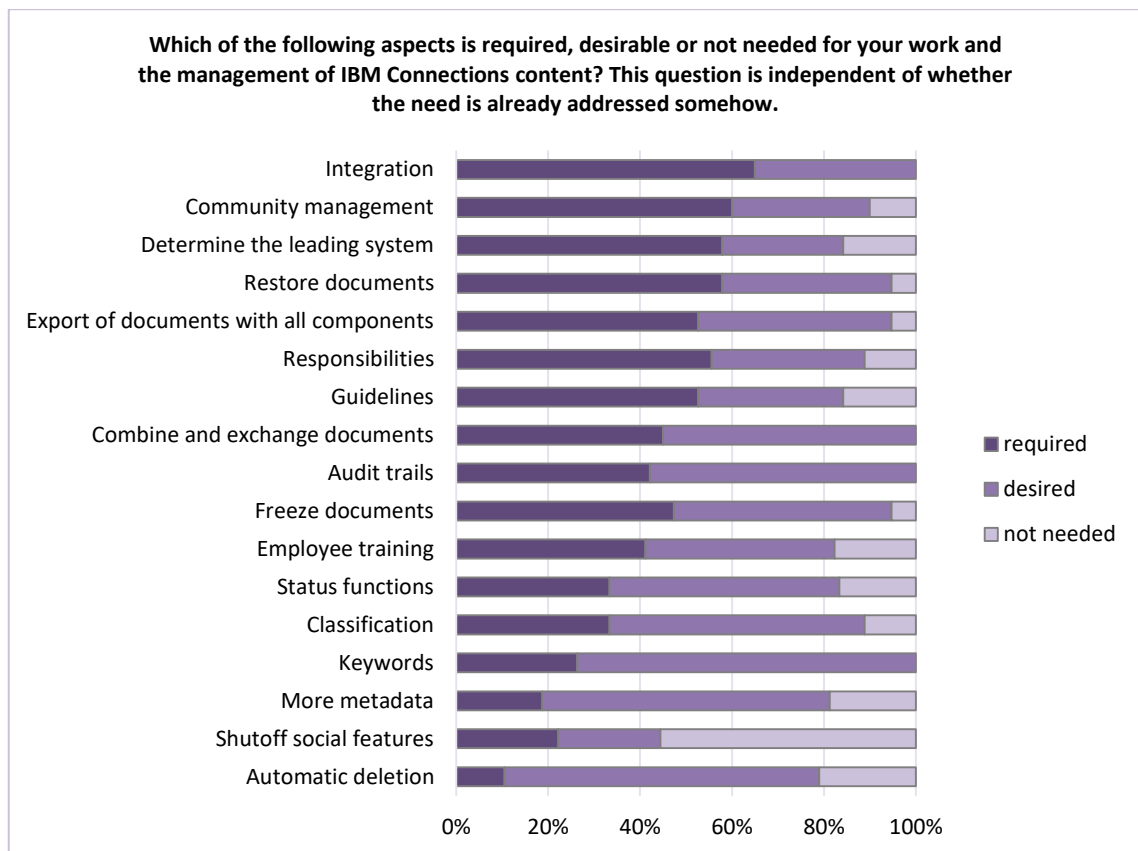


Figure 64: Document management needs
(N=20)

Those respondents who see the need (required or desired) for guidelines for the management of SBD were further asked which aspects should be addressed in these guidelines. All respondents answered that archiving procedures should be included. Furthermore, more than 75% of respondents also would like to see all the other questioned aspects in Social Business Document management guidelines (see Figure 65).

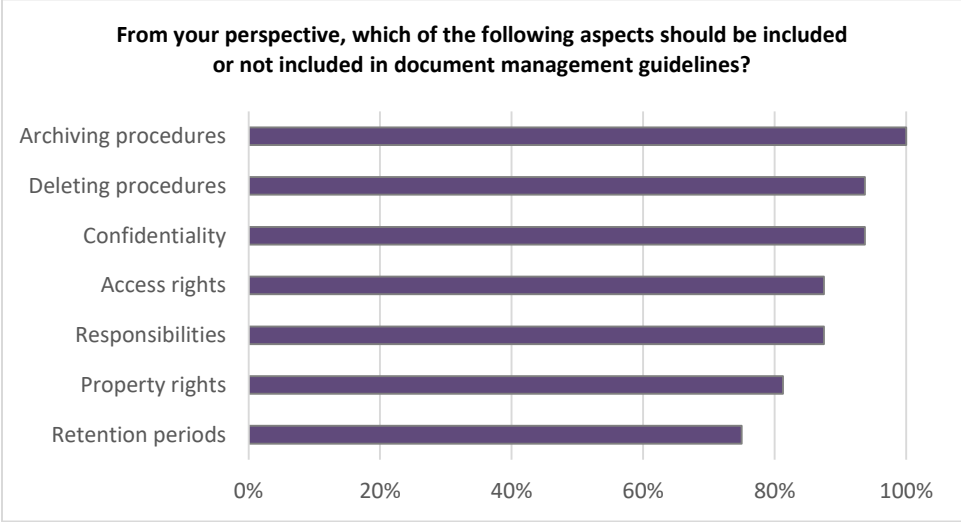


Figure 65: Aspects which should be included in SBD Management Guidelines (N=16)

Finally, participants had the chance to report any other thoughts they had in terms of the management of IBM Connections documents. Participants addressed the following issues:

- *“It should be possible to transfer the ownership of documents from within the user interface and not through the API or even database access (e.g. if responsibilities change or people leave the company)”*
- *“There should be a standard functionality implemented in the system, which offers the possibility to backup individual documents, but also whole communities.”*
- *“Important aspects are data security and parallel systems.”*

Chapter 9.

Framework Addressing the Long-term Management of SBD

The overall aim of this study is to identify current requirements, challenges and processes for the long-term management of Social Business Documents. This aim is accompanied by research objective 4's goal to establish a framework addressing the challenges of the long-term management of Social Business Documents. Throughout the previous chapters the requirements, challenges, current processes as well as possible actions have been outlined. Within the following the different findings are summarised and the connections between the different aspects are first outlined through a model. Furthermore, the different methods of analysis that were developed and the findings that resulted from the study are brought together in a framework. The framework takes into account the requirements and challenges organisations must be aware of and indicates actions that should be taken in order to establish the preliminary steps for the effective long-term management of Social Business Documents.

9.1. Implications: Discussion of Findings

The analyses of the three empirical activities have been outlined individually above. However, within the following the data and findings are now brought together and discussed. Table 38 gives an overview of the aspects addressed in each activity and also indicates where the literature review and the tool analysis have contributed.

Table 38: Contribution of Research Activities to the Different Topics

		Litera- ture	Tools	Focus Group	Case/ Interview	Survey
Value & Current Management	Usage Purpose	x	-	(x)	x	(x)
	Kinds of Documents	x	x	x	x	x
	Management Purpose	x	-	-	x	-
	Management Practices/Processes	x	-	x	x	x
Current Concerns	Challenges	x	x	x	x	x
	Risks	x	-	-	x	-
Actions	Needs	x	x	x	x	x
	Ideas	-	-	x	x	-

The discussion is separated into three different blocks. Section 9.1 discusses the value of Social Business Documents as well as the requirements, which both have an impact on the need to manage them. Further, this section also discusses the current management processes of organisations. Section 9.1.2 discusses the current management challenges of SBD already faced by companies. Finally, section 9.1.3 discusses the needs and ideas of companies through which the challenges can be addressed.

9.1.1. The Value, Requirements and Current Management of SBD

Determining the value of a document includes – among other aspects – the identification of the document content, the way it is stored, the purpose it is used for and its quality. Quality can be assessed through criteria such as accuracy, comprehensiveness, credibility, currency, pertinence, precision, relevance, reliability, simplicity and validity (Burke and Horton, 1988, p. 92f). It is beyond the scope of this dissertation to examine document quality as it is a very broad and complex topic that should be addressed by a separate research investigation. Furthermore, many of these aspects for value currently are challenges of SBD, which makes a determination of the quality of documents difficult.

However, some aspects have been addressed in the empirical investigations outlined above. In terms of the content included in Social Business Documents there appear to be no true boundaries and nearly everything that can occur in a company and can be fixed can be included in SBD. This includes documents for communication, compliance, coordination and historic reasons; representing activities such as planning, documentation and dissemination of information and decision-making. Even though highly regulated information such as tax-related information or employee data is (mainly) not stored in SBD, other documents such as reports, meeting minutes or contracts, which all are important for compliance aspects, are kept in SBD. Furthermore, work-related information such as tasks, guidelines or instructions, which are important for the conducting of daily business, is also included in SBD. Additionally, Social Business Documents are also often used for communication with external partners, which makes the documents valuable evidence of inter-organisational activities.

However, most often the documents are not exclusively stored as SBD in the collaboration systems, which leads to several concerns such as: duplicity, identification and actuality issues, as outlined in the next section, as well as questions about the value of the Social Business Document in the collaboration system. Furthermore, there are documents which are exclusively stored in the ECS and are of value. As has been clearly shown in the case study there is a potential loss, both in personal resources as well as in knowledge, if all the information saved in the ECS is lost and must be restored or recreated (as far as this is possible at all).

Overall, it can be summarised that Social Business Documents are of value for organisations for different reasons including their evidentiary and transactional qualities, which confirm the need for management activities including records and archival requirements. A citing of one participant further supports this statement by saying: *“The collaborative work on such really*

sustainable documents requires possibilities for long-term archiving. Only taking the documents this might be easy, however, taking into account for examples the comments: pooh... that is a tough job!"

As became clear through the focus group the way that information is stored in documents, thus through which kind of document, does not play a role in terms of their value. Instead of the format, the content is relevant for assessing the value. However, the format is important in terms of its management. As has been identified through the tool analysis there are different functions and components available for different kinds of documents. Therefore, it is important to know in which format a document is stored. The focus group and interview analysis identified that most information is stored in one of the following kinds of social documents (listed alphabetically):

- Blogs posts
- Files/Documents/Repositories
- Forum/Discussion posts
- Tasks/To-dos
- Wiki entries

Most of these documents are related to some kind of grouping/categorisation in terms of communities they are saved in and through which they are made available.

The kind of content and thus the value of documents imply a special need for their management in order to be able to keep and work with the documents. However, section 3.1.3 already outlined different requirements, forcing organisations to manage their documents. One of the information management principles thereby also requires compliance with operational requirements. In particular, the in-depth interview addressed and revealed the requirements for SBD management perceived by organisations (see section 8.2.3). Comparing these findings to the summary of requirements from the literature it can be seen that most are similar. However, new requirements could also be identified. One is the need for **indexing** providing documents with a unique identification. Another is the **auditability** of Social Business Documents. Even though this requirement can also be seen as part of the requirement integrity, it was explicitly addressed at different point in the empirical investigations and therefore should also be explicitly visible here. Furthermore, the requirement for **findability** was mentioned. While findability could be seen similarly to discovery it is separated here as discovery often is seen as the legal need to find information, whereas findability refers to the possibility of users to find documents during their day-to-day work. Finally, the overlying requirement for **risk management** which can be seen as one of the major aims of information management activities in general.

In order to address the requirements participants were also asked about existing processes for Social Business Document management. It was revealed that the management of SBD is not yet widely addressed in organisations. While some organisations have already implemented first practices others have not begun to think about the topic at all before the issue was raised through this research study. Within the following, the current practices are briefly summarised.

Versioning of documents seems to be the mostly widely used functional activity for managing SBD. One reason for this might be that the function of versioning is often a standard feature for SBDs such as wiki entries. However, taking for example IBM Connections, which is the system used by the participating companies in this research programme, a versioning function is only available for wiki entries. For blog and forum posts it is indicated that something changed, but it is not visible what changed. Therefore, even though versioning is widely used it is not used across all types of SBD and it is not actively and possibly not even deliberately executed activity.

More than half of the surveyed participants further outlined that they **add additional metadata** to their documents by using the tagging functionality. Tags might be a good way to capture additional information about the content, but they offer the possibility to freely add words and are not intended for structural metadata. Retention periods could be indicated by the use of tags, however it would be hard to include some kind of automated workflows with them. If doing so, some kind of thesaurus or similar would be needed.

Deleting documents is another activity performed by at least 42% of the questionnaire participants. However, except where further guidelines or instructions for the deletion rules are given, it is done rather randomly without a systematic process. Furthermore, the deletion is done manually, without any automation.

Aside from the activities outlined above, individual companies further perform additional activities. Thus, the case company **exports** many of their Social Business Documents by means of a content conversion into PDF files and transfers these into their Document Management System. However, there are several issues attached to this process including the information being current, the information loss and the need for a manual action, which are further outlined in the next section. The same company manages 'finished' communities, for example, by removing all members but one admin user at the end of the project. This ensures that the documents cannot be changed anymore, but also excludes their further findability and usage by all other employees.

Another company has developed a community management and a community lifecycle including aspects such as community cleanup (inactive communities), community gardening, training, archiving, etc. However, they are focussing on a community as a whole, not on individual documents. This can lead to challenges when, for example, dealing with different retention periods. Furthermore, these activities currently are in quite an early stage and are rather high level guidelines raising the awareness instead of clear process outlines.

Also aside from the actual functions that are performed within the systems, most companies have some kind of guidelines attached to the usage of their Enterprise Collaboration System. However, these guidelines mostly address aspects such as the ownership of content, responsibilities, confidentiality, data protection and etiquette, which are by no doubt important aspects, but do not directly address activities for the long-term management of SBD. Most of the activities performed come from individual initiatives or departmental rules and concepts

and thus it can be expected that only a few users are actually performing the activities; especially since the participants of this study represent the pioneers in this topic area of ECS usage.

9.1.2. Current Management Challenges of SBD Faced by Practitioners

“The introduction of social capabilities increases the work complexity, even though it promises the opposite” (quote of a focus group participant). Enterprise Collaboration Systems aim to support and enable collaboration. However, even though ECS might achieve this, they also place existing challenges around document and records management, archiving, etc. on a different level and furthermore lead to many new challenges, which militates in favour of the quote cited above.

The literature review and analysis already outlined different general document management challenges, which also apply to SBD. Furthermore, section 7.1 summarised the challenges arising through the characteristics of SBD and through the concept of records in section 7.2.

Within the following, the challenges as addressed by the different participants in the different activities (focus group, interview & survey) are summarised. Within their paper Hausmann and Williams (2016) developed a categorisation for SBD management challenges, which is hereby followed and which is further developed through the categorisation of DM facets developed in section 8.2.3. Table 39 summarises the different categories and shows examples for each category.

Table 39: Classification of SBD Challenges Identified Through Participant Insights

Category	Description	Examples
Documental/ Informational	Aspects arising through the characteristics and the content of documents themselves.	Compound documents; Document lifecycle; Status of documents; Missing information
Human	Aspects arising through the attitude or actions of people.	Awareness; Human carelessness; Acceptance
Legal	Laws and regulations influencing the management of documents.	Audit trail; Retention periods; privacy
Organisational	Questions which need to be addressed/decided by the organisation.	Ownership; Responsibilities; Knowing what to manage at all; Metadata; Classification; Currency; Duplicability; Document lifecycle; Status of documents
Technical & Functional	Construction and functional aspects of the way the systems handles documents as well as the possibilities for users to work with the documents.	Inflexible system structure; Missing or insufficient DM functions; System integration; Content transformation/ conversion; Community management; Status of documents; Metadata; Classification; Information security including availability, confidentiality and integrity; Compound documents

What can be seen from the examples is that one challenge can sometimes be assigned to more than one category (e.g. metadata, classification or status of document). The categories are not exclusive, but rather show the different areas where the challenges arise.

The Documental/Informational category describes challenges which emerge through the characteristics of the documents themselves as well as their content. This includes the challenges arising through their interactive nature, their possibilities for editing, their compound nature, etc. Many of the challenges in this category are connected to other categories and can also be grouped in another category. The document lifecycle for example is a challenge of the SBD themselves. It is hard to define in which state a document currently is and if it is finished at some point in time. However, it is also an organisational question to define the different states of the SBD lifecycle and a technical challenge to implement the different required functions in each stage as well as the possibility to indicate the different stages.

Within the category Human all those aspects are summarised, that deal with the attitudes or actions of people. Lyman (2002) addresses some of these aspects as cultural problems and outlines that people often do not recognise the historic value in the very pace of technical changes and asks the questions of *“how much to save, what to save, and how to save it”*. This could be confirmed through the insights gained through the different research methods. Many participants are not yet far enough in their thinking of what happens with the documents and information saved in their systems to think about the future, for example, how things will be in three or five years. ECS are just being introduced and more heavily used. The acceptance for the systems themselves is increasing, but many people are not yet aware of the need for content management. A later discussion with one of the focus group members, who at the time of the focus group did not yet understand the need for SBD management, for example, showed that only now that he experiences a case of non-compliance through changing the ECS system to a different version his opinion about the importance of SBD management has changed. Besides, the case study showed that many employees are still thinking in terms of individual documents and not about the whole process behind a document, which might be one reason for not seeing the importance of managing documents.

The different laws, regulations, guidelines, etc. addressing the management of SBD are grouped within the category Legal. There are challenges at hand though, for example, the privacy policy which gives *“compliance and risks management a completely new meaning”* (participant quote from case study interview). However, also the laws and regulations as briefly mentioned in section 3.1.2 lead to challenges in defining retention periods or complying with specifications for audit trails.

“Often organizations do not have a clear overview of what information they have, where it is stored or in which form it is kept. Thus they have insufficient knowledge about what needs to be managed in which way” (Hausmann and Williams, 2016, p. 57). The category Organisational brings together all the questions, which need to be answered by the organisation in order to be able to manage SBD. This on the one hand includes the knowledge of the own information, but

on the other hand also includes decisions needed to be made regarding the responsibilities, the classification or the time and process when and how a document gets managed.

Finally, the category Technical & Functional includes system-related challenges in terms of construction and functional aspects of the way the systems handle documents as well as their possibilities for users to work with the documents. Lyman (2002) outlines: *“Every new technology takes a few generations to become stable”*. Even though the ECS systems itself might be stable for their main purpose of communication and coordination support, they are still quite new and other systems such as ECM systems might not yet be ready to include SBD in the same way as they do traditional documents. This leads to many challenges in terms of missing functions or interoperability depending on where we want or need to manage SBD.

As has been outlined within the category Documental/Informational, many of the challenges are connected and thus, if thought completely through, could be included in all of the described challenges. To make this clear, the following example scenario is given, partly reflecting what has been described in the case study. If a company decides to manage its SBD within its Document Management System, several challenges arise. First, it needs to be decided at what point in time a document gets transferred to the DMS (Organisational). If this decision has been made, currently a person has to be aware of the need to transfer a specific document (Human) and has to transfer the document manually (Technical). Thereby, it is converted into another file format as for example PDF. However, through this conversion some information such as components, additional metadata and version can be lost (Documental/Informational). Furthermore, the conversion can lead to problems in terms of validity (Legal). Besides, the document is now duplicated and available in two different systems and it can still be commented, for example, in the ECS.

As this example shows, one challenge often needs to be seen from many different perspectives, in order to identify all its different facets and the different challenges are highly connected to each other.

9.1.3. Needs for Actions

Beside the requirements, which can also be seen as needs, why specific management activities needs to be conducted and challenges arise, participants discussed and were asked about actions and functions which are needed in order to address the challenges. Within the following, these needs for actions are summarised. Thereby, a classification into two different groups: organisational & human and technical & functional actions is developed and used.

The category organisational & human includes those actions which need to be addressed through the employees of an organisation and which represent challenges in uncertainties of processes, procedures, etc. Technical & functional needs in contrast represent those actions that are addressed in regards to the systems and where changes within the systems are needed. However, most needs for action have two sides, one organisational/human and one

technical/functional and thus apply to both categories, but the categories will help in outlining both perspectives of one need for action.

The need to manage Social Business Compound Documents as a whole, with all its components, is an example of such a hybrid need. On the one hand, it requires system functions which apply to the whole document and, on the other hand, it also requires a company to know which components are available for which social document. As there are construction differences between the systems and between applications, the fields in the different databases and the respective files in the file system need to be known, in order to be able to address them. Therefore, the actions of getting to know the own system's functions, as well as the SBD structure within the own system can be formulated. Furthermore, also the functional need of addressing the whole document if, for example, exporting the document, emerges.

The assignment of responsibility is outlined as a requirement. However, because of multiple users, missing functions and unclear organisational determinations the assignment of responsibilities also is a challenge. Following, two different needs for actions derive. First, the organisational action to reconsider their information policies and activities in order to be able to make determinations about who is responsible for which content and to develop processes and guidelines. Second, the technical need to develop the possibility to capture the name or function of this person. The technical feasibility thereby applies to all actions defined in guidelines such as the need for deleting and archiving processes as asked for in the survey.

The same applies to the need to be able to assign a status to a SBD, capture more metadata, classify a document or assign keywords. On the one hand, organisational decisions are needed which, for example, outline when a document is inactive. On the other hand, the technical functions is needed to show and work with the function in the system.

Rather technical & functional needs for action are the needs for appropriate functions to restore documents and to export documents with all their components and metadata information as well as for their availability for audit trails.

Perhaps the most prevailing and most important organisational & human need for action is to decide on a leading system and which system should be used for which processes. Even though the survey identified the technical & functional need for integration of systems and the possibilities for community management (which is rather a general than a long-term requirement) as even more important, this all is dependent on what is decided for the leading system. For example: if it is decided that the ECS is the leading system and that the ECS should also be the system where the SBD should be managed, then many more functionalities are required in ECS than are available within most systems at the current time. However, if the ECS system only is the leading system for the collaboration, but it is decided that all documents should be managed within a DMS, different (and fewer) functionalities are needed within the ECS and there are more organisation & human needs for actions such as deciding when to transfer a document in the main focus. Miles (2011a) argumentation is similar. He outlines that

specific social content management systems are needed which meet the problems of searchability and retrievability, legal hold, security and governance aspects. He further outlines two different models for such systems: (1) social content repositories and (2) combined social publishing/social content management systems. Using the social content repository will migrate the social content to an ECM system using, for example, integration connectors such as CMIS. Within the second model ECS applications are used as part of the ECM system, through a further extension or module. Thus, aspects such as security, governance and classification are automatically included. However, with this approach only the tools integrated within the ECM can be used and not the ECS as outlined in this dissertation. The third option of including document and record management functionality into the ECS is not described by Miles. However, depending on which way is followed, thus where the SBD is managed, the technical & functional aspects might only be needed in one of the outlined scenarios and not in the other. Combined with the action of deciding for a leading system is the need for action to integrate systems. Depending on where the SBD documents should be managed, systems might need to be integrated to exchange documents and/or functions. However, deciding to manage SBD within an ECMS also brings along different challenges such as that the content is not managed before it gets archived, tags and classification cannot be fully transferred to the ECMS and the SBD cannot be retransferred to the ECS application, which further leads to risks such as information loss. However, if the SBD should be managed within the ECS itself, more general archiving functions are needed. This includes functions such as audit trails, recovering/restoring content, versioning for all kind of documents, freezing documents, backups and the possibility for automatic deletion. What becomes apparent through these examples is that challenges and needs for action are highly interlinked in both directions: challenges lead to needs for actions which in turn can lead to new challenges.

In addition to all these needs for actions participants further outlined two ideas which would support the long-term management of Social Business Documents. These ideas are a management dashboard in the ECS as well as the function of indices. A management dashboard which, for example, identifies and shows the documents not used or gives an overview of all newly created documents including, for example, missing metadata could help responsible employees in better managing SBD. Indices could be helpful in both cases, the management of SBD in the ECS as well in the ECMS. If each SBD would have an own and unique index, this index could be used for direct addressing of a document through the ECMS or for functions such as automatic deletion of document, for example, which exceeded their retention period.

Within the following, the different findings are brought together to outline the different relationships of SBD management aspects and to provide a framework which summarises requirements, challenges and actions of SBD management.

9.2. Summarising the Findings: Relationship Model of SBD Management Categories

Figure 56, the Social Business Document Management Landscape, already provided preliminary insights into the dependencies and connections between the various relevant aspects including requirements, challenges, processes, ideas and risks. The findings from the different investigations conducted throughout this study now allow for the further specification and development of the different dependencies and connections, which are then illustrated through a model.

Put simply a model is a representation of something in a specific form. Within the tool analysis in chapter 5, different modelling techniques were used, resulting in the different models of ER-diagrams, functional maps, tables of storage formats and kept metadata as well as the lifecycle view; together representing individual aspects of SBD within the software system. Chapter 6 then outlined information models, which summarised the different findings. In the following, the term model is used to outline the order and relationships between the categories in a simplified, descriptive and schematic form, not the individual aspects that are important for the long-term management of SBD.

Object

As can be seen in Figure 66, the object of investigation is the **Social Business Document** itself. Social Business Documents as used within organisations contain valuable business information. They are used for the day-to-day work, are vehicles for knowledge creation and are used to capture the history of the organisation over the long term. They can be described and seen as document objects and some may also be business records which require different processes and must meet different legal requirements for dealing with them.

Management Need & Processes

Because of their value and nature as business documents, Social Business Documents must be managed and must meet existing document management requirements such as integrity, accountability or preservation. These are shown as **fundamental requirements** within the model. When addressing and meeting these fundamental requirements, different challenges arise. These challenges can be separated into two different groups: **challenges in understanding SBD** and **challenges in managing SBD**. An example for a challenge in understanding SBD is the existence of different interrelated components of SBD. As the design/construction of the components differs from system to system and for different SBD, the key challenge is to understand the different possible component combinations and arrangements. This in turn leads to three things. First, the **extended requirement** to get to know SBD within the own system; second, the related **action for understanding SBD** of analysing SBD within the own system; and third, the **action for managing SBD** as a whole, including all their components. This example already shows the confusing connections between requirements, challenges and actions and outlines the existence of functional chains.

In general, actions describe activities and processes which should address the challenges in order to comply with the specific requirements. However, depending on the action, it can also lead to its own challenges or requirements. If, for example, it is decided to manage SBD within an ECMS (action), new challenges in transfer or integration of the SBD will arise as well as the requirement to implement appropriate functions. Thus, even though placed in the middle of the model and dependent on previously identified insights from the challenges, the extended requirements are the important aspects, which need to be addressed in order to effectively manage SBD.

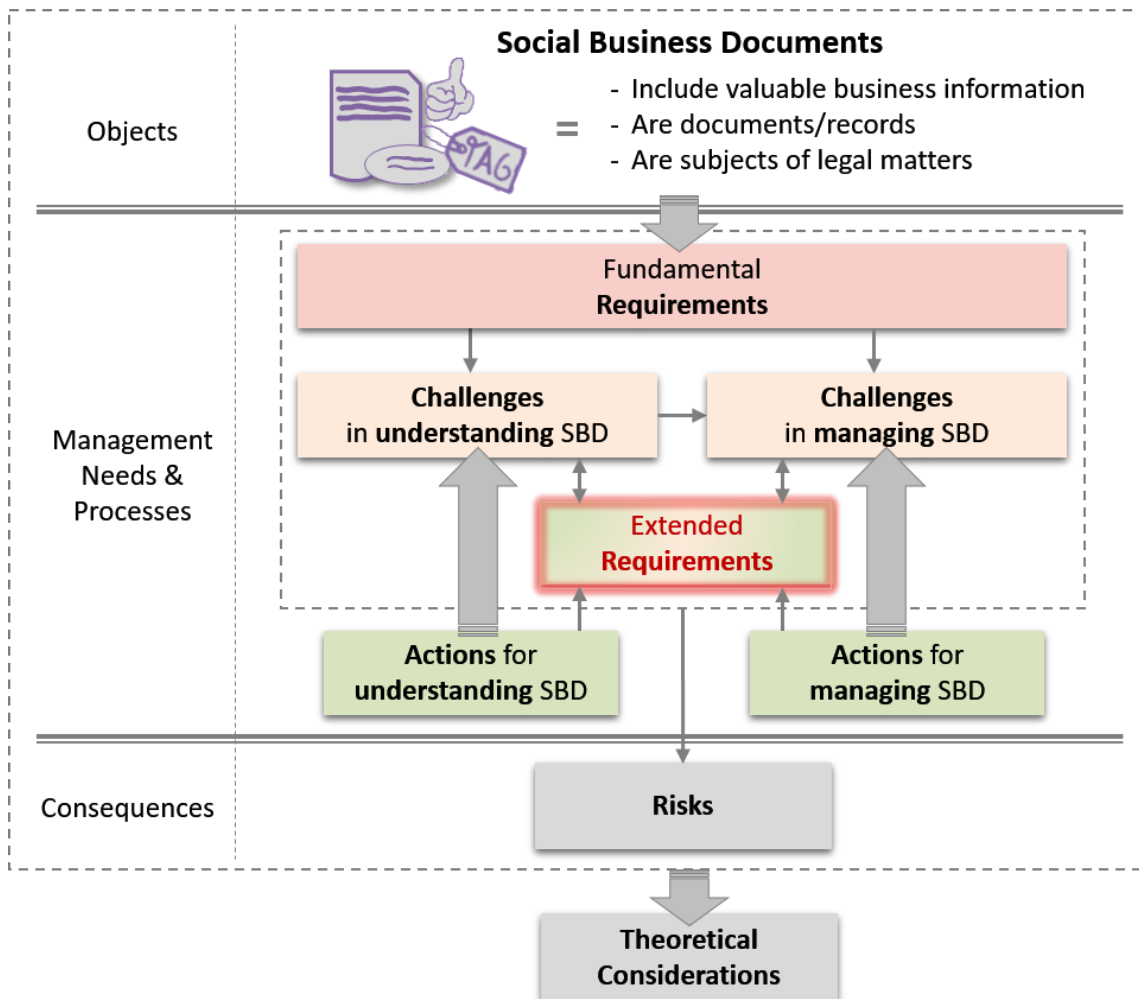


Figure 66: Relationship Model of SBD Management Categories

Consequences

The model finally also indicates that failing to address the requirements and challenges can lead to **risks** such as loss of information and knowledge or loss of information quality. The risks which can emerge when using social applications in enterprises (Social Media as well as Enterprise Collaboration Systems) have briefly been addressed in section 3.2 and are not further examined as they are beyond the scope of this study.

However, combined these insights point to theoretical considerations which need to be addressed. Examples are the questions of the lifecycle of SBD as well as the general recognition

of SBD as documents. These and further theoretical considerations which emerged through the investigations of this study are outlined in chapter 10.

Deeper insights and explanations of the requirements, challenges and actions are further outlined through the framework discussed in the next section.

9.3. Framework Development and Discussion

Based on the relationship model outlined above, the individual aspects of the categories requirements, challenges and actions that address the management of Social Business Documents are further addressed through the framework shown in Figure 67. Thereby, the framework focusses on those challenges and requirements that are important for the long-term management of Social Business Documents. Requirements such as turning off comments or the possibility to merge and exchange content between communities and applications that represent general management aspects are not further described.

Fundamental Requirements

Most of the fundamental requirements were outlined within the literature review in section 3.1.3. They were further expanded through the findings gained in the interview/case study investigation, summarised in section 9.1. As Social Business Documents are 'normal' digital documents with additional or different characteristics, the fundamental requirements for Social Business Documents are the same as for any other business document. However, the new characteristics of SBD raise new challenges when addressing these requirements. It is thereby not the aim of this study to map the requirements to specific challenges, as one requirement can lead to several different challenges which need to be addressed, but the fundamental requirements support the basic need for managing SBD.

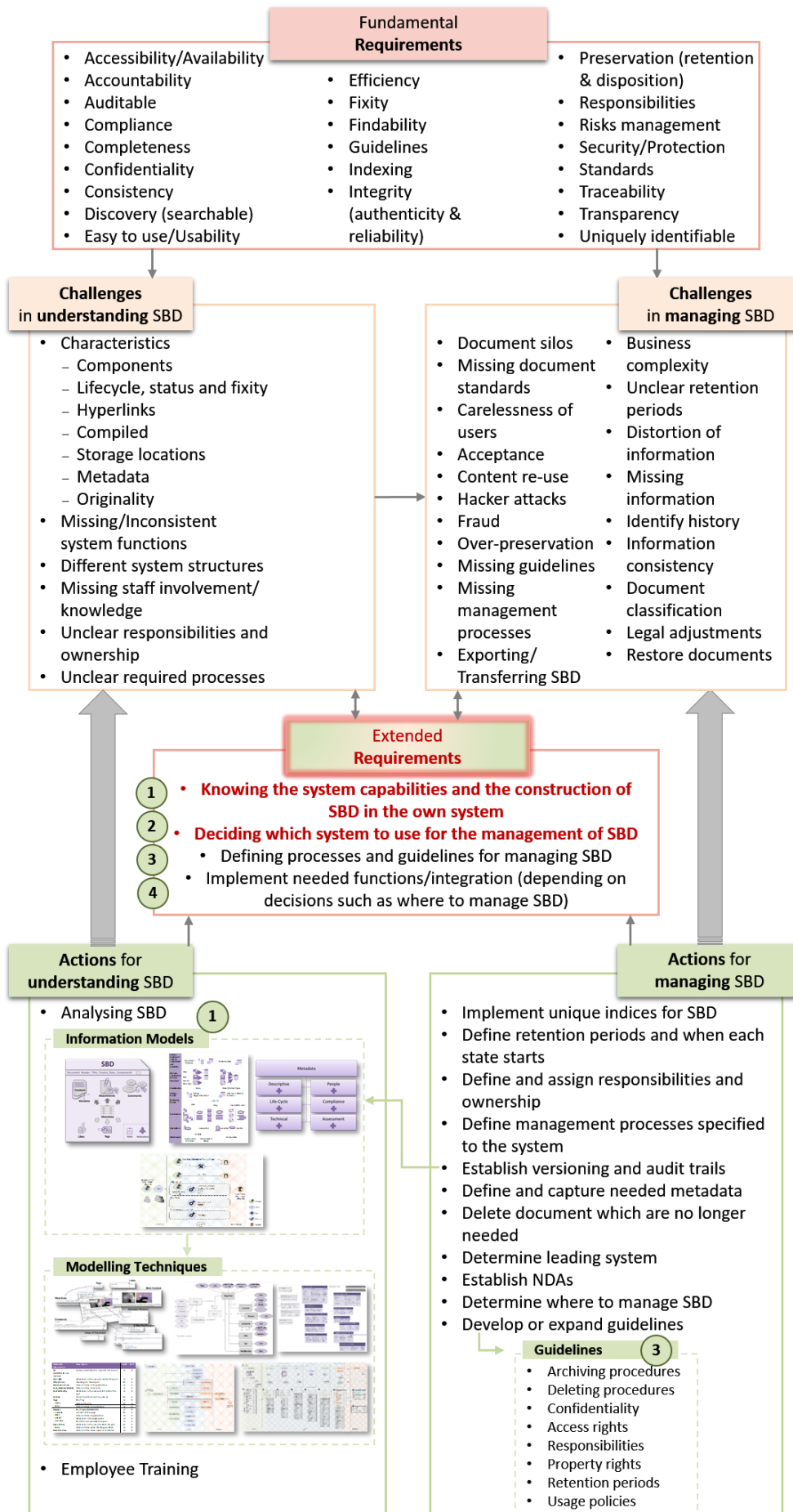


Figure 67: Framework Addressing the Long-term Management of SBD

Challenges

The focus of this study is on the challenges of the long-term management of SBD. These include the different general document challenges (section 3.1.2), social content management challenges as currently addressed in the literature (section 3.4) challenges identified through the tool analysis (section 7.1), challenges emerging from the record definition (section 7.2) and challenges derived from the empirical investigations (summarised in section 9.1.2). Summarising all these challenges they can be categorised into two main groups: challenges which arise because of a lack of **understanding** of SBD and challenges which arise with the actual **managing** of SBD. Both groups of challenges are linked, because through the understanding of the SBD characteristics, new management challenges may emerge. Within section 9.1.2 the challenges identified through the empirical investigations have been summarised and categorised into: documental/informational, human, legal, organisations and technical & functional challenges. These categories show the source/area where the challenge derives from and can be applied to all challenges. However, the differentiation between understanding and managing challenges shows the action which needs to be addressed and each of the previously developed categories addressed both, understanding and management challenges. For example, there is the organisational challenge of defining the document status, which occurs alongside the technical challenges of implementing the status within the system.

As already outlined above, both types of challenge can lead to further requirements as well as actions which should be taken.

Actions

The actions should address the challenges in order to comply with the requirements. In particular, the interview/case study and the survey identified existing processes used in practice as well as new ideas, which are consolidated in the category of actions for **managing** SBD. Furthermore, the investigations into the nature and structure of SBD revealed that even though there are common elements, as outlined through the information models, there are also many differences. These need to be known and can be identified through the different modelling techniques. Therefore, the action for **understanding** SBD includes the modelling processes as actions. The different general information models, which have been developed through this research study, can be used as starting point for the analysis and can be stated more precisely through the different modelling processes in order to show an organisation's specific conditions of SBD within their system.

Extended Requirements

As the systems for SBD differ, also the challenges for managing SBD can be different. The extended requirements therefore outline the needs which should be addressed in order to be able to understand and manage Social Business Documents in a particular organisation and setting. The extended requirements thereby point to four different steps that should be taken.

① Knowing the system capabilities and the construction of SBD in the own system

Many challenges build on the action of analysing Social Business Documents in order to understand their specific nature, the identification of their construction as well as the system's capabilities. The first and one of the most important extended requirements therefore is to get to know the own systems for creating and using SBD. This can be achieved with the help of the information models and modelling techniques developed in this study. This step can furthermore be seen as the first step into the direction of an Information Audit and the starting point for any SBD management plan.

② Deciding which system to use for the management of SBD

When the construction of the own SBD, as well as the own system's capabilities for managing SBD are known, it needs to be decided which system to use for the management of SBD, the ECS or the ECMS. This second step influences most of the following aspects. Thus, dependent on this decision different challenges might emerge. For example, if it is decided to manage SBD within the ECS, further long-term management functions within the ECS might be necessary. If it is decided for the management within the ECMS, interfaces for the communication of the two systems are needed.

③ Defining processes and guidelines for managing SBD

Heavily dependent on the decision about the system in which SBD will be managed are the processes and guidelines, which should be implemented for the management of SBD and which need to be defined in a third step. Although the value of guidelines is heavily discussed by practitioners, because guidelines do not manage SBD themselves, they define processes and actions which need to be taken, raise the awareness of the need to manage SBD and assign responsibilities. Therefore, they can be seen as the leading documents describing the management of SBD. Furthermore, when developing guidelines different decisions such as where to manage SBD, who is responsible, etc. have to be answered as they are needed in order to describe the processes. Developing guidelines thereby does not necessarily mean new guidelines for SBD, but can also mean to expand existing guidelines to also include and account for SBD. The framework in Figure 67 outlines the different aspects that should be addressed within these SBD management guidelines.

④ Implement needed functions/integration

Also dependent on the decisions where to manage SBD and the process which should be followed, it needs to be ensured that the necessary functions are available for usage according to the guidelines. This fourth step of the extended requirements, together with appropriate employee training finally should enable the effective long-term management of Social Business Documents.

The framework can be seen as the practical contribution of this study and addresses the different aspects of managing SBD that organisations need to account for. Even through the

insights gained from the empirical investigations into practice all arose through the work with IBM Connections, the tool analysis identified that most of the challenges and actions can be applied to Social Business Documents in general. What differs are the processes for how they are addressed, what is already possible within the systems and what must additionally be done by the users. Therefore, the challenges which need to be addressed are similar for all systems.

Today, first organisations can be found that are starting to recognise the need to manage Social Business Documents. However, most are not aware of the need yet and SBD remain largely unmanaged. Furthermore, as traditional document management processes can only partially be applied to this new form of documents, organisations are facing the problem of not knowing how to manage SBD. The developed framework should assist organisations in, first, recognising that the fundamental document requirements also apply to SBD, second, that SBD have different characteristics to traditional document which leads to new challenges and, third, provides preliminary ideas for how the different challenges of managing SBD can be addressed. Furthermore, it should also become clear that the relations between the requirements, challenges and actions are complex and that one action can in turn lead to new challenges. To date the framework only includes the findings of this study. It therefore should not be seen as exhaustive, but rather as a starting point and subject to possible further development. This especially applies for the actions as not each challenge is currently addressed through an action and still many challenges remain open.

There are different reasons for this. First, the topic of managing Social Business Documents for the long-term is a relatively new topic that has not yet been researched widely. This study provides a deep investigation, however due to the many different facets identified in this study, it is not possible to capture every aspect directly. Second, many challenges and actions are dependent on an organisation's decisions about where and how they would like to manage their Social Business Documents. There are still theoretical challenges of definition, such as how records in the context of SBD are defined, which lead to practical challenges. Therefore, further research is needed into both the practical insights as well as the theoretical concepts.

Contrary to many other investigations the framework developed above is not arranged according to the lifecycle of documents. One reason for this is that the lifecycle of SBD is quite undefined. However, as Lyman (Lyman, 2002) outlined, *"all documents follow a life cycle from valuable to outdated, but then, perhaps, some become historically important"*. What can be seen from this citation is that it might not be clear if a specific document has value or becomes valuable over time. *"Every document serves some immediate use when first created—even if only that of satisfying some inner need of the author"* (Vickery, 1978, p. 279), but it is not clear what will happen with the document in the future. Therefore, we need to manage all documents directly from the beginning.

Chapter 10.

Theorisation

“At the beginning of the global networked society 30 years ago, it seemed as if the document approach was outdated, but now it appears more relevant than ever” (Lund, 2009). This dissertation followed a document approach and examined the current requirements and challenges of managing Social Business Documents. It showed, that the document perspective is still of current research interest and forms an important and relevant discourse in the literature. Thus, confirming and supporting the Lund’s quote above.

This study investigated three views of documentary practice: the documents themselves through the analysis of their nature and structure; the document context through the empirical, practical investigations addressing the social interaction with documents; and documentation as an act, by investigating the functions and purpose of Social Business Documents. Zacklad (2013, p. 251) outlines that through digitisation, new documentary practices emerge. Within the following, the findings from the previous chapters are examined and mapped onto the various theoretical concepts of documents, showing problem areas as well as supporting and confirming the assertion that Social Business Documents are a valid documentary form, supporting Zacklad’s view.

10.1. Definition of Social Business Document

As outlined in chapter 2 and 4, this study takes a documentary practice view and follows document theory. Document theory should always *“start with the notion of a document”* (Buckland, 2013, p. 223). The history of documents and their definitions are heavily influenced by authors such as Otlet and Briet who discussed three-dimensional objects as documents, followed by more recent scientists such as Buckland, Levy and Lund who point the focus to the evidence of documents rather than its format, and take into account digital documents. Furthermore, recent investigations within documentary practice through authors such as Zacklad, Ferraris and Choksy point out the social and behavioural aspects of documents, thus expanding the document view.

One of the main concerns of all these researchers, which is at the core of document theory, is the definition of what a document is. Within this dissertation, social objects such as a wiki entry or a blog post are defined as Social Business Documents. Within the following, this reasoning is argued for and explained from a theoretical perspective.

Within document theory, the complementary theory argues to view a document from three complementary angles: the physical, mental and social aspects of documents in combination

(Lund, 2009). This leads to three views of how documents can be seen: made, serve or considered as documents (Buckland, 2013, 2014). Mapping these to the concept of Social Business Document as argued for in this thesis, the following statements can be made:

- Social Business Documents are manifest in electronic bits, kept in files or databases and thus have a physical/material object, which can be transported from one place to another. They can be *“made as documents”*.
- The importance and value of the information captured in Social Business Documents as identified in this study’s empirical investigations shows they have significance to humans and therefore have a mental aspect. As SBD are among other things, used for conducting business processes and as evidence of business activities they further *“serve as documents”* and are *“considered as documents”*.
- The social aspect focusses on the collaborative actions of documents and what is done with the document. Social Business Documents only exist because of the purpose of collaboration with others and they are used as sources of information for everyday discussion and decisions.

Considering the above outlined aspects, it can be argued that the term Social Business Documents is valid for information objects, such as wiki entries for example, to be classed as documents. Further applying the eight conditions Buckland (2013, p. 233) described as being relevant to apply when defining something as a documents (see 2.1.2) leads to the following statements all adding support to the concept of Social Business Documents:

- *Creation*: SBD exists in the software system.
- *Discovery and Location*: SBD can be found through searches, their location in a community/spaces or links to and from people.
- *Permission*: Through the access to the software system and possible groups (communities/sites) restrictions to accessing SBD are at hand.
- *Condition*: Even though SBD are, in general lacking an indication to their status and their lifecycle is not clear, they are in a state where they can and should be used.
- *Description*: Its representation should be clear through either the application the SBD is created (e.g. a forum post should be for discussion) or its description.

Partly going along with these conditions is the question Olsen et al. (2012, p. 110) raise. They asked: *“for how long does the document need to be “valid” in order to be a “document”?”* In general, documents are created in order to keep something fixed for the future (Zacklad, 2006). Yet, documents in general and especially SBD can be more or less temporal. There will be a time when they are outdated, but for another time, they will be ‘valid’ just as they are.

Despite the above conditions of Buckland (2013, p. 233) being met, the two conditions of interoperability and trust might be seen problematic:

- *Interoperable*: Here the standardisation to be usable is questioned. As outlined through the nature and structure of Social Business Documents, the different systems have

different ways how SBD are stored and frequently no standards are used for their construction. It is currently not possible to take an SBD with all its components and metadata information from one system and open it in another or even on another computer, using the same, but not identical system. Thus, the interoperability condition is not currently being met. However, the way SBD are constructed has become well known through applications such as Wikipedia entries, likes on Facebook or blog posts on WordPress pages. Therefore, SBD are standardised enough to be used by different people.

- *Trust*: The trust condition relates to the confidentiality of documents. Even though most SBD are lacking full audit trails, they always have an author who is visible, a time stamp of when it was created and edited and some SBD allow versioning. Trust might be questioned in cases where SBD have been changed and the changes are not traceable any more. However, this problem is a general problem of digital documents and not specific to SBD.

Hjørland (2000, p. 36) stated, that because of the change to electronic communication and the Internet, “*many concepts such as ‘document’ also have to be redefined*”. However, Social Business Documents are not contradicting, but rather confirming the concepts and principles of defining documents in document theory. Kouper already posits, that a blog post can be considered a document, as it has a physical dimension, serves a communicative purpose and follows certain forma and genre conventions (2010, p. 350).

Thus, the above arguments support the use and terminology of Social Business Documents as put forward in this thesis. However, whilst Social Business Documents share the characteristics of traditional documents they also contain some difference and therefore expand the scope and boundaries of how a document has been described in the past.

Based on the different definitions of documents and digital document, section 2.3 already developed a working definition for Social Business Document. Now, that the usage of the concept of documents is confirmed and through the different investigations of this study, this definition can now be refined, taking into account the different findings. The revised definition is as follows:

Social Business Documents are user-generated electronically stored semi-structured information which are created through collaboration technologies, application and functions. They often occur as compound documents, consisting of the main intellectual entity as well as different social content components/fragments which have their own nested lifecycle within the overall evolving lifecycle of the compound Social Business Document. Being social objects, they extend our knowledge by enabling and supporting business communication and collaboration between stakeholders and therefore include valuable business information which needs to be managed accordingly (adapted from Hausmann and Williams, 2015, p. 365).

The main changes between the working definition and the revised definition can be found within the addressed technology, the aspects of the lifecycle and the mentioned value. While the

working definition mentioned the occurrence of SBD through the creation in Web 2.0 applications and social software, the final definition more broadly addresses them as collaboration technologies, applications and functions. As has been shown with the example of Alfresco, Alfresco itself is a document management software and not social software, but it still includes applications which support collaboration between people. The same applies for other software types. Even though the focus of this dissertation was on the occurrence of SBD in ECS and ECMS, the creation of SBD is becoming more and more widespread. For example, Enterprise Resource Planning systems are beginning to include collaboration functions and thus, to enable the creation of Social Business Documents.

Furthermore, this revised definition addresses the branched and undefined lifecycle of Social Business Documents as one of their main characteristics, which leads to various challenges in their management. Thus, the need for management of SBD is further strengthened in the definition through the reference to the value that SBD can have.

If in the future new technologies will emerge, which will again change the way people exchange information and work together, this definition is likely to be subject to further change. However, the above outlined definition is taken for this dissertation and seen as representing the current status of SBD.

10.2. Social Business Documents as Documents for Action

In a recent development in the documentary literature, Ferraris developed the theory of documentality and social objects, which was described in section 2.1.2. Ferraris focusses on the social acts supported by, through and with documents. Within his definition of social objects he outlines that social objects can also only be *“in the mind of people involved in the act”* (2014, p. 114). With this statement, Ferraris is not in line with Buckland’s conditions of documents, as thoughts for example cannot be found, are not discoverable and also not physical. However, leaving this point to one side for the moment, social objects are further described as inscribed social acts, involving at least two persons. A Social Business Document is inscribed and has the purpose to support a social act of, for example, informing people or discussing something. Thus, even though the main SBD can be created by only one person, its main purpose is for collaboration with others. Therefore, SBD can be seen as social objects.

Alongside the concept of social objects is the concept of Documents for Action (DfA), developed by Zacklad (section 2.1.2.3), which focusses on the behavioural aspects of and transactional view to documents. Social Business Documents, as social objects embedded in organisational processes can be seen as examples of Documents for Action. Looking at the characteristics described for Document for Action and those outlined here for SBD it becomes clear that they match. Both are often incomplete, have different versions and multiple authors, are fragmented and the fragments have a non-trivial relationship. What Zacklad calls fragments are called components in this dissertation, however, the idea is the same. Zacklad outlines, that DfA are ongoing and that definitions of documents and their concepts need to account for this. In

particular, the discussion around the lifecycle of SBD showed a prominent example of these ongoing documents. As Social Business Documents are currently among the largest growing content type in organisations, the need for adequate definitions and processes is high.

Even though the new types of documents such as DfA and SBD are not in contrast with existing documentary practices, they do require new theoretical concepts for their understanding as well as new practices for their usage and management. Within their concept of neo-documentalists (section 2.1.2.2), Börjesson et al. asked different questions, addressing the changes of documents emerging through the digital environment. Besides questions about what documents and documentation means today and how it differs from previous times, they also ask the question of how *“current practices of documentation affect the professional practices”* (Börjesson et al., 2016). Through focussing on the management of Social Business Documents the framework developed in this dissertation gives first insights about the current challenges derived through the attempt to adapt current practices and assumptions to Social Business Documents.

10.3. Characteristics of Documents through Document Modelling

Several theoretical considerations concerning the characteristics of documents can be made and are further outlined below.

10.3.1. General Characteristics

In the very past documents were concerned with paper including text (Buckland, 1998, p. 804; Levy, 2001, p. 22) and also the characteristics were limited to paper size and ink type and style. Later, these characteristics changed, as three-dimensional objects were taken into account and their main characteristic was seen as described by the documents' evidential power. More precisely, the characteristics of digital documents have been described in section 2.1.1.3 outlining those aspects, which are connected with the systems of digital documents. This dissertation further examined the characteristics of SBD by analysing four different systems from different perspectives. To achieve this four different ways of modelling Social Business Documents have been developed: object, functional, content and lifecycle modelling.

Scifleet and Williams (2009, p. 215) state, that *“Integral to any understanding of information management is the importance of the material architecture designed to support the information resources. It is the way that information resources are structured, described and organized”*. By analysing Social Business Documents with the help of the four modelling techniques, the material structure, as well as their functional capabilities and their changeability could be identified leading to a set of different characteristics within the areas of components/content, storage, functional, metadata and lifecycle characteristics (chapter 6). While some of these characteristics might not be new, many characteristics are, and thus expand the possibilities of how documents can occur and what can happen with/to a document. Examples, which can already be found in the literature, are their user-generated and interactive nature (Shegda, 2010). However, other characteristics arise as the possibility of parallel functions, which can be

performed in an undefined order and time, or the availability of several additional document components leading to the compound Social Business Document appear to be new.

It is often argued, that the format of a document should not play a role in terms of the need for its management, evidential power, record definition, etc., which is confirmed by the author. However, the format and thus the characteristics of a document determine the processes that can be applied to a document, the document's lifecycle and lead to several challenges and requirements for practitioners seeking to manage SBD. Additionally, these characteristics further support emerging changes in the way we think about documents. While in the past paper documents were independent of the technology they were produced with, the linkage has become stronger with digital document requiring a computer and specific software for them to be read (if not printed). With SBD this link between technology and documents has become stronger again, as the integration of SBD within an ECS to communities or different peoples' profile, for example, as well as the lack of standards for the creation of Social Business Documents and its means of storage in files and database columns make it impossible to split the content from its technology.

It therefore should be noted, that every document can become a social document. Thus, traditional digital documents such as PDFs or an office document itself do not originally have collaborative features. When created in their dedicated systems such as Open or Microsoft Office there is no version control, no possibility to tag, like or comment the file. However, when uploading them to an ECS these collaborative features become possible. Thus, created as a 'normal' document they **become social** when brought into the ECS. In contrast, we have all the documents which are created directly within ECS such as wiki entries. These Social Business Documents are **born social**. Hodge (2000, p. 2) uses the term born digital for documents which are created and disseminated in electronic form, which goes along with the above outlined description.

Further, there are documents which are between these extremes. These are traditional documents such as office documents which are directly created within the ECS and where no other software is needed additionally. The 'final' document, the Social Business Document, will be similar for both, become social and born social documents. Figure 68 represents these three different documents types according to their creation.

Furthermore, *"for a very long time, the document has been viewed as a static information resource with limited ability for change"* (Liu, 2004, p. 284f) which led to an easy definition of a document's boundaries. However, through the different links to a document and thus their connectivity, as well as their changing nature, these boundaries are not that clear anymore and need to be redefined. Also other established theoretical concepts, such as the document lifecycle or the definition of records, needs to be rethought because of these changing SBD characteristics. The four modelling techniques developed in this work can help in identifying the changes.

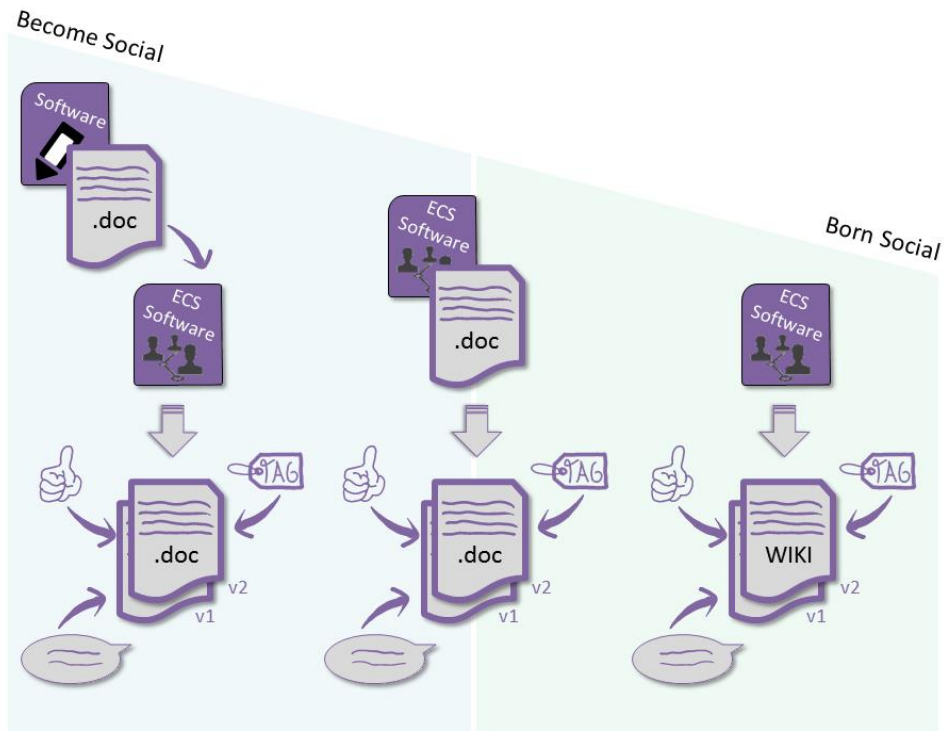


Figure 68: Become vs Born Social Business Document

10.3.2. SBD Information Models

Social Business Documents can occur in many different systems, all having many similar, but also different ways of how they are implemented within the systems, which functions are supported and how they can change during their lifetime. In order to understand the nature and structure of Social Business Documents, four systems were analysed, examining their SBD. Building upon the individual models derived through the different modelling approaches, which were applied, four different conceptual information models could be developed: the conceptual information model, the structural information model, the functional information model and the metadata model. Together, they describe the main aspects of SBD in general.

The conceptual information model (section 6.1) outlines the components Social Business Documents can have and already indicates the various metadata available for the main document, but also for each individual component. It further shows the possibilities for nested components. The structural information model (section 6.1.2) indicates the different ways that SBD are physically constructed and stored within the different systems. Within the functional information model (section 6.1.3), the general possibilities to work with SBD are outlined. The functional model thereby indicates the existence of nested lifecycles of individual components within the overall document lifecycle. Finally, the metadata model (section 6.1.4) summarises proposals from the literature about which aspects should be kept for business documents. The model distinguishes between six different groups of metadata and further indicates which data is currently already kept automatically by the systems. For all provided metadata suggestions it

still needs to be decided which ones are important for each individual organisation and thus needs to be kept.

Even though all four models represent practical findings, they can be seen as theoretical models, which can then be adapted by each organisation in order to represent its own SBD within its chosen systems.

10.3.3. Lifecycle of SBD

Many different representations of the information lifecycle with different levels of detail can be found within the literature. One example was presented in section 2.1.1.3. Although they are named differently and outlined in a different number of steps, the characteristic most have in common, which was used within this dissertation is the separation between the three phases of creation, use and disposition. However, what became clear from the empirical investigations as well as from the identification of possible functions within the systems is that:

- The systems of SBD do not on the most part, support functions that can be assigned any kind of status, separating between active, semi-active or inactive documents. Furthermore, the status on an SBD can change back and forth between phases during the lifetime.
- The functions for working with/on SBD do not follow a strict order.
- It is not clear, when a SBD is finished.
- The components of SBD themselves have their own lifecycle, nested within the overall SBD lifecycle and overlapping among the different components.
- Some information (especially within the metadata) changes over the life of an SBD and can be lost.

Even though the general lifecycle of SBD can still be described within the phases of creation, use and disposition, especially the phases of use and disposition raise the level of complexity and need more detailed description. While in the traditional document lifecycle description the steps of actions are always moving forward and there is only a linkage back, if some information is re-used, the use phase of a SBD takes an undefined path of adding and deleting various document components also including changes in the main document itself. Furthermore, most Social Business Document currently remain within the system they are created. If they are not protected somehow it will always be possible in the future to edit the document and its components, even if the matter is, from a practical standpoint already closed. If SBD are not being evaluated, they will never enter the formal disposition phase. Thus, they may never be deleted or archived. Therefore, it is likely that the SBD will remain as an inactive document in the system. Unless managed out of the system there will come a point when a document was not used or change for a longer period of time but still exists in the active collection of documents.

A new SBD lifecycle therefore should account for these different situations. A first suggestion for change, including the above-mentioned aspects, is visualised in Figure 69 below.

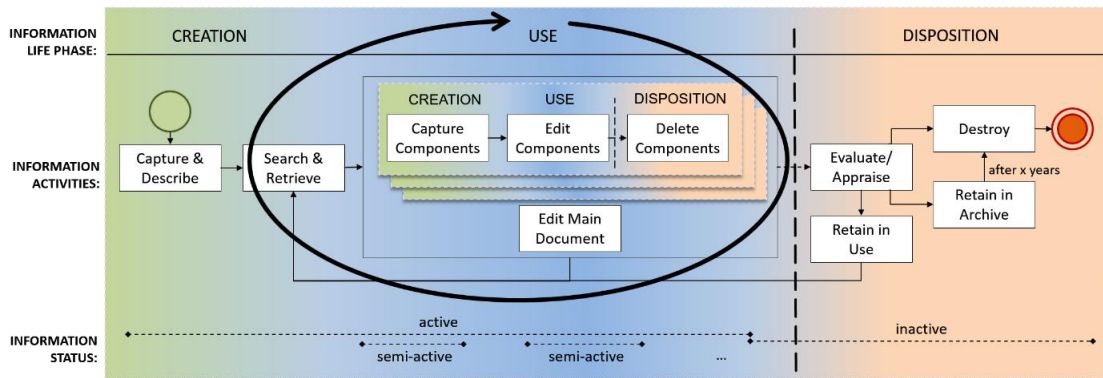


Figure 69: Social Business Document Lifecycle
(based on the information lifecycle of Williams, 2015)

The three biggest changes in this SBD lifecycle are:

1. the nested lifecycle of components,
2. the undefined and ongoing use phase and therefore,
3. the possibility that the disposition phase will never be reached.

These undefined characteristics of the SBD lifecycle lead to different challenges especially within the definition of records and long-term management aspects.

10.3.4. The Concept of Records

The standardised ISO 30300 definition of records focusses on information as evidence regardless of the format. As SBD can include evidential information they thus can also potentially be records. However, business records are mainly created to serve administrative purposes and to function as evidence about a transaction or decision (Atherton, 1985, p. 48). Therefore, different requirements and functions are associated with records, which they need to comply with. As section 7.2.1 already outlined, other definitions, as well as the requirements and functions of records, lead to major challenges for the management of SBD as records. In particular, the characteristic that they should become a fixed document, as well as the need to be meet the records management principles and qualities challenges the status of SBD as records.

As Gilliland-Swetland (2005, p. 238) outlines: *“Records in the system should be able to be identified, fixed, segregated, and migrated to new software and hardware configurations. They should include an audit trail. It should also be possible to ensure that they are complete and that their physical and intellectual integrity has not been compromised in any way”*. As can be seen from the characteristics of SBD as well as their lifecycle, SBD do not easily comply with these claims and because of their collaborative and living nature it is hard to adapt them to fit.

Therefore Gilliland-Swetland (2005, p. 247) further concludes, that there is a need to further define what a record is in both, the electronic environment, but also in terms of human experience. Currently records are looked at from a juridical and technologically framed perspective. However, we might need a more inclusive and culturally based view taking into account records as products of human activities. In connection to the management of e-mails

as records, but also fitting to SBD as records Waugh (2014, p. 215) more clearly outlines that *“In this time of transition we need to accept that the resulting records produced now will not be perfect, but systems will get better if we adapt and change our advice.”* Though, it might not only be the systems that will get better, but we might also need to reformulate are our requirements for records in order to adapt to new kinds of document/new kinds of records created.

10.4. Management of Documents

The currently established research around document theory is mainly concerned with defining what a document is, the different views of how documents can be seen and interpreted, and which criteria documents and records should fulfil. Even though the criteria, as well as the conceptual considerations about the document lifecycle provide initial insights for document management, this topic has not yet been widely discussed in the theoretical considerations of documents. Also within the area of Enterprise Information and Content Management most concepts rather are concerned with the use of information and content. Within the ECM research framework of Tyrväinen et al. (2006) the management of documents is partly addressed through the process perspective of deployment. Through the construction of the framework as a cube on a base, they also imply that it should be looked at from three different perspectives (1) content, (2) technology and (3) enterprise. However, they do not further outline any specific actions. Through this dissertation, especially the technology and enterprise perspective have been addressed. By analysing the four different systems and showing how SBD are constructed within them, the technology perspective was taken up. Through the empirical investigations, the enterprise perspective was analysed. Both helped in identifying the challenges for managing Social Business Documents.

A few more details concerning document management can be found within the information capability framework of Friedman et al. (2011). Within their common capabilities different functions of document management are outlined. Additionally, they include social platforms, such as social networks, as information sources, already indicating that the Social Business Documents need to be managed as well. However, this framework focusses on the technical capabilities, leaving out the organisational aspects.

Often connected with the management of documents are the concepts of records and archiving. The difference between them are widely discussed within the literature. However with concepts such as the record continuum model (see for example McKemmish, 2001 or; Svärd, 2013) also these questions become rather irrelevant. Furthermore, the separation or merging of both concepts do not further assist in guiding the processes of managing documents.

In 1999 Tyrväinen and Päivärinta argued for the need to rethink document management to better support the adoption of organisational-wide document management systems. Today, the author argues for a need to rethink document management practices to better support the actual management processes. A large body of information and knowledge is stored in

organisational documents and it is not only for legal purposes that these documents need to be managed adequately. Nonetheless, the theoretical contributions are still missing as the theory is just starting to account for concepts which take into account document types such as SBD. Therefore, taking the theory forward in the area of managing SBD should be one of the next steps for the future. By outlining the practical challenges and requirements in managing SBD, as well as the investigations in the document modelling, document models and the lifecycle model, first investigations into these further theoretical considerations are provided through this dissertation.

Chapter 11.

Research Contribution and Outlook

This chapter presents the final part of this research study. It addresses the individual research questions by referencing the different investigations which address them. Furthermore, the practical findings for the long-term management of SBD for businesses as well as the development of theory in the area of documentary practice is summarised before insights to future work are given and concluding remarks are presented.

11.1. Addressing the Research Questions

The aim of this study was to identify current requirements, challenges and processes for the long-term management of Social Business Documents. To address this aim, five main research questions, some including subsidiary questions were introduced in section 1.2.2 and are addressed throughout this dissertation.

This study it was based on a literature review, a tool analysis and empirical investigations using the three different research methods (focus group, interview with case study and survey), which reflects its complexity. Thus, qualitative data collection methods were used within an exploratory design frame taking an interpretative theoretical perspective. Through the findings of these investigations it was possible to address the research questions throughout this dissertation. Within the following the different research questions are revisited and a brief outline is provided to show where the findings have been presented in this dissertation.

RQ1: How can Social Business Documents be described?

To address this first research question a series of subsidiary research questions (RQ1(a) to RQ1(d)) were used which together helped describing Social Business Documents.

RQ1 (a): Which types of Social Business Documents are currently available and in use in ECS?

The literature analysis in section 2.2 revealed the most prominent applications available in Enterprise Collaboration Systems. Each of these applications allows for the creation and/or usage of some kind of documents or content. Following, section 2.3 gave examples of different SBD addressing their purpose and differentiating between Social Business Documents and social content. The most common SBD following from this analysis, as well as from the analysis of the applications available, are wiki and calendar entries, blog and discussion/forum posts, tasks and traditional digital documents that become social through their upload into a collaboration

environment. Furthermore, the focus group revealed that the most used and most valuable content is stored in documents in wikis, blogs and activities.

RQ1 (b): How are Social Business Documents constructed and what is an appropriate model for describing and representing their construction?

The different modelling techniques outlined (section 5.2.3) and used to analyse SBD in four different systems (sections 5.3 to 5.6) revealed the construction of Social Business Documents in the form of compound documents. Beside the main content of an SBD, which is saved within a wiki entry itself, for example, the components most commonly attached to it are versions, attachments, comments, tags and likes, each having its own metadata. Additionally, the components themselves can be nested. A comment, for example, can be liked and tagged as well. These findings are summarised within the conceptual model, representing the different components and their metadata (section 6.1).

The functional modelling further revealed the existence of the nested document lifecycles within one SBD as most components can be edited and/or deleted within the 'use' phase of the main SBD. This leads to a changing construction of the SBD depending on the creation or deletion of components.

Additionally, the tool analysis showed that the way that SBD and their components are stored in the backend of a system varies. The content can be stored in database tables or in files within a file system. Additionally, the format differentiates the components that are attached through links or ids; pictures are sometimes added as attachments or directly included in the main content itself, etc. All these findings are summarised within the description of the structural information model outlined in section 6.1.2.

RQ1 (c): How do Social Business Documents change over their lifecycle?

The functional modellings within the four systems revealed the different functions which can be used to process and edit Social Business Documents. The findings have been summarised within the functional information model in section 6.1.3 and include, above all, the creation and deletion of different components as well as editing functions of the main SBD itself. The functional information model also indicated the absence of a strict order of functions and their repeating occurrence. Furthermore, the lifecycle modelling identified the changing components and metadata of Social Business Documents leading to several different challenges including the unclear status of documents or the traceability of edits.

Because of the different possibilities to work with SBD a clear statement about how SBD change over their lifetime cannot be given. Depending on the document it might just stay as it, or different components might be added and deleted during its lifetime. As there is no clear and strict order in the functions and possibilities of SBD the related management activities need to make sure that the different changes are traceable and accurate in order to be able to understand the document's history.

RQ1 (d): What are the characteristics of Social Business Documents?

Social Business Documents are a subclass of digital documents. Therefore, the characteristics of digital documents, which have been outlined in the literature review (section 2.1.1.3), also apply to SBD. However, because of their occurrence in collaborative environments and the possibilities for processing, Social Business Documents have many more unique characteristics than other digital documents. The findings of the different modelling approaches thereby led to the identification of many different characteristics of SBD, which were categorised into component/content, storage, functional, metadata and lifecycle characteristics and have been outlined in chapter 6.2.

Even though a definition of Social Business Documents was already addressed quite early in this study, the further analysis through the subquestions provided much deeper insights into the nature and structure of Social Business Documents as well as it revealed the differences between the various systems and types of Social Business Documents. A more general description of Social Business Documents was outlined through the different information models. However, in order to describe a specific Social Business Document of one organisation, the specifications of the characteristics should be analysed and outlined.

RO2: What are the current requirements and challenges associated with the long-term management of Social Business Documents in the academic literature and currently experienced by practitioners?

Through the investigations into the document as well as content management literature, general requirements and challenges for the long-term management of documents have been identified and outlined in chapters 2 and 3. The requirements and challenges in those two parts are not new or specific for Social Business Documents but apply to all kinds of documents. Chapter 3 also outlined the current challenges and questions, which have already been raised in the literature, focussing on the management of social content. However, as outlined in the literature review (section 3.3), academic work in the area of Enterprise Collaboration is still mainly concerned with the adoption, use and impact of the technology, largely leaving out management questions.

Practitioners in contrast are already starting to understand the importance of managing Social Business Documents and are facing new challenges emerging through the nature and structure of SBD. These became especially evident through the interview/case study and the conducted survey among practitioners. The model developed in section 9.2 thereby shows that a strict distinction between requirements and challenges is hard to make as they influence each other. However, the framework outlined in section 9.3 summarises the identified requirements and challenges.

RQ3: How, if at all, are organisations currently managing Social Business Documents?

The identification of current themes within the academic and practitioner literature showed that practitioners are only now becoming aware of the need to manage Social Business Documents. However, section 3.3 also outlined that the current state of management is rather informal and chaotic. In order to more clearly address RQ3 it was divided into two subsidiary questions. Thereby RQ3 (a) rather focussed on the strategic implementation of SBD management practices while RQ3 (b) focussed on the operational management.

RQ3 (a): Do organisations have strategies and policies for the management of Social Business Documents in place and, if yes, what do they contain and what is their scope?

Both, the literature as well as the empirical investigations presented here showed that the management of Social Business Documents is only rarely connected to strategies or policies. Organisations are still struggling with knowing which information is stored where in general and the content creation outside established ECM/RM processes is one of the biggest issues for Social Business Document management (Jones, 2012, p. 7). Furthermore, the survey conducted revealed that only 12.5% of the responding organisations who have a business continuity plan include SBD within their plan.

While many organisations who use ECS have guidelines in place addressing the general usage of social content, most are missing out the management needs and processes. In those organisations, already including activities such as versioning or deletion of documents these activities are based on their own initiatives or departmental rules and concepts and thus are not widespread amongst the organisations.

The case company investigated in this study has established policies for the management of documents such as archiving and deletion rules, for example, which they are trying to adapt to SBD as well. However, lacking awareness of users for the conducting of management activities, missing functions within the software system as well as the complex characteristics of SBD make the transfer of traditional processes to SBD more difficult.

In summary the scope of strategies and policies for the management of Social Business Documents should be the same as for traditional documents: supporting knowledge creation, being compliant with laws and regulations, keeping history fixed, etc. However, appropriate strategies and policies are mostly not yet in place.

RQ3 (b): What processes exist for Social Business Document management and how do they address the challenges identified?

As there are few strategies and policies in place for the management of Social Business Documents there are also only limited amounts of processes which can be identified to date. As the survey results show the only activities performed by more than half of the participants are versioning of documents and capturing additional metadata. However, especially the versioning is a function often processed by the system per se. All other document management activities

asked for, such as the deletion of documents, the further assignment of workflows and the transformation to a DM system as well as the classification of documents, which represents one of the main activities for document management, are performed by fewer than 50% of the organisations.

However, the case study company outlined one specific SBD management process. They are exporting their SBD through a dedicated tool and transferring them into their ECMS, thus they can also classify them there as they do for all other business documents. However, as outlined before there are problems with the export in terms of information getting lost. One example of such a loss by the case company was identified through this thesis and could be resolved, but other problems still exist. Furthermore, this process entails other challenges such as what to do of the SBD is changes in the ECS after an earlier version has already been transferred to the ECMS.

Some organisations are taking the first steps in establishing SBD management processes through concepts such as community management and community lifecycle concepts. However, even if the long-term management is addressed in these concepts by means of deleting or keeping information/communities, they currently do not outline any clear responsibilities for these matters and also do not outline the concrete processes.

Overall, it can be stated that there are currently only initial and isolated processes at hand describing the management of Social Business Documents and that many challenges are not yet addressed.

RQ4: How can the research findings be consolidated to provide a framework to guide organisations in addressing their challenges for the long- term management of Social Business Documents?

The different findings which have been derived through this study have been consolidated with the help of a relationship model outlining the categories where findings have been gained, including the relationships between the different categories (see Figure 66) and a framework focussing on the requirements, challenges and actions of and for the long-term management of Social Business Documents (see Figure 67). As the aim of the framework is to address the challenges, the requirements were also taken up as they are the source for many of the challenges and at the same time can be seen as describing the goal to be reached. Furthermore, actions trying to counter the challenges are outlined.

Thereby, one requirement can lead to several different challenges and different requirements can also lead to the same challenges. Furthermore, not every challenge is already being addressed through a specific action. This on the one hand is because of the interwoven relationship of requirements, challenges and actions and on the other hand because some challenges are dependent on decisions made by the organisations. However, what becomes clear is that one major action of organisations should be the analysis of the Social Business Documents characteristics and capabilities within their systems. Many of the challenges arise

from the SBD nature and structure. Thus, this needs to be clear first before management actions can be taken.

The management actions consist of two major kinds of activities. First, defining and deciding things and, second, the implementation of the decisions. For example, it needs to be decided which metadata should be kept. In a second step, it must be ensured that the technical capabilities are at hand to capture the metadata with the SBD.

Even though the framework is not yet complete in terms of completely guiding organisations within their initiatives for the long-term management of Social Business Documents, it consolidated the findings gained through this study and therefore provides a first reference point for organisations. However, the framework is open for further refinement and should be developed further in the future.

RQ5: How can the research findings extend current theorisation in the field of documentary practice?

This study used the view of documentary practice as the theoretical lens. Therefore, section 2.1.2 outlined different theories and concepts within documentary practice. In different sections and within different topic areas challenges as well as similarities with theoretical concepts have been outlined. Therefore, the previous chapter summarises and discusses the findings in the area of:

- Definitions provided in the literature and their fit with Social Business Documents (section 10.1 and 10.2).
- The characteristics of Social Business Document (section 10.3).
- The missing focus of the management of Social Business Documents (section 10.4).

11.2. Contribution Revisited

Within the following, the practical and theoretical contributions outlined throughout this research study are shortly summarised.

11.2.1. Practical Contribution

This study contributes to practice in different ways. The two most visible contributions are the identification of challenges for the long-term management of Social Business Documents as well as the development of the framework addressing these challenges and including first actions to solve the challenges. One major action thereby is the analysis of an organisation's own SBD nature, structure and capabilities within the individual systems in use, which is supported through the development of the different information models (conceptual, structural and functional information model), the metadata model and the modelling techniques.

The information models outline the general possibilities of and for SBD and can be used by organisations as a starting point to analyse their own SBD. Thereby, the different modelling techniques, namely the object, functional, content and lifecycle model, can be used to specify

the information models according to the own prevailing conditions. Furthermore, the metadata model can guide organisations in their thinking of which information should be kept for their documents.

However, besides the framework and the models and modelling techniques included, a major practical contribution of this thesis is the creation of awareness for the topic of the long-term management of Social Business Documents. Throughout the empirical investigations it became clear that most participating organisations have not yet considered the management of SBD. However, over time their attention has been raised and the need for further examination arose. With the publication of this dissertation and the further dissemination of the research findings, it might be possible that the awareness and need for the management of SBD will be further raised beyond the scope of the participating organisations.

Furthermore, those organisations who already have processes in place might still benefit as issues in the processes can be revealed through the closer examination of SBD as suggested within the analysis. Within the case study company, for example, it was revealed that within the exported blog entries, which are transferred to the DMS, things such as comments, author and time-stamp were missing and these are now also included in the export.

Not all challenges which have been revealed by this study have been addressed by now. However, if the actions developed are conducted/implemented, a major contribution will also be seen in an increased quality of Social Business Document management.

11.2.2. Theoretical Contribution

This research analysed the bodies of literature in the domain of documents and Enterprise Information Management. It further addressed research in the area of enterprise collaboration identifying current academic as well as practitioner themes and combined these areas to provide the current body of literature around the management of documents in Enterprise Collaboration Systems. The study thereby makes a significant theoretical contribution to the area of documentary practice by extending its view to the document type of Social Business Documents. While the role of documents as paper documents, but also as digital documents for keeping information fixed and supporting communication and collaboration, but also as legal and historical evidence is well understood in general, the importance of Social Business Documents was not yet been addressed.

The focus within the investigations of Social Business Documents have been on both aspects of the term document. On the one hand, the document as a noun, describing the physical object was characterised through the analysis of the nature and structure of SBD. On the other hand, also documentation as a verb (and therefore an action) was addressed as it was looked at how the documents change over their life and through the interaction of different people.

The specific theoretical contributions have been outlined in the subsections of chapter 10 and are briefly summarized in the following:

- The naming of Social Business Documents as documents has been confirmed through the existing definitions and concepts of the term document and a definition for Social Business Documents has been developed.
- The characteristics of Social Business Documents have been outlined.
- Different information models representing general SBD specifications have been developed.
- The lifecycle model was adapted to fit the circumstances of Social Business Document.
- The need for redefining the concept of records has been argued.
- The concept of Documents for Actions has been supported through the example of Social Business Documents as Documents for Actions.
- The need for further theoretical investigation for the management of Social Business Documents has been identified.

11.3. Future Work

The end of one research journey should be seen as possibilities to the beginning of others. Therefore, based on the different practical and theoretical insights gained throughout this study, suggestions for future work are outlined in the following.

Implementation of Framework

The framework developed in this study is based on empirical insights. However, it was not implemented or tested within an organisation. One reason is the broad scope of the framework and the wide range of connected implications. The activities within the framework are not activities which can 'just be done'. Many of them are connected to organisational wide decisions and need to fit to other organisational strategies and policies. Therefore, they present time-consuming and resource-consuming activities as well as the need for strong support within an organisation. Despite all, in order to verify and expand the framework it should be implemented within an organisational setting.

Impact of Research Findings

Along with the implementation of the framework and the further distribution of the findings of this study in general goes the analysis of the impact of the research findings. Two different, but connected impacts can be explored. First, the impact this study has to raise the awareness for the need to manage SBD as other kinds of documents. Second, the potential impact that the framework has on the quality of Social Business Documents over the long-term.

Components as Documents

This study argues that the components of a Social Business Document are social content, being part of the compound Social Business Document. Section 2.3 discussed the separation between Social Business Documents and other Social Business Content, which is supported by the view that documents should always be seen within context. Thus, a comment is always attached to an SBD which builds its context and a like does not mean anything if we do not know what was liked. However, depending on the content of a comment, it could also speak for itself. Thus, the

questions arises if the comment should also be seen as an own document, leading to an SBD, which contains one or more documents at the same time? Within future work it should be analysed if, depending on its content, a comment could also be a valid document on its own.

SBD Collections

Depending on the type, it is possible to link Social Business Documents. Wiki entries, for example, stay for their own. However, through the hierarchy, which can be built with the help of child and parent pages, different entries can be linked, leading to Social Business Document collections. This is similar for tasks, which can be structured in a hierarchy. As these collections are connected in a certain context, the collections should also be looked at together.

Integration of SBD and DMS or Extending Functions of ECS

Currently, two different ways for managing Social Business Documents are discussed. The first way is the management of SBD within their originating systems. The second is the management through a Document Management System. Future research should more deeply investigate the advantages and disadvantages of both implementations. What can already be seen today is the need for further functionality in the ECS, if SBD should be managed in there, or, the need for coordinated process and standards, if managed within a DMS.

Extension to other Enterprise Systems

This study focussed on the investigation of Social Business Documents in Enterprise Collaboration and Enterprise Content Management Systems. However, more and more other systems, such as Enterprise Resource Planning systems, for example, also include the possibilities of commenting and/or liking documents and thus support the creation of SBD as 'become social' documents. Therefore, future work should investigate SBD in other system in order to also address the effective management of SBD in these systems.

Emerging Themes

Even though the themes that have been identified by practitioners and within current studies in the literature are similar in parts, they also differentiate in some themes. For example, the practitioners are concerned with GRC as well as the management of their information, which have not been addressed widely in the academic literature yet (section 3.3). Emerging themes within Enterprise Collaboration Systems extend to the measurement of activities often referred to as analytics (Schwade and Schubert, 2017) as well as the identification of use cases and scenarios (Schubert and Glitsch, 2015, 2016). All these themes contribute to addressing Social Business Documents. Therefore, future academic studies could analyse these topics from a document perspective, connecting these topics.

Levy (2001, p. 69) wrote: *"Even today's radical innovations will turn into tomorrow's legacy systems"*. However, this should not stop researchers from investigating new technologies or concepts, but can also be a stimulation for future research.

11.4. Concluding Remarks

Within our society documents serve as social functions and provide us with important knowledge (Francke, 2005, p. 62). We have always used some kind of writing for expression, but the way this writing occurs today *“is surrounding us and creates our identity, protects us to the same extent in which it inspects us”* (Ferraris, 2007, p. 4001). However, knowledge *“is acquired, used and reused, stored and disposed of, at a cost”* (Burke and Horton, 1988, p. 75). Furthermore, the new technologies change our practices, language and understanding and thus changes the world we construct (Winograd and Flores, 1986, p. 6). One example of such a change is the decreasing document lifespan, which can be seen today. While in the past, documents in organisations were fixed for about 6 month to a year before they needed to be changed, the speed of creating and editing document today is dramatically increasing (Rockley, 2003, p. 93).

As already outlined in the introduction of this dissertation, Social Business Documents are one prominent example of the current changes in documentary practices. Alongside the positive benefits of Social Business Documents they also bring new challenges in terms of their long-term management. This study has been a journey designed to investigate these challenges. Thereby, this study adopted document theory and document practice as the theoretical lenses and investigated Enterprise Collaboration as the origin of SBD. Furthermore, the concepts of Enterprise Information Management guided the study in terms of managing documents and thus brings together the topic as a whole. However, as Newman already outlined, *“EIM is not achieved by technology alone. Instead, it requires a holistic approach that balances technology choices with equally important organizational, governance, process and architecture dimensions”* (2005, p. 2). With the focus on the nature and structure of Social Business Documents within the systems and the organisational requirements, challenges and actions derived through the empirical investigations, this study tried to address the different dimensions and summarised the findings within the developed model and framework.

Both representations as well as the theorisation and the many findings outlined throughout this study can help organisations in their Social Business Document management practices and also progress documentary theory. However, even though different perspectives were taken into account, *“there will never be a common framework for all information”* (Genovese, 2012) and *“Not a single type of document has ever proven adequate for all needs and ideal in all situations”* (Liu, 2004, p. 286). In order to further support organisations and to further progress theory according to newly developed technologies and processes, the investigations into Social Business Documents should be extended nonetheless, but it also should be accepted that not all concepts and process will be perfectly fitting for all.

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Appendix A:

Case Study



KDZ Wiesbaden: Gemeinsames Arbeiten mit IBM Connections

Verena Hausmann
Florian Schwade

Arbeitsbericht im Rahmen der
Initiative IndustryConnect

INDUSTRYCONNECT
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Bitte referenzieren als:

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1. KDZ Wiesbaden: Gemeinsames Arbeiten mit IBM Connections

Verena Hausmann und Florian Schwade

Stand der Fallstudie: September 2015

Die KDZ Wiesbaden ist eine Dienstleistungsmarke und setzt sich aus der Zusatzversorgungskasse (ZVK) für die Gemeinden und Gemeindeverbände in Wiesbaden und der Kommunalbeamten-Versorgungskasse (BVK) Nassau zusammen. Zur Erfüllung ihrer Dienstleistungen ist die KDZ sowohl *intern* im Rahmen von Abstimmungsprozessen als auch im Projektmanagement mit *externen* Partnern und bei der Kommunikation mit Mitgliedern (kommunale Arbeitgeber) sehr stark auf aktuelle Daten und einen guten Informationsaustausch angewiesen. Zur Unterstützung ihrer Tätigkeiten hat die KDZ Wiesbaden ein IBM WebSphere Portal sowie das Kollaborationstool IBM Connections eingeführt. Diese Fallstudie beschreibt die Einführung von IBM Connections bei der KDZ, wie die Einführung die KDZ in ihrem Kommunikations- und Informationsaustausch unterstützt und welche Veränderungen sich hierdurch ergeben haben.

Folgende Personen waren an der Bearbeitung dieser Fallstudie beteiligt:

Tab. 1: Beteiligte Personen

Person	Funktion	Unternehmen	Rolle
Ralf Ortner	Bereichsleiter BO & DV	KDZ Wiesbaden	Anwender- unternehmen
Rüdiger Riedel	Leiter Rechenzentrum	KDZ Wiesbaden	Anwender- unternehmen
Verena Hausmann	Wissenschaftliche Mitarbeiterin	Universität Koblenz-Landau	Autorin
Florian Schwade	Wissenschaftlicher Mitarbeiter	Universität Koblenz-Landau	Autor

Ein Teil der Lösung ist unter <https://www.kdz-portal.de> zugänglich.

1.1. Unternehmensprofil

Als Dienstleistungsmarke besteht die KDZ Wiesbaden (im Folgenden als KDZ bezeichnet) aus zwei selbstständigen Körperschaften/Anstalten des öffentlichen Rechts, der (1) Zusatzversorgungskasse (ZVK) für die Gemeinden und Gemeindeverbände in Wiesbaden und (2) der Kommunalbeamten-Versorgungskasse (BVK) Nassau. Die KDZ beschäftigt sich mit der betrieblichen Altersvorsorge der Arbeitnehmer ihrer Mitglieder.

1.2. Hintergrund, Branche, Produkt und Zielgruppe

Die KDZ wurde vor über 75 Jahren gegründet und besteht heute aus den fünf Geschäftsbereichen Pensionsberechnung der Beamten, Lohn und Gehaltsabrechnung als Dienstleistung, Landesfamilienkasse, Beihilfe (alle der BVK zugeordnet) sowie der betrieblichen Altersvorsorge für Angestellte des kirchlichen und kommunalen Dienst (der ZVK zugeordnet). Im Bereich der BVK finden sich die jeweiligen Arbeitsgrundlagen in gesetzlichen Regelungen, bei der ZVK in tarifvertraglichen Regelungen. Abb. 1 stellt den Aufbau der KDZ graphisch dar. Darüber hinaus gibt es den übergreifenden Geschäftsbereich der Kapitalanlage, welcher dazu führt, dass die KDZ unter das Informationssicherheitsgesetz fällt.

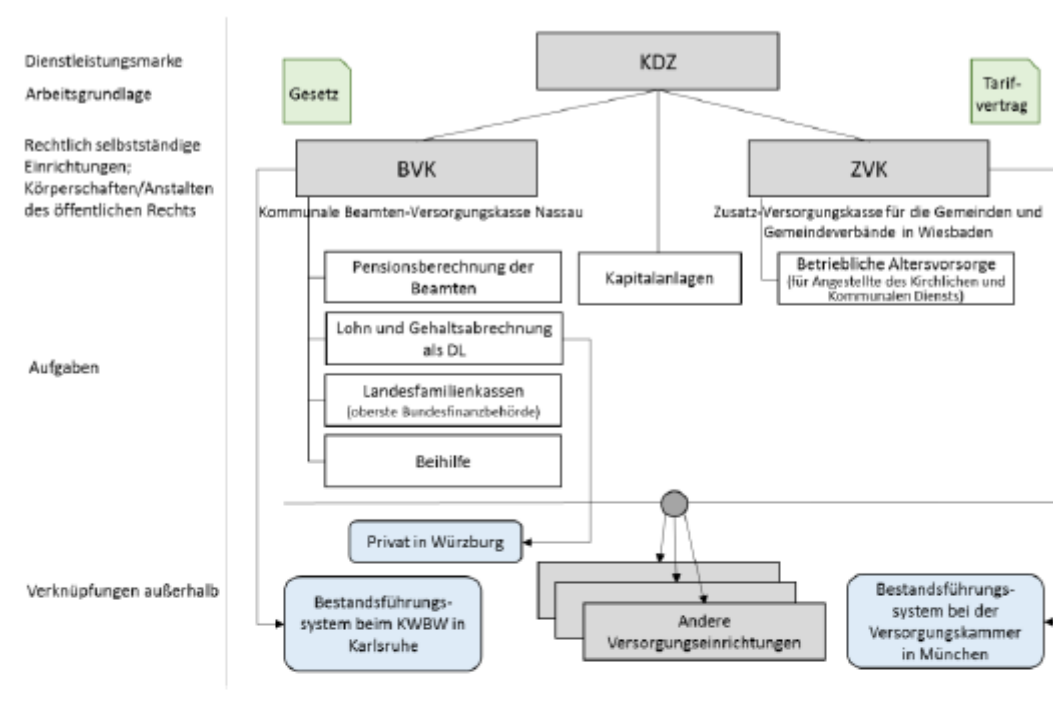


Abb. 1: Aufbau KDZ Wiesbaden

Mit circa 85 Mitarbeitern insgesamt, davon vier in der IT-Abteilung, verwaltet die KDZ rund 2,4 Milliarden Euro. Die KDZ hat als öffentliche Einrichtung keine Gewinnerzielungsabsichten und ist zur Sparsamkeit und Wirtschaftlichkeit verpflichtet. Mit ihrer Zuständigkeit im Landkreis Wiesbaden und den kreisangehörigen Städten, Gemeinden und gemeindlichen Einrichtungen, dem Westerwaldkreis, Rhein-Lahn-Kreis, Hochtaunuskreis, Main-Taunus-Kreis, Rheingau-Taunus-Kreis, Main-Kinzig-Kreis, Lahn-Dill-Kreis, Kreis Limburg-Weilburg und dem ehemaligen Landkreis Biedenkopf zählt die KDZ derzeit circa 1.200 kommunale Arbeitgeber als ihre Mitglieder, welche wiederum circa 320.000 beschäftigte Mitarbeiter haben.

Bundesweit gibt es 24 KDZ-ähnliche Einrichtungen, die jedoch durch ihre regionalen Tätigkeiten nicht in Konkurrenz zueinander stehen. Private Dienstleister im Bereich der Altersvorsorge führen zu einer verschärften Wettbewerbssituation. Tarifvertragsparteien, Gesetzgeber sowie die Rechtsprechung, auf dessen Grundlage die KDZ arbeitet, führen zu sehr komplexen Aufgabenstellungen und fremdbestimmtem Handeln.

Die Dienstleistungen der KDZ umfassen vor allem die betriebliche Altersvorsorge auf der Grundlage des Tarifvertrages über die zusätzliche Altersvorsorge der Beschäftigten im öffentlichen Dienst (ATV-K) sowie die Alters-, Erwerbsminder-

rungs- und Hinterbliebenenversorgung. Hierbei wird zwischen der betrieblichen Altersvorsorge als Pflichtversicherung und der PlusPunktRente 2013 als freiwillige Versicherung unterschieden. In beiden Fällen sind die Riester-Förderung und die Betriebsrente enthalten.

1.3. Unternehmensvision

Bereits vor der Einführung von IBM Connections waren die Unternehmensziele auf die Kommunikation mit den Stakeholdern (Mitglieder, Versicherte, Mitarbeiterinnen und Mitarbeiter, Geschäftspartner und alle, die mit der KDZ in Kontakt stehen und treten) ausgerichtet. Mit der Zeit überarbeitet, beschreibt die KDZ ihr Unternehmensziel derzeit wie folgt:

„Unser Unternehmensziel ist es, als Kompetenzzentrum, unser Partner-Netzwerk zu erweitern, zu pflegen und zu entwickeln. [...] Im Dialog mit unseren Partnern optimieren wir unsere Produkte und Kommunikationsplattformen. [...] Durch hohe Wissenstransparenz sind wir Mittler und erste Adresse zum Austausch von Informationen innerhalb unseres Netzwerkes...“

1.4. Stellenwert von Informationstechnologie im Unternehmen

Die KDZ arbeitet zum Zeitpunkt der Erstellung dieser Fallstudie an einer allgemeinen IT-Strategie, welche sich bereits in der Genehmigungsphase befindet. Sie bezieht sich auf die Grundlagen der Infrastruktur und ist auf die Sicherheit, die Verfügbarkeit und den Betrieb der IT ausgerichtet. Die IT dient dabei keinem Selbstzweck und ist prozessorientiert ausgerichtet.

Generell gibt es bei der KDZ keinerlei Softwareeigenentwicklung, da die Abhängigkeit auf einzelne Mitarbeiter vermieden werden soll. Derzeit gibt es auch Überlegungen, einen Managed-Service einzukaufen, der bei der Verwaltung und Administration des WebSphere Portals und IBM Connections helfen soll, da hier das Grund-Know-how fehlt.

Sicherheit ist ein sehr wichtiger Faktor in der IT. Daher wird die IT einmal im Monat von einem nicht-deutschen Partner (Anmerkung: Es gibt kein deutsches Unternehmen, das eine solche Dienstleistung anbietet) ohne Ankündigung durch Penetrationstest angegriffen. Die Partner werden alle paar Monate gewechselt, damit mit anderen Verfahren angegriffen wird. So ist bei einem Test aufgedeckt worden, dass die Firewall während des Einspielens eines Updates Sicherheitslücken aufweist. Seitdem geht das System vom Netz, wenn die Firewall aktualisiert wird.

2. Auslöser für das Projekt (ex-ante Sicht)

In den folgenden Abschnitten werden verschiedene Aspekte beschrieben, die zur Einführung von IBM Connections geführt haben.

2.1. Ausgangslage

Durch die mit 85 Mitarbeitern eher kleine Unternehmensstruktur, kennen sich sowohl die Mitarbeiter untereinander als auch die Partner zum Großteil persönlich. Es wird eine weitgehend hierarchiefreie Kultur gelebt, die sich zum Beispiel durch Open-Space-Büros ausdrückt. Da die Mitarbeiter der BVK und der ZVK fachlich sehr weit auseinander liegen, besteht zwischen ihnen kein Bedarf für eine Zusammenarbeit. Die BVK besteht aus kleinen Gruppen und war im Gegensatz zur ZVK schon immer sehr teamorientiert ausgerichtet.

Durch die Bindung der Dienstleistungen der KDZ an die Rechtsprechung und Gesetzgebung sind viele Dinge vorgegeben und im Falle rechtlicher Änderungen müssen sich Prozesse umgehend ändern, sodass Agilität gefordert ist. Hierzu zählt auch, dass Mitarbeiter und Mitglieder über Änderungen informiert werden müssen. Diese Informationspflicht war in der Vergangenheit kompliziert, zeit- und kostenintensiv.

In Rahmen eines Projekts zur Einführung eines optischen Archivs im Jahre 1999 entstand die Idee des workflowbasierenden Arbeitens. Es wurden die Archivlösung nscale von Ceyoniq zusammen mit dem PAVONE Espresso Workflow System eingeführt. Da die KDZ seit 1998 Lotus Domino nutzt, wurde eine Schnittstelle zwischen nscale und Lotus Notes eingerichtet (DocAkte). Im Jahr 2000 begann man dann auf Basis von Lotus Domino ein Wissensmanagementsystem aufzubauen. Dieses wurde laufend weiterentwickelt, aber man stieß dabei an die Grenzen der Funktionalitäten von Domino. Auf der Veranstaltung „IBM Hannover 2005“, die dem Thema Notes Version 7 gewidmet war, wurden die ersten Ideen zu IBM Connections, der neuen Kollaborationslösung von IBM, vorgestellt. Die KDZ war zu einem frühen Zeitpunkt an IBM Connections interessiert, sah zu diesem Zeitpunkt jedoch noch keine Einsatzmöglichkeiten im eigenen Unternehmen.

2.2. Motive und Ziele

Es gab zwei wesentliche Gründe, die zur Evaluation von IBM Connections und einem WebSphere Portal für einen Einsatz bei der KDZ führten. Ein früherer Direktor der KDZ, der vorher Vorstand einer Versicherung war, hatte von seinem früheren Arbeitgeber die Idee für ein Agentur- und Maklersystem mitgebracht, mit dem Ziel, die Kommunikation zu verbessern. Zwar hat die KDZ keinen Außen-

dienst, ihre Prozesse sind der einer Versicherung jedoch recht ähnlich und ihre Mitglieder nehmen in dieser Analogie die Rolle der Vertriebspartner ein. Das von damaligen Vorstand angedachte System sollte auch als Projektmanagementsystem genutzt werden.

Der zweite Grund war, dass man, wie oben angedeutet, bei der Nutzung von IBM Domino für das Wissensmanagement an Grenzen gestoßen war. Man war auf der Suche nach einem ganzheitlichen Ansatz, der sowohl Workflow- als auch Wissensmanagement unterstützen würde.

Die Competence Site (<http://www.competence-site.de/>), ein Spin-Off der Fraunhofer-Gesellschaft, diente als ein Beispiel und Motivator für den Einsatz eines WebSphere Portals und dessen Möglichkeiten.

Das primäre Ziel der Einführung von IBM Connections in der KDZ war es, das Projektmanagement mit externen Partnern zu verbessern. Darüber hinaus sollte IBM Connections mit WebSphere zusammen als Content Management System und als Wissensmanagement System für ein Intra- und Extranet genutzt werden, um Kompetenzen zu sammeln, bereitzustellen und Best Practices auszutauschen. Im Zusammenspiel sollte somit das langfristige und übergeordnete Ziel unterstützt werden, die KDZ als ganzheitliches Kompetenzzentrum mit seinen Mitgliedern präsentieren zu können und den Erfahrungsaustausch zwischen den Beteiligten mittels einer hausübergreifenden und netzübergreifenden Kommunikations- und Projektplattform zu fördern.

2.3. Erwarteter Nutzen

Vor der genaueren Untersuchung von IBM Connections mit Hilfe einer Business Value Analyse (siehe Abschnitt 2.4) sowie dem tatsächlichen Betrieb und den daraus entwickelten weiteren Einsatzmöglichkeiten (siehe Abschnitt 4.3) gab es lediglich grobe Vorstellungen über den Nutzen, den die neue Plattform erzielen würde. Hierzu zählte, dass der Kontakt zwischen den Mitarbeitern untereinander, aber vor allem auch zu den Mitgliedern verbessert und vereinfacht werden sollte. Als konkretes Ziel wurde die Reduzierung von E-Mails und Doppelarbeit formuliert. Beispielhaft hierfür stand ein Abstimmungsprozess über ein Dokument. Wenn in der Vergangenheit eine E-Mail mit Dokumentenanhang zur Abstimmung an 15 Personen geschickt worden war, schrieben die Beteiligten ihre Änderungen in das Dokument und schickten dieses an eine Person oder alle zurück. Falls die Nachricht nicht an alle ging oder die Veränderungen gleichzeitig eingegeben wurden, musste eine Person am Ende die Änderungen konsolidieren und das neue Dokument wieder an alle verschicken. Somit gab es zum einen ein sehr hohes E-Mail-Aufkommen, zum anderen lag dieses Dokument am Ende in verschiedenen Versionen und mehrfach bei den unterschiedlichen Benutzern vor. Mit der Hilfe

von IBM Connections sollten diese Abstimmungsprozesse vereinfacht, redundante Information vermieden und die Informationen besser zugänglich gemacht werden.

2.4. Entscheidungsprozess und Investitionsentscheidung

Aufgrund des in der Ausgangslage (Abschnitt 2.1) beschriebenen schon vorhandenen Einsatzes von Lotus Domino, der frühen Arbeit auf der EULUC Plattform (einer von der DNUG bereitgestellten IBM Connections Plattform für Mitglieder) und der damit verbundenen Auseinandersetzung mit der Software IBM Connections schon während der Entwicklungszeit gab es keine wirklichen Alternativen zu IBM Connections. Zudem kamen ähnliche Kollaborationsprodukte erst in späteren Jahren auf den Markt.

In 2007, zwei bis zweieinhalb Jahre nach dem ersten Kontakt mit IBM Connections, definierte die KDZ das Agentur- und Projektmanagement als zwei Use Cases mit den oben genannten Zielen. Der Direktor der KDZ beauftragte eine Business Value Analyse unter Einbezug der Aufsichtsgremien. Als einzige Alternative wurde das Produkt Novell GroupWise betrachtet. Es schien zwar von der Usability IBM Connections teilweise überlegen zu sein, jedoch fehlte hier das interne Know-how bei der KDZ. Somit wurde die Business Value Analyse nur für IBM Connections und WebSphere für drei Szenarien durchgeführt: (1) nur Connections, (2) nur WebSphere und (3) Connections und WebSphere zusammen.

Es wurden Geschäftsprozesse analysiert und die durchschnittlichen Zeiten und/oder Prozesskosten eingesetzt, die zum Teil durch vorher durchgeführte betriebswirtschaftliche Analysen bekannt waren. Darüber hinaus wurde auf Werte zurückgegriffen, die 2005 für die Einführung des Bestandsführungssystems ermittelt worden waren. Es wurde zudem berechnet, wie teuer mögliche Fehler, die durch die neue Lösung behoben werden könnten, sein würden. Außerdem wurde mittels Szenarien aus Erfahrungswerten ermittelt, wie viel durch die Senkung der Fehlerquote, durch besseren Informationszugang und Kollaboration eingespart werden könnte.

Hierzu folgten drei Rechnungen, eine großzügige, eine mittlere und eine sehr knappe. Bereits die sehr knappe Berechnung mit einer Senkung der Fehlerquote zwischen 5-15% ergab ein hohes Einsparpotenzial.

Darüber hinaus gab es Faktoren wie das Einsparpotenzial, wenn über das Portal (WebSphere) die Upload-/und Download-Funktion von den Mitgliedern genutzt wird, anstelle des Postweges oder weniger vorkommende Störungen (z.B. durch Besuch und Telefon) von Mitarbeitern. Vor allem die Mitarbeiter im ZVK Leistungsbereich sind hoch spezialisiert. Es wurde beispielsweise ermittelt, dass jede Störung dazu führt, dass der betroffene Mitarbeiter 20 bis 25 Minuten braucht, um

wieder in dieselbe qualitätsgesicherte Arbeit zurück zu finden, in der er vor der Störung gearbeitet hat.

Mithilfe der Business Value Analyse wurde schnell erkannt, dass *WebSphere alleine* keine nennenswert positiven Effekte gebracht hätte und das größte Potenzial in einer Einführung von *IBM Connections zusammen mit WebSphere* bestand. Die finale Entscheidung für die gemeinsame Einführung von Connection und WebSphere wurde daraufhin 2010 vom Direktor der KDZ getroffen.

2.5. Vorstellung der Partner

Die KDZ wurde bei der Einführung und beim Betrieb von IBM Connections und WebSphere von der Firma Agentbase unterstützt. Zusätzlich ist die Firma CONET ein IBM Connections Partner der KDZ.

Partner: Agentbase AG

Die Agentbase AG (<https://www.agentbase.de>) ist ein IT-Dienstleister im Bereich Business Process Management (BPM), Portale und Social Business und bietet Betreuung bei der Analyse, Implementierung und Wartung von IT-Anwendungen an.

Für die KDZ Wiesbaden ist die Agentbase AG der primäre und Individualpartner im Bereich Social Business und somit auch von IBM Connections. Sie betreuen die kompletten Managed Services von IBM Connection und dessen Wartung, Update und Security Management; WebSphere und dessen Portalentwicklung, Domino inklusive Anwendungspflege; und Chat. Außerdem führte Agentbase in der Einführungsphase Schulungen für IBM Connections bei der KDZ durch.

Partner: CONET Technologies AG

Die CONET Technologies AG (<http://www.conet.de/>) ist ein IT-System und Beratungshaus im Bereich SAP, Infrastruktur, Kommunikation und Software und bietet darüber hinaus verschiedene IBM-Connections-Applikationen an.

Für die KDZ ist CONET zum einen ein Backup-Partner für die Agentbase AG. Zum anderen hat die KDZ unter anderem die beiden Applikationen „Tag it“ (Vereinheitlichung der Tags durch Vorschläge) und den PDF-Generator (ermöglicht die Erstellung von PDFs aus z.B. Wikis und Blogs mittels Templates) von CONET im Einsatz.

3. KDZ Connect

Zusammen bilden die allgemeine Website mit Informationen zur KDZ, das auf WebSphere basierende KDZ Portal zum Wissens- und Dateiaustausch mit Kunden sowie die IBM Connections Lösung (*KDZ Connect*) eine umfangreiche Kollaborationslösung. Die Website stellt dabei das öffentliche Medium dar; KDZ Connect die interne Arbeitsumgebung für KDZ Mitarbeiter und externe Partner. Das KDZ Portal verbindet diese beiden Schnittstellen.

3.1. Geschäftssicht und Ziele

Das Social Portal mit IBM Connections dient in erster Linie folgenden drei Anwendungsbereichen: Informationsaustausch mit Mitgliedern und Partnern, interne Kommunikation sowie Kommunikation mit Partnern und Wissensaufbau.

Die KDZ steht in Kontakt mit einer Vielzahl an Mitgliedern und Partnern (vgl. Geschäftssicht in Abb. 2). In Bezug auf die Mitglieder ist der Informationsaustausch das Hauptanliegen, das mit dem Social Portal und KDZ Connect unterstützt werden soll. Allgemeine Informationen sowie aktuelle Formulare werden bereitgestellt, sodass Mitglieder diese herunterladen können. Informationsänderungen und Anträge etc. können von den Mitgliedern über das Portal hochgeladen werden.

Die interne und externe Projektarbeit wird mittels KDZ Connect durch seinen Kommunikations- und Informationsbereitstellungsfunktionen unterstützt. Darüber hinaus ist eines der Hauptziele auch der allgemeine Wissensaufbau.

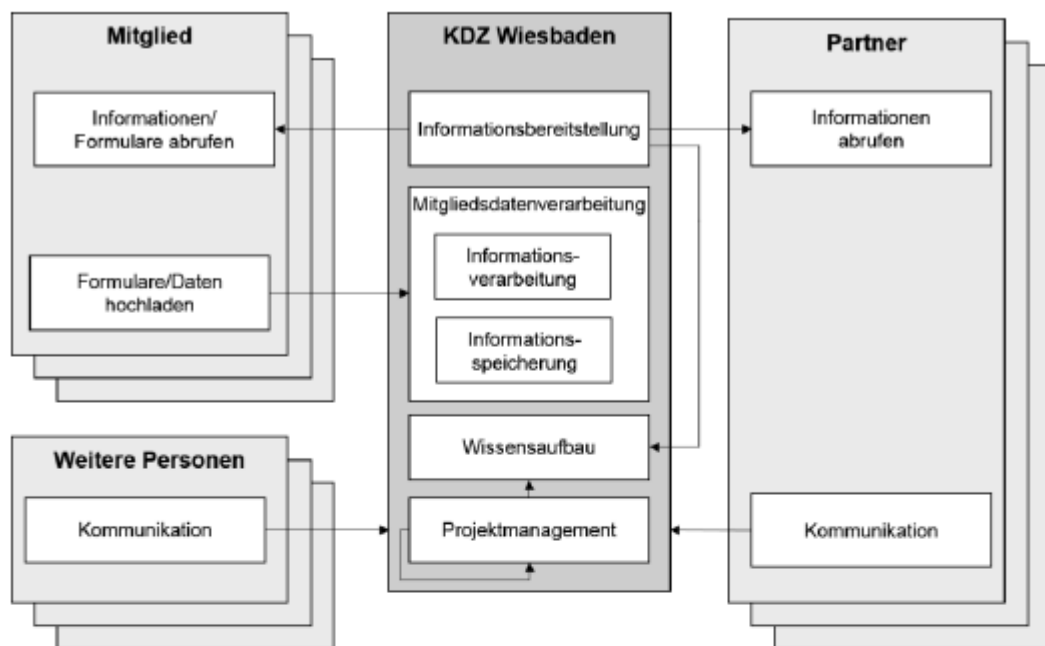


Abb. 2: Geschäftssicht KDZ Wiesbaden

Es können fünf Nutzergruppen identifiziert werden: (1) Mitarbeiter der Beihilfe (KDZ intern), (2) Mitarbeiter der ZVK (KDZ intern), (3) Social Portal (WebSphere) Mitglieder, (4) Partner und (5) weitere Personen, die auf dem Portal mit der KDZ in Kontakt treten, mit denen es jedoch keine Rechtsbeziehung gibt. Zu den Mitgliedern gehören unter anderem Gesamtkreise, Städte, Gemeinden, öffentliche, rechtliche, kirchliche und sonstige Einrichtungen aber auch Wohnungsbaugesellschaften, Sparkassen und Fraport.

Das Social Portal und auch KDZ Connect sind weltweit ohne VPN-Verbindung erreichbar. Neben dem Up- und Download von Informationen über das Portal sind im KDZ Connect alle verfügbaren Funktionen freigeschaltet. Blogs, Wikis, Aktivitäten, Foren, Ereignisse, Dateien, Lesezeichen, Subcommunities sowie zugehörige Communities werden genutzt. Der Ideation-Blog wird selten, RSS-Feeds sowie die Mediengalerie gar nicht genutzt. Die zusätzliche Applikation der Bibliothek ist nicht installiert.

3.2. Prozesssicht

Bei der Beschreibung von Arbeitsvorgängen spricht man oft von Geschäftsprozessen. Diese sind in der Regel stark strukturiert und kommen in einer präskriptiven Form vor; so auch bei Prozessen in ERP-Systemen. Im Kontext von Kollaborati-

onssystemen gestalten sich Prozesse jedoch oft flexibel und sind situationsabhängig durch verschiedenste kollaborative Vorgängen geprägt. Daher spricht man hier von Use Cases und Kollaborationsszenarien. Use Cases bezeichnen dabei Geschäftstätigkeiten auf abstrakter Ebene. Die darin enthalten Kollaborationsszenarien detaillieren und konkretisieren Use Cases anhand von Beschreibungen der spezifischen Schritte der Zusammenarbeit und/oder der Verschachtelung von Kollaborationsszenarien untereinander.

Im Rahmen von KDZ Connect wird eine Vielzahl von Vorgängen kollaborativ unterstützt. Abb. 3 zeigt eine Übersicht der Use Cases, welche bei der KDZ Wiesbaden Anwendung finden. Da diese Use Cases jedoch nicht immer nur durch KDZ Connect, sondern auch durch Fachanwendungen unterstützt werden, gibt es zu einigen Use Cases auch Pendanten in Form von Geschäftsprozessen. Dazu gehört unter anderem die „Zahlungsvise für die Beihilfe“. Sie ist einerseits als Geschäftsprozess vorhanden, wird andererseits jedoch kollaborativ in KDZ Connect durchgeführt und wird daher auch als kollaborativer Use Case relevant.



Abb. 3: Übersicht der mit KDZ Connect bearbeiteten Use Cases

Eine zentrale Rolle kommt dem Use Case „Projektmanagement“ zu. Nicht nur intern, sondern auch mit externen Kunden und Partnern wird KDZ Connect ver-

wendet, um das Projektmanagement zu unterstützen. Besonders wichtige Kollaborationsszenarien sind in diesem Zusammenhang „Informationen teilen“ und „Protokolle und Aufgaben erstellen“. Aber auch weitere Kollaborationsszenarien (Abb. 4) wie „Informationen abrufen“ werden in unterschiedlicher Intensität genutzt.

Neben dem Projektmanagement stehen einige weitere Use Cases im besonderen Fokus der Arbeit mit KDZ Connect: „Interne Mitarbeiterkommunikation“, „Softwareentwicklung“, „Teamorganisation“, „Wissensmanagement“ und „Workshoporganisation“. Neben diesen stark unterstützen Use Cases gibt es jedoch auch weitere, welche teilweise mit KDZ Connect unterstützt werden. Hierzu zählt beispielsweise der Use Case Personalmanagement, in welchem die Kollaborationsszenarien „Dienstreise genehmigen“ oder „Urlaubsantrag genehmigen“ vorkommen.

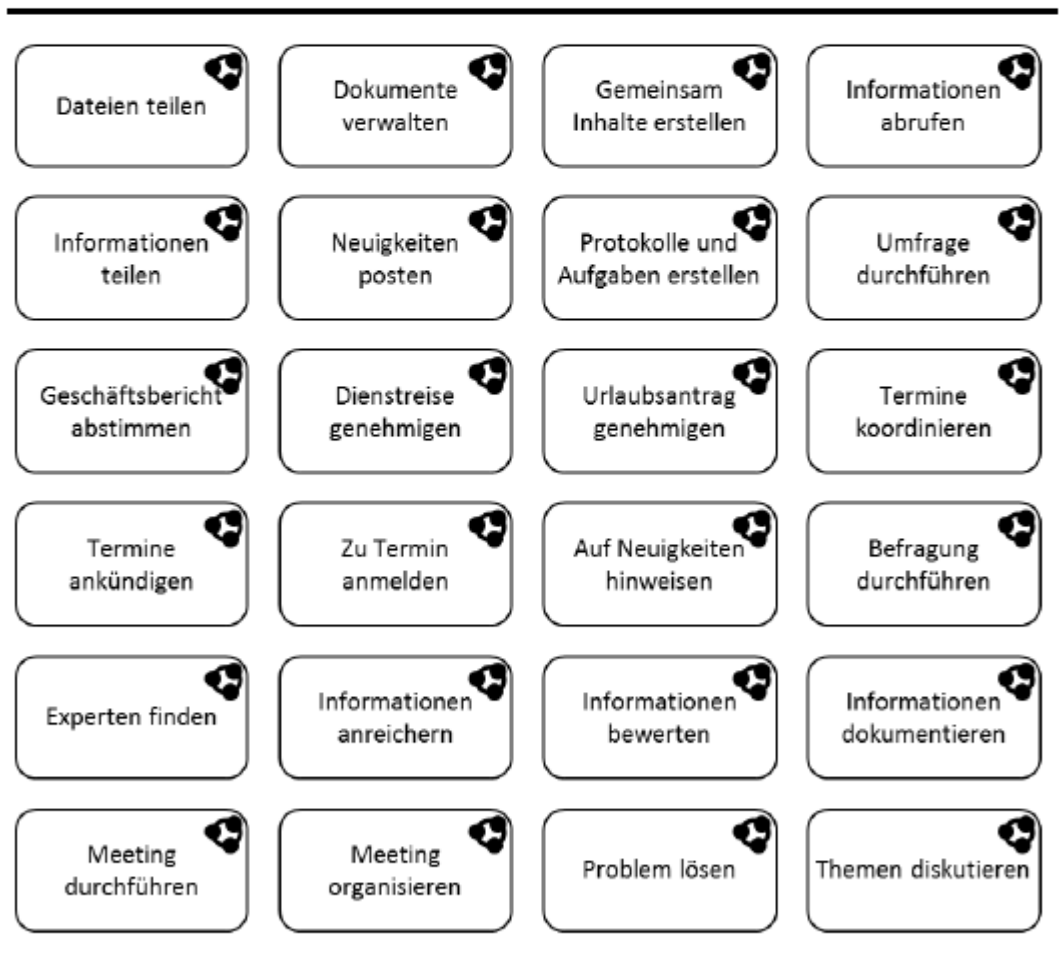


Abb. 4: Übersicht der mittels KDZ Connect bearbeiteten Kollaborationsszenarien

Durch ihre Ausrichtung auf kommunikative und organisatorische Ziele überschneiden sich die bei der KDZ häufig anzutreffenden Use Cases stärker als andere in Bezug auf die Nutzung bestimmter Kollaborationsszenarien. So spielt das Kollaborationsszenario „Informationen teilen“ eine zentrale Rolle. Das Teilen von Informationen betrifft dabei viele verschiedene Bereiche. So zum Beispiel das Bereitstellen von Arbeitsanweisungen, Geschäftsberichten, Agenden für Meetings und Protokolle. In KDZ Connect können diese direkt kommentiert und angepasst werden. Daneben treten auch „Meeting organisieren“, „Dateien teilen“, „Dokumente verwalten“, „gemeinsame Inhalte erstellen“, „Informationen abrufen“, „Neuigkeiten posten“, „Protokolle und Aufgaben erstellen“ und „Umfrage durchführen“ gehäuft in diesen Use Cases auf. Die übrigen in Abb. 4 dargestellten Kollaborationsszenarien werden nur unregelmäßig, jedoch auch mittels KDZ Connect durchgeführt.

3.3. Anwendungssicht

Die KDZ setzt eine Vielzahl von Anwendungen ein (vgl. Abb. 5). Ein großer Teil der Anwendungen basiert auf IBM Domino. Die wichtigsten Anwendungen im Kontext der Kollaboration und des Wissensaustausches sind IBM Connections 5 (KDZ Connect), WebSphere Portal, IBM Sametime, IBM Notes und Ceyoniq nscale. PIWIK wird als Anwendung für Web Analytics genutzt, mit der Zugriffsstatistiken erhoben werden. Zudem gibt es extern betrieben ein kassenübergreifendes Wissensmanagement System auf Basis von AKA (gehostet von der Versorgungskasse in München) sowie Atlassian Jira als Ticketsystem zur Zusammenarbeit mit externen Partnern (als Managed Service von Agentbase).

IBM Connections wird von der KDZ als Infrastruktur wahrgenommen. Der Zugriff kann über einen Webbrowser oder über die entsprechenden Apps für mobile Endgeräte erfolgen. Zusätzlich werden das Windows Desktop Plugin und das Firefox Plugin für KDZ Connect verwendet.

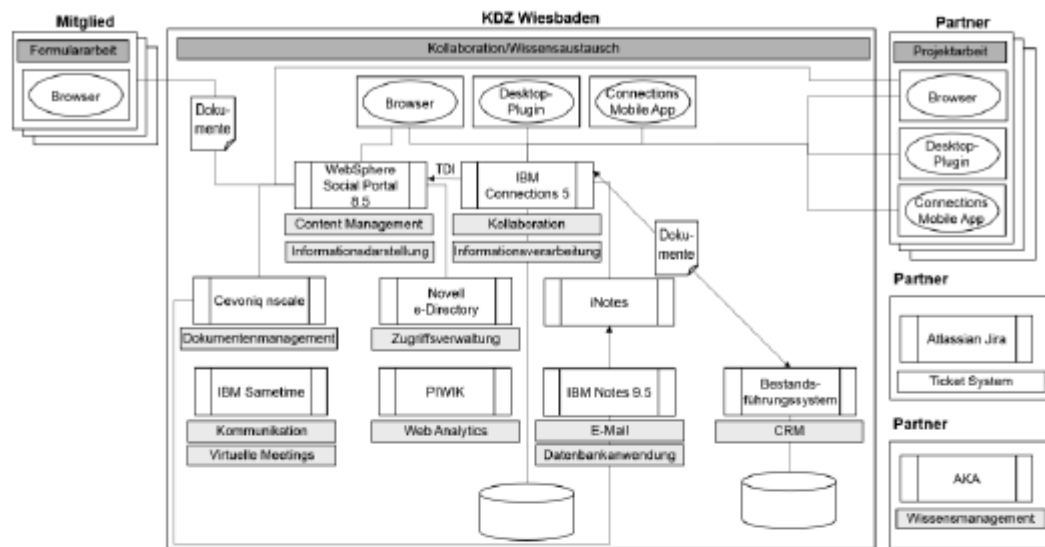


Abb. 5: Anwendungssicht KDZ Wiesbaden

Zwischen dem Bestandsführungssystem und KDZ Connect gibt es eine Schnittstelle. Diese Integration ermöglicht den Dokumenten- und Datenaustausch zwischen den beiden Systemen. Daten können temporär im KDZ Connect abgelegt werden. Diese werden dann automatisch in das Bestandsführungssystem übernommen und aus KDZ Connect entfernt. Dies ist insbesondere bei sensiblen Daten, beispielsweise Stammdaten, die aus Gehaltsabrechnungsverfahren stammen, relevant. Grundsätzlich werden Daten, die als sensibel eingestuft werden, nicht im KDZ Connect abgelegt sondern im Bestandsführungssystem. Dabei handelt es sich größtenteils um Steuerdaten, Sozialversicherungsdaten und medizinische Daten. Der Zugriff auf sensible Daten ist nur über eine Authentifizierung mittels Zertifikat möglich. Das ungefähre Volumen, das durch diese Daten anfällt, beläuft sich auf etwa 60 bis 70 Gigabyte am Tag.

Jegliche Inhalte, die im Social Portal (WebSphere) dargestellt werden, stammen aus Communities in KDZ Connect. In WebSphere findet kein Web Content Management statt. Dazu werden Inhalte aus KDZ Connect mittels des Tivoli Data Integrator (TDI) ins WebSphere Portal integriert. So können im Portal die Inhalte aus verschiedenen Connections Communities aggregiert werden. Dieser Connector wird auch verwendet, um die Benutzer zwischen den beiden Systemen zu synchronisieren.

Alle Standardfunktionen von IBM Connections stehen in KDZ Connect zur Verfügung, jedoch werden nicht in allen Communities alle Funktionen freigeschaltet. Zusätzlich wurde iNotes ins KDZ Connect eingebunden, damit Mitarbeiter von

unterwegs aus schnell auf ihre E-Mails zugreifen können. Im internen Gebrauch wird Sametime für die Kommunikation und für virtuelle Meetings eingesetzt.

Grundsätzlich sind alle Portal User auch User im KDZ Connect. Sie haben jedoch keinen vollen Zugriff auf KDZ Connect. Inhalte können eingesehen werden, die Kollaborationsfunktionen stehen jedoch nicht zur Verfügung. Da es unterschiedliche Stakeholder für das Portal und KDZ Connect gibt, ist ein Berechtigungskonzept notwendig. Der Zugriff auf die Anwendungen im Portal wird über ein Novell eDirectory gesteuert. Dazu werden Gruppen verwendet. WebSphere filtert in einem ersten Schritt, welcher Benutzer in welcher Gruppe eingetragen ist. In einem zweiten Schritt wird für die Benutzer ein Attribut überprüft, über das der Zugriff auf einzelne Objekte geregelt werden kann. So kann ein Berechtigungskonzept hinterlegt werden, das nur den Zugriff auf Informationen ermöglicht, die tatsächlich benötigt werden.

Die Vielzahl der Systeme stellt die KDZ vor die Herausforderung, die Login-Daten der Benutzer zu verwalten. Es ist zwar ein LDAP vorhanden, ein Single-Sign-On ist aktuell jedoch noch nicht realisiert. Dies ist auf Probleme mit den Namenskonventionen der eingesetzten Systeme zurückzuführen. Für den Zugriff auf KDZ Connect erhalten Mitarbeiter anfangs ein Standardpasswort, das im Benutzerprofil geändert werden soll. Die Erfahrung hat jedoch gezeigt, dass ein Großteil der Benutzer das Passwort nicht ändert.

3.4. Technische Sicht

Die KDZ betreibt ein eigenes Rechenzentrum im Haus. Im Zuge dessen werden auch der First-Level Support und die Administration der eingesetzten Systeme von der KDZ selbst durchgeführt. Alle weiteren Dienstleistungen, wie beispielsweise die Anwendungsentwicklung, werden von Dienstleistern und externen Partnern bezogen. So entstand ein partnerschaftliches Netz von sieben Firmen. Das haus eigene Rechenzentrum befindet sich in Wiesbaden. Der Großteil der Server wird mittels EMC² VNX virtualisiert. Als zugrunde liegender Massenspeicher dient ein EMC Centera Server. Wie in der Anwendungssicht beschrieben, basiert ein Großteil der eingesetzten Anwendungen auf Domino. Daher gibt es insgesamt vier Domino Server, von denen drei auf Linux und einer auf Windows laufen. Zusätzlich gibt es einen Server für KDZ Connect, einen Server für Sametime und einen WebSphere-Server für das Portal (siehe Abb. 6). Aus Sicherheitsgründen befinden sich die Server für KDZ Connect und das Social Portal in einer demilitarisierten Zone (DMZ). Um eine möglichst hohe Ausfallsicherheit zu gewährleisten sind alle Server physikalisch redundant ausgelegt. Darüber hinaus sind auch alle Services außer WebSphere redundant ausgelegt. Die Datenbanken von IBM Connections befinden sich auf einem Datenbankserver und sind somit nicht auf verschiedene Instanzen aufgeteilt. Im Bereich der Datenbanken setzt die KDZ auf Oracle und

DB2-Datenbanken. Die DB2 wird dabei für all das genutzt, was über die Portlets in IBM Connections gespeichert wird, wie z.B. Wikis, Blogs, Foren und Dokumente. Die Oracle-Datenbank speichert alles, was operativ in den Fachabteilungen läuft wie z.B. das DMS System nscale.

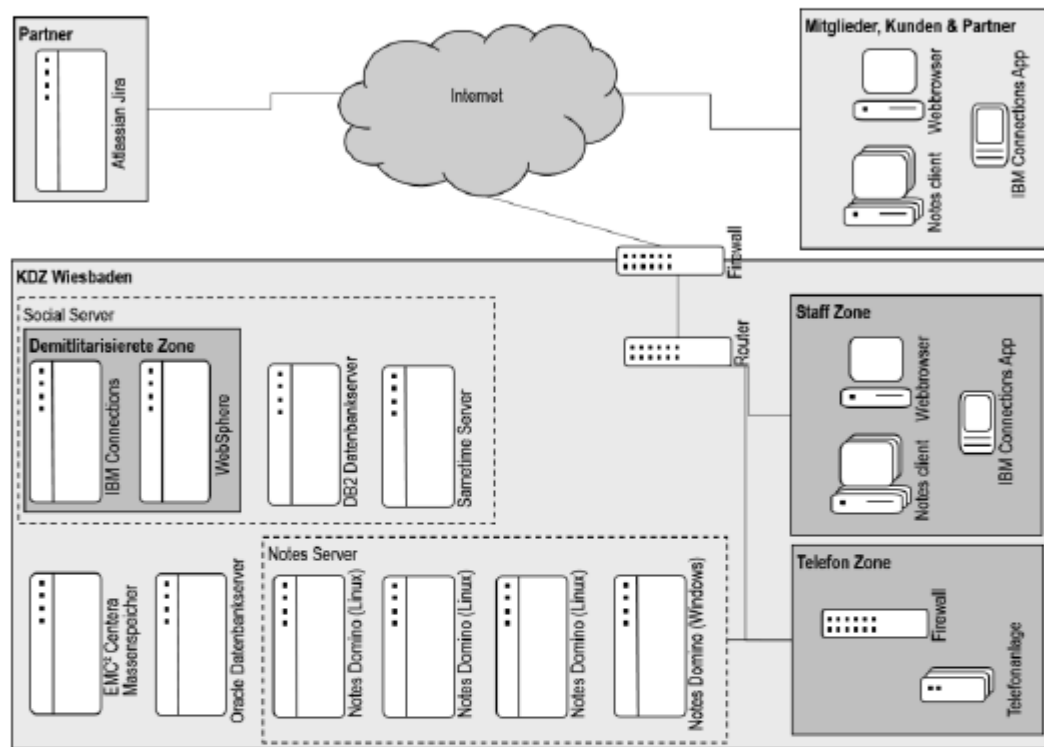


Abb. 6: Technische Sicht KDZ Wiesbaden

Das Netzwerk der KDZ wird durch eine Firewall geschützt. Zudem gibt es separat eine physische und eine Softwarefirewall für die IP-Telefonie. Die Telefonanlage verfügt über eine Anbindung an Notes aber nicht an Sametime. Dazu hätte die KDZ eine zweite Telefonanlage benötigt und setzt daher auf eine Lösung von Microsoft.

Mitarbeiter haben über das Intranet, Mitglieder, Kunden und Partner über das Internet (mittels Webbrowser und Apps für mobile Endgeräte) Zugriff auf IBM Connections und das WebSphere Portal.

Tab. 2 zeigt, welche Softwareversionen zum Zeitpunkt der Aufnahme der Fallstudie (Sept. 2015) genutzt wurden.

Tab. 2: Spezifikationen und Merkmale

Software	Server/Hardware
Connections 5	IBM Connections Server auf Linux 64bit
WS Portal 8.5	WebSphere Server (Zertifikatsserver von Secommerce)
Sametime 8.5	IBM Sametime Server
Domino 9	Notes Domino Server
Notes 9.5	Notes Clients
DB2 Datenbank	DB2 Datenbankserver auf Linux 64bit
Astara Sophos	Externe Firewall
Novell eDirectory	IBM OS
Ceyoniq nscale	ECM ² Centera

4. Einführungsprojekt und Betrieb

Nach der oben beschriebenen Ausgangslage werden im Folgenden die Aspekte des Einführungsprojektes sowie der laufende Betrieb nach der Einführung, zum Zeitpunkt der Aufnahme der Fallstudie im September 2015 beschrieben.

4.1. Konzeption, Entstehung und Roll-out der Lösung

Nachdem die Entscheidung für die Einführung von IBM Connections gefällt war, fand eine schrittweise Einführung statt. IBM Connections wurde bereits 2,5-3 Jahre vor der KDZ-internen Einführung durch Projektcommunities mit externen Partnern über die EULUC-Plattform genutzt. Die daraus entstandenen Erkenntnisse konnten nun genutzt werden.

Zunächst wurde IBM Connection 3.5 gekauft und operational mittels erster Projekt-Communities getestet. Ziel war zunächst die Unterstützung der Zusammenarbeit mit externen Partnern und das damit verbundene Projektmanagement mittels IBM Connections zu unterstützen. Während dieser Zeit hatten lediglich ausgewählte KDZ-Projektmitarbeiter sowie ausgewählte externe Partner Zugriff auf das KDZ interne IBM Connections. Die Mitarbeit von externen Partnern auf der Plattform wurde mittels Nutzungsbedingungen (NDA) geregelt, welche projektbezogene Vorgaben zur Nutzung der Plattform beinhalten.

Zwar wurde IBM Connections gemäß des Unternehmensleitbildes, eine langfristige Strategie für die Kommunikation und Kollaboration zu unterstützen, eingeführt, eine explizite, schriftlich festgehaltene Einführungsstrategie für IBM Connections

gab es jedoch nicht. Auch wurde nicht an ursprünglich geplanten Projektzielen und Maßnahmen festgehalten. Mitarbeiter wurden bezüglich bestehender Probleme und der Frage „Wie kann die Technik verwendet werden, um die neu etablierte Arbeitskultur zu unterstützen?“ befragt. Daraufhin wurden Ziele und Führungsstrategien formuliert.

Der Personal- und Betriebsrat äußerte verschiedene Bedenken bezüglich IBM Connections. Sie wollten einem Go-live erst zustimmen, wenn Richtlinien zur Nutzung erarbeitet sind. Zwar gab es erste Versionen einer Social Media Richtlinie, diese war jedoch noch nicht verabschiedet. Durch diese und krankheitsbedingte Verzögerungen wurde dann im März 2015, nun mit Connections Version 4, der interne Roll-out gestartet, obwohl die Social Media Richtlinie noch nicht verabschiedet war. Bis auf das Einsetzen des KDZ Unternehmenslogos sowie die Einbindung von Sametime und iNotes wurden hierbei zunächst keine Anpassungen bzw. kein Customizing durchgeführt.

Die technische Anbindung verlief Zug um Zug alphabetisch und mit Neueinstellung. Nach der technischen Anbindung wurde der eigentliche Roll-out erst durch einzelnen Personen und später dann gruppenweise durchgeführt. Die Vorgehensweise hierfür ist im nächsten Abschnitt erläutert.

4.2. Projektmanagement und Change Management

Auch wenn es bei der KDZ keine klar festgelegten Projektphasen gab, so wurden im Rahmen der Projektorganisation verschiedene Schritte durchgeführt, um die Einführung von KDZ Connect zu unterstützen. So wurden zwar Zielvorstellungen formuliert (Meilensteine), diese beschrieben jedoch nur sehr grob, dass Inhalte bis zu einer gewissen Zeit eingestellt werden sollten.

Die eigentliche Arbeit mit KDZ Connect wurde zunächst mit internen Mitarbeitern begonnen, „die dazu passten“. Hierbei wurde über persönliche Kontakte nach Mitarbeitern gesucht, die die Themen Projektmanagement und Kollaboration gerne softwareunterstützt angehen wollten. Nachdem, wie oben erwähnt, erste Projekte mit externen Mitarbeitern auf der externen IBM Connections Plattform EULUC liefen, gab es Präsentationen über IBM Connections für die einzelnen Arbeitsgruppen. Anschließend wurden Gruppen- und Fachbereichsleiter angeschrieben, um Redakteure zu nennen, die federführend für ersten Content auf der eigenen Plattform sorgen sollten. Diese wurden dann separat noch einmal von dem Partner Agentbase geschult. Erst als die Redakteure ein gewisses Maß an Content in KDZ Connect eingestellt hatten, wurde ein Einführungstermin festgelegt. Somit wurde das Go-live in den einzelnen Arbeitsgruppen individuell und erst nach Erstellung von Inhalten ermöglicht.

Darüber hinaus wurden konkrete Anwendungsfälle aus den einzelnen Fachbereichen gesammelt. Diese, sowie neue Inhalte und Tipps wurden und werden über interne Werbeaktionen für KDZ Connect am schwarzen Brett der KDZ vorgestellt.

Die anvisierten Geschäftsprozesse sollten nun mit KDZ Connect unterstützt werden. Hierbei musste jedoch die mit IBM Connections einhergehende Veränderung der Prozesse berücksichtigt werden, sodass die Veränderungen in der Arbeitsweise Zug um Zug geschahen. So musste und muss sich das bei manchen Mitarbeitern vorhandene Bereichsdenken ändern. Als ein frühes Projekt zum Arbeiten mit KDZ Connect wurde eine ZVK Community erstellt, welche generelle, für alle Beteiligten interessante Informationen enthält und welche die Kollaboration zwischen allen ZVK Mitarbeitern fördern sollte. Mitarbeiter wollten diese Community zunächst geschlossen haben. Es forderte ein Umdenken, zu realisieren, dass es gut ist, wenn alle Zugriff auf gewisse Informationen haben. Aus datenschutzrechtlichen Gründen ist das Öffnen der Communities jedoch nicht überall und vor allem nicht zwischen BVK und ZVK möglich.

Ein Beispiel für einen gescheiterten Use Case aufgrund von mangelnder Akzeptanz von Mitarbeitern war die Idee, die Dienstwagenplanung über einen Kalender in KDZ Connect zu realisieren.

Auch wenn es eigentlich keine großen Akzeptanzprobleme mit KDZ Connect gibt, so bedarf es trotzdem Zeit und guter Best-Practices, die Integration in alle Geschäftsprozesse durchzuführen. Das Microsoft Word Desktop-Plugin war bei der KDZ ein Beispiel, welches die Integration von IBM Connections in den Arbeitsalltag erleichtert hat, da Dokumente hiermit direkt in KDZ Connect gespeichert werden können. Darüber hinaus wurde die IBM Connections App freigeschaltet, da diese einigen Mitarbeitern das Zurechtfinden in KDZ Connect im Vergleich zum Browserzugang erleichterte.

Was die Beteiligung und Mitarbeit an IBM Connections hindert, ist der Faktor, dass Wissensvermittlung und Wissensbereitstellung bei der KDZ zurzeit nicht Teil von Bewertungen und Zielvereinbarungen im Rahmen von Leistungslohn sind.

4.3. Laufender Betrieb und Weiterentwicklung

Mit dem WebSphere Portal als Einstiegspunkt für interne Mitarbeiter und externe Kunden und IBM Connections als darunter liegende Arbeits- und Infrastruktur sollte nun eine zentrale Tür für Informations- und Wissensvermittlung sowie Zusammenarbeit bei der KDZ geschaffen werden.

Technischer Betrieb

In Bezug auf den technischen Betrieb wird KDZ Connect als unproblematisch gesehen. Jedoch ist die Datensicherung schwierig. Die KDZ hält derzeit zwar eine

einfache interne Datensicherung vor; es gibt in IBM Connections jedoch keinen Aufspringpunkt für Restors über den man einfach Backups zu einem bestimmten Zeitpunkt einspielen kann. Es wird nach einer Lösung gesucht, die DB2-Datenbank zu spiegeln und diese in einem externen Ausfall-Rechenzentrum in einem Linux Cluster zu speichern. Damit sollen das Portal und KDZ Connect ausfallsicher werden.

Informationen zu Releasewechsel werden zum einen von den KDZ Partnern Agentbase und CONET zum anderen auch direkt von der IBM an die KDZ heran getragen. Die Entscheidung zum Update wird dann nach einer internen Evaluation getroffen.

Ein Umstieg auf eine Cloud-basierte Lösung wie die IBM Smart Cloud kommt für die KDZ derzeit aufgrund von Datenschutzbedenken nicht in Frage.

Nutzung und Adaption

In Bezug auf die Nutzung und Adaption von IBM Connections ist die Wahrnehmung, dass das Gesamtprojekt in Verbindung mit dem Portal zwar noch nicht „über den Berg“ ist und es ein weiteres Jahr Einführung braucht bevor das Projekt tragfähig wird, jedoch ist es für die bislang relativ kurze Betriebsdauer weit fortgeschritten. Abgesehen vom Bereich Lohn & Gehalt, der derzeit aufgrund starker Veränderungen im Bestandsführungssystem IBM Connections noch nicht nutzt und dem Bereich der Pensionsberechnung für Beamten, in dem Protagonisten fehlen, ist IBM Connections unternehmensweit eingeführt. 85 registrierte interne und 800 externe Nutzer sind derzeit auf der Plattform registriert. Die Verteilung von erstellten Communities liegt dabei zu 50% bei rein KDZ-internen und 50% mit externen Partnern genutzten Communities. Es ist jedoch zu beachten, dass das WebSphere Portal für viele Nutzer der hauptsächliche Konsumweg für IBM Connections Inhalte ist. Der ausschließlich lesende/konsumierende Portaluser weiß somit in der Regel nicht, dass er auch IBM Connections User ist. Darüber hinaus herrscht noch eine gewisse Konsumhaltung. Inhalte werden viel gelesen, aber es werden nur von wenigen Mitarbeitern Inhalte bereitgestellt. Für Diskussionen oder Kommentare zu Inhalten ziehen viele Mitarbeiter nach wie vor Präsenzmeetings vor. Das Mitarbeitertracking mittels PIWIK, welches lediglich zur Akzeptanzmessung genutzt wird, zeigt derzeit eine durchschnittliche Verweildauer von Nutzern auf der Plattform von über 30 Minuten pro Sitzung auf. Der Umgang mit KDZ Connect ist hierbei teilweise noch zaghaft. Neue Communities werden zwar erstellt, jedoch werden z. B. die Anpassungsmöglichkeiten der Komponenten innerhalb einer Community noch nicht genutzt, da sich User oft nicht trauen, hier etwas zu verändern.

Gemessen an den Geschäftsprozessen werden derzeit 10–15% der Geschäftsprozesse mittels KDZ Connect direkt abgebildet und/oder unterstützt. Wie auch in der Anfangsphase werden weiterhin Anwendungsfälle aus den Abteilungen gesamt-

melt. Diese werden monatlich von der DV-Verbindung (ein Team aus 4 Personen, das die Verbindung zwischen der IT und den Fachabteilungen darstellt) besprochen und die nötigen Einführungsschritte geplant und umgesetzt. Privat genutzte, öffentliche Communities sind erlaubt. So entstanden zum Beispiel Communities für den Fanclub Eintracht Frankfurt, Kochrezepte und Handarbeitsschnittmuster. Diese Communities helfen, die Einführung von KDZ Connect weiter voran zu treiben, da so der Umgang mit dem System auf einer freiwilligen Basis gelernt wird. IBM Connections soll bei der KDZ jedoch immer weiter als direktes Arbeitsmittel verstärkt werden und nicht zu einem System werden, dass man just for fun benutzt.

Content Management

Das Content- und Dokumentenmanagement spielt für die KDZ eine wichtige Rolle. Zum einen arbeiten die Mitarbeiter mit personen-bezogenen und kritischen Daten wie Krankheitsakten und Steuerinformationen, die geschützt werden müssen und Aufbewahrungsfristen unterliegen. Zum anderen sollen und müssen Informationen wie Tagesordnungen und Protokolle von Besprechungen, Arbeitsanweisungen, Handlungsmethoden, Aufgabenplanungen etc., die in klassischen Dokumenten wie Word oder PDF gespeichert sind, aber auch in Wikis, Blogs, Foren und Aktivitäten adäquat gemanagt werden. Des Weiteren ist die rechtssichere Archivierung bei der KDZ nach TR RESISCAN BSI zertifiziert.

Die kritischen, mitgliederbezogenen Daten werden nur temporär in IBM Connections abgelegt und von dort kundengleich/real-time abgeholt und in das Bestandsführungssystem übernommen. Über das Portal werden auch Dateien von Personen hochgeladen, mit denen es keine Rechtsbeziehung gibt. Diese können auch Dateien wie z.B. Bescheide herunterladen. Diese Massendownloads werden automatisch generiert und über einen automatischen Uploader bereitgestellt. Mittels des Berechtigungskonzepts der Oracle Datenbank wird gewährleistet, dass jeder nur seinen eigenen Bescheid bekommt. Bescheide bleiben zwei Monate liegen, danach startet ein Workflow und sie werden automatisiert gelöscht

Darüber hinaus wünscht sich die KDZ eine Verknüpfung von IBM Connections mit ihrem DMS System nscale, um auch alle anderen Informationen managen zu können. Hierzu wurde von Vertretern von Ceyoniq und Agentbase bereits ein technisches Papier entwickelt, das diese Schnittstelle beschreibt. Derzeit scheitert dieses Projekt jedoch an der Finanzierung.

Von verschiedenen Partnern wird IBM Connections bereits für die elektronische Auftragsverwaltung genutzt. Diese sind nach Abgabenordnung 10 Jahre aufbewahrungspflichtig (nach GDPdU). Mit IBM Connections ist dies derzeit nicht geregelt und stellt ein großes Problem dar.

Des Weiteren gibt es erste abgeschlossene Projekte in IBM Connections bei der KDZ. Es ist jedoch nicht möglich, Communities auf inaktiv zu setzen. Da wichtige Projektinformationen nicht geändert oder gelöscht werden sollen bzw. dürfen,

fehlt auch hier eine konforme Content Management Lösung. Der derzeitige Workaround der KDZ läuft über einen Admin User, welcher als einziger Benutzer noch Mitglied solcher Communities bleibt. Dieses ist langfristig jedoch keine zufriedenstellende und sinnvoll handhabbare Lösung.

Neben diesen allgemeinen Archivierungsproblemen des Zugriffs und der Sicherheit sieht die KDZ auch Klärungsbedarf in den folgenden Fragen: Was passiert mit dem Inhalt auf lange Sicht? Was dürfen andere mit dem Inhalt machen, den ich dort einstelle? Wer hat Urheberrecht? Wer haftet für den Inhalt? Dieses sind keine speziellen IBM Connections Fragen, jedoch Herausforderungen an das Dokumentenmanagement allgemein, die auf die Inhalte in IBM Connections adaptiert werden müssen.

Zukunftsvisionen

Trotz des bislang guten Projektverlaufs müssen weiterhin Anreize für die Nutzung von KDZ Connect geschaffen werden, um die Plattform vollständig in den Arbeitsalltag zu integrieren. Hierfür sollen zum Beispiel die Zeiterfassung, Dienstreiseanträge und -abrechnungen sowie die Materialbeschaffung als Anwendungen mit Schnittstellen ins KDZ Connect eingebunden werden. Darüber hinaus wird derzeit ein Modul entwickelt, das Nutzer gezielt über Activity Streams informieren kann. Auch ist geplant, die derzeit auf einem Oracle Web Portal basierende KZD-Pinnwand mit Informationen zu Speiseplänen, Vergünstigungen, Vorstellung neuer Kollegen usw. auf KDZ Connect umzustellen. IBM Connections und das WebSphere Portal sind bereits heute schon mit verschiedenen Fachapplikationen verbunden. Diese Integration soll jedoch noch weiter ausgebaut werden, in welchem Connections ein wichtiges Puzzleteil für einen ganzheitlichen Ansatz darstellen soll.

So sind weitere Ziele nicht nur die vereinfachte Einarbeitung von Mitarbeitern durch gebündeltes Wissen in KDZ Connect, sondern allgemein das Festhalten des Wissens von Know-how-Trägern, so dass dieses auch nach Ausscheiden aus dem Unternehmen vorhanden ist.

Aufgrund der hohen Anzahl an Mitgliedern und Berechtigten ist es die Vision der KDZ, später einmal bis zu 200.000 Berechtigte auf dem Portal und KDZ Connect zu haben, mit dem Ziel, dass alle immer auf die aktuellsten Informationen zugreifen können und die Mobilität und der Wissensaustausch unter den Mitarbeiter gefördert wird. Denn eines steht für die KDZ fest: „Wissen wird durch Teilen mehr! Wenn man es nicht teilt, wird es weniger. Dieses gilt es zu vermeiden.“

Appendix B:

Document Management Case Study



KDZ Wiesbaden: Dokumentenmanagement und KDZ Connect

Verena Hausmann

Arbeitspapier im Rahmen der
IndustryConnect Initiative

INDUSTRYCONNECT
engaged + industry + research



Bitte referenzieren als:

Hausmann, Verena (2016): KDZ Wiesbaden: Dokumentenmanagement und KDZ Connect, Arbeitspapier CEIR. Universität Koblenz-Landau.



1. Einführung

Stand: Juni 2016

In der vorangegangenen Basis-Fallstudie „KDZ Wiesbaden: Gemeinsames Arbeiten mit IBM Connections“ wurde das Unternehmen KDZ Wiesbaden sowie Ihre Einführung von IBM Connections beschrieben. Als ein besonders wichtiges Thema im Rahmen der Nutzung von IBM Connections hat sich für die KDZ das Dokumentenmanagement (DM) herausgestellt. Viele für die KDZ wichtige und wertvolle Informationen liegen schon heute in KDZ Connect und „Es gibt in Connections auch Inhalte wie zum Beispiel Informationen aus Projektcommunities, die Aufbewahrungspflichten unterliegen“. So ist es sowohl aus rechtlicher Sicht, aber auch aus Aspekte des Wissensmanagement wichtig, das Dokumentenmanagement in KDZ Connect genauer zu betrachten. Hierzu ist im Folgenden zunächst eine kurze Einführung in das allgemeine Dokumentenmanagement der KDZ gegeben, bevor auf das DM in KDZ Connect, sowie die damit verbunden Herausforderungen eingegangen wird. Als Interviewpartner stand Herr Ralf Ortner, Bereichsleiter BO & DV der KDZ Wiesbaden zur Verfügung.

2. Allgemeines Dokumentenmanagement

Information und Dokumente fallen beim täglichen Arbeiten der KDZ überall an. Durch die verschiedenen zur Verfügung stehenden Kanäle der internen und externen Kommunikation, sowie der verschiedenen Softwarekomponenten sind die Informationsquellen dabei sehr verschieden und umfassen unter anderem:

- | | | |
|-----------|---------------|---------------|
| - Mail | - KDZ Connect | - nscale |
| - Papier | - Fach- | - Mitarbeiter |
| - Telefon | anwendungen | - Handakten |

Unabhängig vom Format, in dem Informationen auftreten, müssen sie verwaltet werden. Hierbei spielen die verschiedenen rechtlichen Rahmenbedingungen, die vorhandene Infrastruktur, sowie die verschiedenen organisatorischen Konzepte eine große Rolle. Sie sind nachfolgend kurz beschrieben.

2.1. Rechtliche Rahmenbedingungen

Im Rahmen ihrer Tätigkeiten ist die KDZ verschiedensten gesetzlichen Vorschriften und Gesetzen unterworfen. Im Folgenden werden einige genannt,

welche vor allem in Bezug auf das Dokumentenmanagement und in Hinblick auf IBM Connections eine größere Bedeutung spielen.

Die KDZ ist als öffentliche Anstalt der **digitalen Agenda** unterworfen. Die digitale Agenda ist zwar bislang nur eine Willenserklärung, jedoch wird sie derzeit mehr und mehr durch den IT-Planungsrat und verschiedene **e-Government Richtlinien und Gesetze** der Länder durchgesetzt. Darüber hinaus unterliegt die KDZ als Kapitalanlagengesellschaft der **MaRisk** (Mindestanforderungen an das Risikomanagement) welche indirekt durch Anforderungen an Prozesse auch Auswirkungen auf das Dokumentenmanagement haben kann.

Auch die **EU-Datenschutzgrundverordnung**, welche 2018 in Kraft tritt, wird zukünftig Auswirkungen auf die KDZ und andere KMUs, vor allem im Bereich von kollaborativen Systemen, haben. So beschreibt die Verordnung eine ausdrückliche **COC (Code-Of-Conduct) Verpflichtung** für Unternehmen. Des Weiteren sind ab 2018 z.B. auch IP-Adressen von internen Mitarbeitern schützwürdige persönliche Kennzeichen, welche entsprechend verwahrt und gemanagt werden müssen. Verstöße gegen die Verordnung werden strenger gehandhabt und können neben Geldstrafen z.B. bei Datenschutzrechtlichen Lücken auch den Betrieb eines Systems wie KDZ Connect untersagen. Compliance und Risk Management erhalten durch die EU-Verordnung eine neue, stärkere Bedeutung.

Die **GDPdU** (Grundsätzen des Datenzugriffs und der Prüfbarkeit digitaler Unterlagen) ist eine Abgabenordnung, welche Anforderungen zur elektronischen Archivierung für Steuerprüfungen beschreibt. Sie bezieht sich dabei auf alle digitalen Informationen und Dokumente, die Kosten- oder Ertragsrelevant sind und beschreibt wie diese den Finanzbehörden zur Verfügung gestellt werden müssen. Aus der GDPdU ergeben sich daher große Auswirkungen auf das allgemeine Informationsmanagement einer Organisation.

Durch das von der KDZ betriebene, mit Connections Verknüpfte Webportal, wird die KDZ auch als Anbieter von Telemedien gesehen und muss in diesem Bereich somit auch die Gesetzgebungen rund um das **Telemediengesetz** einhalten. Auf Grundlage dieses Gesetzes sind das private Surfen sowie die Nutzung der KDZ E-Mails zu privaten Zwecken ausgeschlossen. Auf interne, privat-genutzte Communities in KDZ Connect hat das Telemediengesetz jedoch keine Auswirkungen.

Neben diesen Beispielen für öffentliche Vorgaben zum Dokumentenmanagement hat die KDZ auch **Verhaltensrichtlinien** für Social Software. Diese beinhalten sowohl Vorgaben für externe, öffentliche Social Media aber auch für das intern genutzte Enterprise Collaboration System KDZ Connect.

Bei der Zusammenarbeit mit externen Partnern müssen diese eine **Vertraulichkeits- und Sicherheitsvereinbarung** (auch NDA – Non-Disclosure-

Agreement genannt) unterschreiben. Die NDA regelt projekt- und zeitbezogen die Pflichten und Rechte der externen Partner und beschreibt, was als vertrauliche Informationen einzustufen ist. Des Weiteren regelt sie Beschränkungen auf technischer Ebene sowie die Befugnisse zur Nutzung von KDZ Connect.

2.2. Nscale Dokumentenmanagement

Auf der Suche nach einem Archivsystem setzt die KDZ seit 2000 die Dokumentenmanagement/ECM und Archiv-Software der Ceyoniq Technology GmbH nscale, mit ihrer Desktop-Anwendung Cockpit ein. Hierzu wurde eine Analyse der Ordnungsbegriffe und Geschäftsprozesse durchgeführt (siehe Absatz 2.3). Aufgrund verschiedener Zugriffsrechte der einzelnen Geschäftsbereiche unterteilte man die darunter liegende Datenbankstruktur 2003 in drei physikalisch getrennte Oracle Datenbanken mit eigenen Hierarchien und eigenen Zugriffsberechtigungen: ZVK, BVK und Rechnungswesen.

Über die Jahre reichte diese Unterteilung jedoch nicht mehr aus, sodass es heute 7 verschiedene physikalische Arbeitsbereiche, gibt:

- ZVK
- BVK
- Rechnungswesen
- Beihilfe
- KISO (Landesfamilienkasse)
- KDZ Verbindung
- Mitglieder (Template)

Das Template Mitglieder wird jedoch noch weiter durch Ordnerklassen für das Berechtigungskonzept geteilt, sodass es insgesamt 9 Arbeitsbereiche sind.

Der physikalische Storage-Bereich für die Archivierung liegt hierbei auf einem Centera Server. Alle Bewegungsdaten (Profile, Virtuelle Server, alle DMS Einträge, alle DHCP-Einträge) liegen auf einem VNX Server. Beides sind Produkte von EMC.

Alle für die KDZ wichtigen und wertvollen Dokumente, sowohl auf rechtlicher, aber auch aus organisatorischer Sicht, sollen mittels nscale sicher aufbewahrt werden. So werden beispielsweise alle Dokumente von Kunden ausschließlich mit nscale durch eine Zuordnung zu Dokumentenklassen gespeichert.

Mittels einer Verbindung von nscale zur Notes-Datenbank Teamground unterstützt nscale auch die E-Mail-Archivierung der KDZ Wiesbaden. In nscale werden die Bodies der E-Mails archiviert. Diese sind über einen Link mit einem Journaling verknüpft, welches die Metadaten speichert.

Alle Dokumente, egal welcher Herkunft und welches Formates werden dabei entsprechend eines Konzepts zur Klassifizierung und Anhand von Archivrichtlinien, Löschkonzepten und ähnlichem verwaltet.

2.3. Klassifizierung von Dokumenten

Im Rahmen des Dokumentenmanagement der KDZ gibt es verschiedenste Kriterien, welche Auswirkungen auf die anzuwendenden Managementfunktionen der Inhalte haben (siehe Abb. 1).

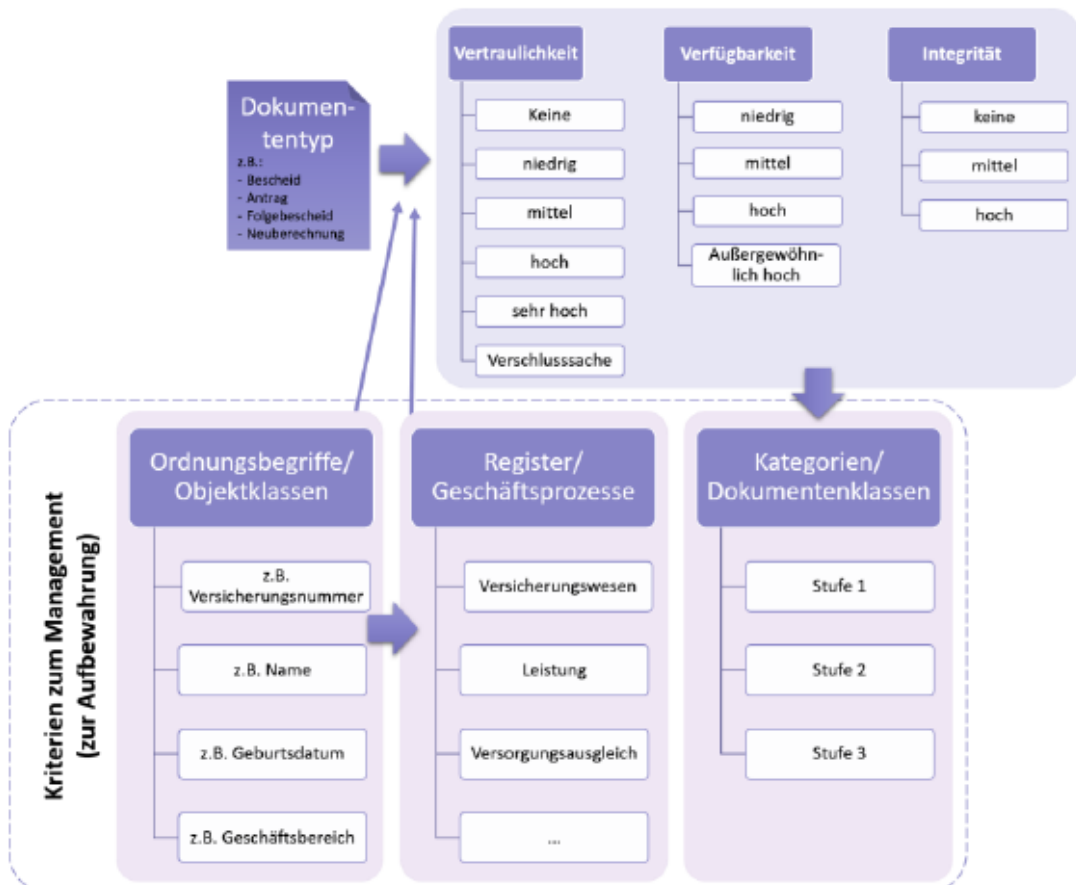


Abb. 1: Klassifizierung von Dokumenten bei der KDZ

Von der Dokumentensicht betrachtet, gibt es zunächst unterschiedliche Dokumententypen. Das Dokument ist immer einem Ordnungsbegriff und einem dazugehörigen Register zugeordnet. Aus dem Dokumententyp, dem Objektbegriff sowie dem Register ergeben sich unterschiedliche Einstufungen für die Vertraulichkeit (Geheimhaltungsstufen), die Verfügbarkeit und die Integrität eines Dokumentes, welche wiederum eine von drei Stufen der Kategorien/Dokumentenklassen ergeben. Die Einteilung und Einstufung in die verschiedenen Klassen der Vertraulichkeit, Verfügbarkeit und Integrität ergeben sich aus der allgemeinen Verwaltungsvorschrift des Bundesministeriums des Innern (Vertraulichkeit), der ISO 27001 (Information technology - Security techniques - Information security management systems - Requirements), sowie der

DATEV Verfahrensbeschreibung. Tabelle Tab. 1 zeigt ein Beispiel zur Klassifizierung eines Dokumentes aus dem Geschäftsbereich ZVK auf.

Tab. 1: Beispiel der Klassifizierung von Dokumenten

Dokumententyp	Rentenbescheid
Ordnungsbegriff	allgemein versicherte Person (Max Mustermann, 07.11.1970,...)
Register	Versicherungswesen
Kategorie/Dokumentenklasse	Stufe 2
Vertraulichkeit	hoch
Verfügbarkeit	hoch
Integrität	mittel

Weitere Beispiele für Ordnungsbegriffe und ihre Register sind z.B. eine Person in Rente im Geschäftsprozess Leistung, oder eine geschiedene Person, welche dem Geschäftsprozess Versorgungsausgleich zugeordnet wird. Im Bereich der BVK wären es Register wie beispielsweise aktiver Dienst, Pension oder Versorgungsausgleich.

Die Beispiele machen deutlich, dass ein Berechtigter (eine Person), zur gleichen Zeit in verschiedenen Ordnungsbegriffen und Register vorkommen kann, da die Dokumente entsprechend der Prozesse unterschiedliche Handhabungen verlangen. Die hier beschriebenen Beispiele sind aus dem Bereich der Kundenbetreuung der KDZ. Darüber hinaus können, wie z.B. in der KDZ Verbindung der Fall, Ordnungsbegriffe jedoch auch Projekte sein, zu dem es verschiedene Prozesse gibt. Daher soll sich die allgemeine Dokumentensichtweise sowie die E-Akte, nicht wie in der Vergangenheit am Dokument orientieren, sondern zukünftig anhand der Geschäftsprozesse, in denen sie vorkommen.

2.4. KDZ Dokumentenmanagement Richtlinien, Konzepte und Verantwortungen

Im Rahmen des Dokumentenmanagements, aber auch der IT-Nutzung und IT-Sicherheit hat die KDZ Wiesbaden im Laufe der Jahre verschiedenste Richtlinien und Hilfestellungen für Ihre Mitarbeiter erarbeitet. Hierzu zählen unter anderem Archivrichtlinien, Löschkonzepte, Konzepte zur Benutzung von Groupware, Datenschutz mit Windows 10, 10 Gebote der 10 IT-Sicherheit, Richtlinien für IT-Administratoren, PC-Nutzungsrichtlinien und Datenschutzkonzepte, um nur einige

zu nennen. Diese werden Teilweise auch an zweimal im Jahr angebotenen KDZ IT-Sicherheitstagen besprochen.

Vor allem die Löschkonzepte sowie Archivrichtlinien sind im Rahmen des Dokumentenmanagements sehr wichtig. Sie bauen derzeit noch auf dem Dokumententyp, bald jedoch auf den Dokumenten- und Objektklassen, der oben beschriebenen Klassifizierungen von Dokumenten auf.

Das Löschkonzept und die Archivrichtlinien beschreiben dabei, wie lange Dokumente aufbewahrt und/oder wann sie gelöscht werden müssen und wer für die jeweiligen Dokumente verantwortlich ist. Die Konzepte und Richtlinien werden dabei von den einzelnen Fachbereichen erarbeitet und diskutiert und sind für alle Mitarbeiter verbindlich. Konkretes Training für die Archivierung und Löschung gibt es jedoch nicht. Da diese Aufgaben jedoch oft von den Fachabteilungen vernachlässigt werden, hat die IT der KDZ Wiesbaden Wiedervorlagen eingerichtet, mit denen die Fachabteilungen alle 2 Jahre über die Überarbeitungspflicht der Konzepte und die Durchführung der darin enthaltenen Pflichten erinnert werden.

Die Verfügbarkeit und die Vertraulich werden darüber hinaus für das Backup-Konzept und die darin enthaltenen Recovery Point Objective (RPO) und Recovery Time Objective (RTO) sowie die Bereitstellungszeiten bei einem Systemausfall genutzt.

3. Dokumentenmanagement in KDZ Connect

Zwar werden in KDZ Connect keine Dokumente wie z.B. Bescheide oder Anträge von Berechtigten, jedoch Dokumente wie z.B. Wiki-Einträge welche Vorgehen in Projekten beschreiben und welche Aufbewahrungsrelevant sind gespeichert. Eine Möglichkeit zu Klassifizierung von Dokumenten wie in vorherigen Abschnitt dargestellt bietet IBM Connections jedoch nicht. Auch gibt es keine direkten Funktionen zur Festhaltung von Aufbewahrungsfristen oder Löschkonzepten in IBM Connections. Dieses stellt die KDZ vor verschiedenste Probleme.

3.1. KDZ Connect Inhalte und ihr Wert für die KDZ

Zwar wird die Dateien-Komponente von IBM Connection bei der KDZ nur sehr selten genutzt, jedoch liegen sehr viele Informationen in sozialen Dokumenten wie Wiki-Einträgen, Blogs usw. vor. Mit externen Kunden/Versicherten wird KDZ Connect lediglich mit lesbaren Inhalte sowie der Forenfunktion über das WebSphere Portal genutzt. Sie haben keinen direkten, bearbeiteten Zugriff auf KDZ Connect. Darüber hinaus werden alle Daten, welche von Kunden über das

Portal hochgeladen werden, direkt an die entsprechenden anderen Systeme weitergegeben.

Inhalte

Die in KDZ Connect enthaltenden Dokumente und Informationen können in die folgenden drei Gruppen unterteilt werden: (1) reine interne Informationen; (2) Mischung aus internen und externen Informationen und (3) Außenkommunikation zwischen Partnern.

- (1) Im Rahmen der rein internen Nutzung von KDZ Connect werden Dokumente und Informationen wie beispielsweise Besprechungsprotokolle, Dienstanweisungen oder Best Practices erstellt und gespeichert. Dabei wird das Wiki vorzugsweise zur Wissensspeicherung, Blogs für Protokolle, Foren zur Klärung von verschiedenen Fraggstellungen und die Aktivitäten zur Koordination von Aufgaben genutzt. Dieses alles erleichtert die Arbeit und sichert eine gleichbleibende Qualität der Arbeit, da hierdurch Arbeitsschritte und –anleitungen erarbeitet und dokumentiert werden.
- (2) Dokumenten, die eine Mischung aus internen und externen Informationen darstellen sind zum Beispiel Fragen zur Sachbearbeitung einer Rechtssituation, die extern von jemandem über das Forum im Portal gestellt, intern beantwortet und wieder nach extern kommuniziert werden.
- (3) Kommunizieren zwei KDZ Partner miteinander über KDZ Connect muss unterschieden werden, ob diese in Bezug zur KDZ Kommunizieren oder nicht. Sind die Themen nicht in Bezug zur KDZ, spielen sie keine Rolle für die KDZ, da KDZ Connect hier lediglich als Serviceleistung genutzt wird. Ist die Kommunikation über ein KDZ initiiertes Projekt, sind die Inhalte und Dokumente von hohem Interesse, da es sich um Projektdokumentation und ähnlichem handeln kann.

Verfügbarkeit

In Bezug auf die Verfügbarkeit der Dokumente aus KDZ Connect kann anhand der oben dargestellten Kategorisierung unterschieden werden. Sollten interne Dokumente (1) für mehrere Tage nicht zur Verfügung stehen, würde dieses zwar den Betriebsablauf behindern, da es keine Qualitätssicherung gäbe, nicht alles nochmals woanders Dokumentiert ist und nicht jeder Mitarbeiter genau wüsste, was er machen muss, jedoch könnte diese Zeit mittels Nachfragen und gegenseitiger Hilfe und Austausch überbrückt werden.

Bei der Kommunikation zwischen internen und externen Personen (2) ist KDZ Connect nur einer von vielen Kanälen. Ein Ausfall des Systems wäre hier lediglich der Wegfall eines dieser Kanäle und Anfragen würde dann wieder vermehrt per Mail, Telefon oder Post ein- und ausgehen.

Kommunizieren zwei Partner mittels KDZ Connect über ein KDZ Projekt (3), könnte ein kurzfristiger Ausfall je nach Projektzeitpunkt kritisch sein, da Aufgaben, Absprachen und Fristen nicht eingesehen werden können und so das Projekt in Verzug geraten könnte.

Wert

Im Gegensatz zur Verfügbarkeit, zeigt die Frage nach dem Wert der Informationen in KDZ Connect z.B. anhand des Verlusts, der eintreten würde, wenn die Informationen in KDZ Connect unwiederbringlich weg wären, jedoch deutlichere Konsequenzen auf.

KDZ Connect wird unter anderem als Erstellungs- und Ablageort für KDZ Betriebshandbücher genutzt. Einige Arbeitsgruppen dokumentieren all ihr Wissen und alle Absprachen in Connections welches zum Beispiel neuen Mitarbeitern helfen kann, ihre Einarbeitungszeit von 3 Monaten auf 4 Wochen zu verkürzen. Im Informationssicherheitsbereich werden im Team die Richtlinien und das Leitbild in Connections erarbeitet. KDZ Connect ist somit ein Produktivsystem für die KDZ Wiesbaden, welches Wissen beinhaltet, das bei Verlust nicht wieder komplett hergestellt werden kann.

Darüber hinaus liegen in KDZ Connect auch Verfahrensdokumentationen, welche aus rechtlicher Sicht vorgehalten werden müssen. Diese sollten somit in nscale aufbewahrt werden. Mitarbeiter vergessen jedoch oft neuste Versionen hierhin zu kopieren. Auch gedruckte Papierversion gibt es nicht von allen Beschreibungen und sind nicht immer aktuell.

Bei Projektdokumenten mit/von externen Partner wäre ein Verlust der Daten eventuell auch ein monetäres und vertragsrechtliches Problem. Es kann vorkommen, dass in einem Projekt nicht das umgesetzt wird, bzw. nicht die Zeiten eingehalten werden, was/die in KDZ Connect dokumentiert wurde. Hierbei gilt KDZ Connect als Nachweis und vertragsrechtliches Absprachemedium, da in NDAs oft festgehalten wird, dass KDZ Connect für ein Projekt als das zentrale Kommunikationsmedium gilt.

Abgesehen von allgemeinen Einschränkungen im Betriebsablauf würde das Wiederherstellen der in KDZ Connect gespeichert und benötigten Informationen, soweit dieses überhaupt möglich ist, grob geschätzt 20 bis 30 Mann-Jahre dauern. Den geldwerten Verlust hierdurch schätzt die KDZ derzeit mit einem mittleren 6 oder knappen 7-stelligen Betrag ein.

3.2. Aktuelles Vorgehen

Mit IBM Connections alleine ist es nicht möglich Dokumentenklassen zu hinterlegen. Zwar gibt es für IMB Connection den CCM (Connections Content

Manager), dieser stellt jedoch keine wirkliche Alternative zu einem richtigen Dokumentenmanagement da, da auch mit dem CCM eine komplexe Unternehmensstruktur nicht abgebildet werden kann. Er wird von der KDZ auch nicht eingesetzt.

Es gibt für KDZ Connect daher lediglich die folgenden Vorhaben für die Vertraulichkeit von Inhalten:

- Dokumente dürfen nicht in KDZ Connect gespeichert werden
- Dokumente dürfen in KDZ Connect gespeichert werden und
 - o sind öffentlich
 - o werden nur mit einzelnen Personen geteilt
 - o werden mit einer oder mehreren Community/ies geteilt

Es ist auch nicht direkt möglich, Dokumente wie z.B. Wiki oder Blog Einträge mit allen ihren Komponenten sowie ihrer Historie zu exportieren. Darüber hinaus hat die KDZ durch eine genauere Untersuchung der Ablage von IBM Connections Inhalten festgestellt, dass die Speicherung von Content nicht einheitlich bei allen Funktionen gleich aufgebaut ist. Es können zwar kryptische Pfade abgelegt werden, diese sind jedoch weder Menschen- noch Maschinenlesbar und es ist somit schwer, diese wieder zu finden. Im Rahmen des Archivkonzepts und des Management von Dokumenten stellt dieses die KDZ vor massive Probleme und Dokumente müssen einzeln, physisch aus der IBM Connections Umgebung rausgeholt und mit einem neuen Index versehen werden. Nur so können die KDZ Connect Inhalte geschützt und dauerhaft archiviert werden.

Als Workaround nutzt die KDZ hier den PDF Generator der CONET AG. Dieser ermöglicht es einzelne Beiträge (nur der direkte Inhalt) in PDF/As umzuwandeln, welche dann in ein temporäres Verzeichnis gelegt werden. Dort werden mittels einer Archivierungsmaske Ordnungsbegriffe, Register und Stichworte zugeordnet und das Dokument entsprechend in nscale abgelegt.

3.3. Herausforderungen/Probleme

Eine Klassifizierung von Inhalten in IBM Connections ist technisch nicht vorgehen. Die oben beschriebene Einteilung in Dokumentenklassen usw. ist damit nicht möglich. Daher sollen alle in KDZ Connect relevanten Dokumente in nscale gespeichert werden. Bei einem PDF/A Export von KDZ Connect Inhalten, die derzeitige Lösung, treten jedoch verschiedenste Probleme und Herausforderungen auf. Das oben beschriebene Vorgehen ist z.B. aufgrund technischer Schwierigkeiten nicht bei Forenbeiträgen anwendbar. Außerdem gehen Metadaten, sowie verschiedene Komponenten (z.B. die Kommentare) und die Historie des Dokumentes bei dem Export verloren. „Dieses ist ein Problem, da sich teilweise aus der Kommentierung ergibt, warum es eine neue Version Inhaltlich gibt.“

Darüber hinaus können nur einzelne Dokumente, nicht jedoch ganze Communities mittels des PDF Exports betrachtet werden. Abb. 2 zeigt den Export der KDZ Connect Dokumente graphisch auf.

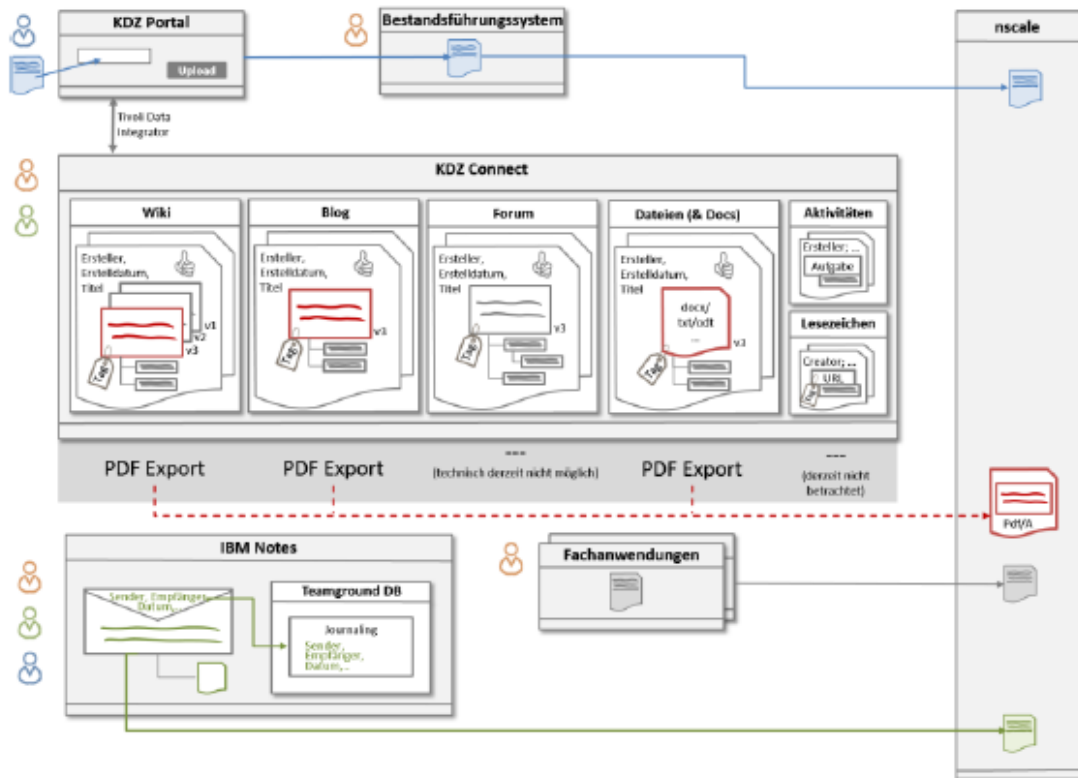


Abb. 2: Archivierung mit nscale

Veränderung

Durch die Analyse für die vorliegende Fallstudie und die damit verbundene Aufdeckung der fehlenden Inhalte von Dokumenten in der Archivierung mittels PDF hat die KDZ ihr technisches Verfahren umgehend angepasst. Seit September 2016 werden bei Wikis und Blog neben dem eigentlichen Inhalt auch die folgenden Elemente mit in das zu archivierende PDF geschrieben:

- Inhalt
- Kommentare (Text und Verfasser; ohne Datum)
- Tags
- Ersteller
- Datum
- Bilder
- @mentions

Dies PDFs können sowohl für einzelne Wikieinträge und Blogpost erstellt werden, jedoch auch für ein ganzes Wiki/ einen ganzen Blog. Bei einem ganzen Wiki/Blog wird dann eine zip-Datei erstellt, in welcher jeweils einzelne PDFs für die einzelnen Beiträge liegen.

Bei einer Datenbankanalyse hat die KDZ darüber hinaus festgestellt, dass die Kommentare eines Wikis beispielsweise nicht in der Datenbank bei dem dazugehörigen Wiki liegen, sondern in einer anderen Datenbank. Für die Archivierung und das Backup-Konzept stellt dieses ein Problem dar, da man gegebenenfalls nur den Wiki-Inhalt speichert wenn man die Datenbank sichert, nicht jedoch die Kommentierung. In einem Rechtsstreit kann es jedoch sein, dass nicht nur der Inhalt, sondern auch der Zugang, die Metadaten und die Komponenten eine Rolle spielen. Bei Dokumenten, die man von außen bekommt und in KDZ Connect abspeichert könnte dieser Vorgang eventuell sogar als ersetzendes Scannen angesehen werden, für welche eine rechtssichere Archivierung nach TR-Resiscan zum Tragen käme.

Neben dem technischen Vorgehen regeln verschiedenste Guidelines und Vorschrift den Umgang mit KDZ Connect. Die Umsetzung erfolgt durch die Mitarbeiter. Hierbei kommt es jedoch auch zu Problemen, wenn die Vorgaben nicht eingehalten werden.

So gibt es zwar keine speziellen Vorgaben, welche KDZ Connect Inhalte archiviert werden sollen, aber es gelten auch hier die allgemeinen Archivrichtlinien. Bei Communities in KDZ Connect soll es immer mindestens 2 Eigentümer geben. Diese müssen entscheiden, ob und welche Informationen aus KDZ Connect nach nscale exportiert werden. Dieser Schritt wird jedoch oft vergessen, sodass Inhalte gar nicht in nscale abgelegt werden. Dieses kann, je nach Inhalt und Situation, zu rechtlichen Problemen und weiteren Risiken führen.

Die Nutzung von Connections für externe Partner ist mittels NDAs beschrieben. Meist beinhaltet dieses z.B. auch, dass externe keine eigenen Communities erstellen dürfen und lediglich den Status „Mitglied“ und nicht „Eigentümer“ einer Community haben dürfen. Diese ist jedoch mittels den IBM Connections mitgelieferten Funktionen nicht zu überprüfen.

Im Rahmen ihrer Geschäftstätigkeiten nimmt die KDZ an verschiedenen Ausschreibungen Teil. In den Bewerbungen wird inzwischen verstärkt nach einer Bewertung der Informationssicherheit und des Datenschutzes gefragt. Wurde dieses Kriterium früher mit 5-10% bewertet, sind es heute oft 20-25%. Die hier angebrachten Kriterien müssen auch auf KDZ Connect angewendet werden und könnten Herausforderungen mit sich bringen.

Des Weiteren müssen alle User, die in irgendeiner Weise Sachbearbeiten, auf Grundlage der MaRisk (Kapitalanlagen-Gesellschaften betreffend) einmal im Jahr überprüft und re-zertifiziert werden. Dieses bezieht sich auch auf die Zugriffsrechte auf KDZ Connect. Hierzu wird jedes Jahr eine Liste mit den Rechten und Rollen aller User erstellt werden. Externe Partner müssen Änderungen aufgrund ihrer Meldepflicht mitteilen. Interne User-Rechte werden von zwei KDZ Mitarbeitern, in Kontakt mit den Fachabteilungen, besprochen.

Probleme gibt es jedoch bei den User, welche sich nur über WebSphere anmelden und teilweise gar nicht wissen, dass die auch KDZ Connect User sind. Auch könnte die Userverwaltung in IBM Connections in Zukunft unter die EU Datenschutzgrundverordnung fallen, da hier personenbezogene Daten anfallen. Das Management dieser Daten muss entsprechend ermöglicht werden.

In Bezug auf die eingangs beschriebenen Gesetzen muss geprüft werden, in wie weit sich diese auch auf die Inhalte von KDZ Connect auswirken/diese beeinflussen. So ist IBM Connections beispielsweise nicht GDPdU konform und hat auch keine GDPdU Schnittstelle. Dieses bedeutet, dass alle Dokumente, welche GDPdU konform sein müssen nicht in KDZ Connect abgelegt werden dürfen oder diese Informationen zusätzlich in einer dokumentierten Form in ein anderes GdpdU konformes System, wie nscale, abgelegt werden müssen.

Erste Beispiele, bei denen die hier beschriebenen Herausforderungen bereits aufgekommen sind, gibt es bei der KDZ bereit. So werden in KDZ Connect zum Teil von Juristen auch Rechtsgutachten erstellt. Diese haben eine Halbwertszeit von 50 Jahren, bis abschließend der beschriebene rechtliche Sachverhalt nicht mehr relevant ist. „Kollaboratives Arbeiten, gerade an solchen tragfähigen, nachhaltigen Dokumenten verlang eine Möglichkeit zur Langzeitarchivierung“. Diese kann derzeit in IBM Connections jedoch nicht durchgeführt werden, da es zum Beispiel irgendwann auch die Mitglieder der Community, in der es erstellt worden ist, nicht mehr im Unternehmen sind und Fragen des Managements und der Verantwortlichkeiten aufkommen.

Des Weiteren gab es bereits erste aktive Anfragen bezüglich der Langzeitarchivierung von KDZ Connect Inhalten. Die erste Idee, eine Aktivität zu erstellen, welche das Dokument auf Wiedervorlage beschreibt konnte so nicht umgesetzt werden, da nicht klar ist, wer in Zukunft die Nachricht bekommen soll, dass etwas auf Wiedervorlage liegt, da man nicht weiß, wer speziell dann in diesem Bereich arbeitet, man jedoch lediglich direkte Personen hinterlegen kann.

3.4. Ideen für Verbesserungen beim Management von IBM Connections Inhalten

Der Notwendigkeit KDZ Connect Inhalte managen zu können und zu müssen hat die KDZ bereits erkannt. Klar ist jedoch auch, dass IBM Connections nicht zu einem Dokumentenmanagementsystem werden soll. Jedoch muss es die Möglichkeit geben, IBM Connections Inhalte mittels eines DMS verlustfrei verwalten zu können. Hierzu wünscht sich die KDZ die Möglichkeit einer übergeordneten Indizierung in IBM Connections, welche dann in einem DMS weiterverwendet werden könnten. Dieses würde eine direkte Ansprache der

Dokumente in IBM Connections ermöglichen, sodass die KDZ einen physikalischen Export eventuell gar nicht als nötig ansehen würden.

Neben den Indizes wäre jedoch auch eine Klassifizierungsmöglichkeit von IBM Connections Inhalten sehr hilfreich, sodass Dokumente entsprechend ihrer Klassifizierung in gesicherte physikalische Bereiche übertragen werden könnten.

Auch hilfreich fände die KDZ Schlagworte/Stichworte, welche Dokumenten als zusätzliches Metadatum mitgeliefert werden könnten. Zwar gibt es in IBM Connections die Möglichkeit Tags zu vergeben, jedoch können diese nur kleingeschrieben werden und bestehen nur aus einem einzelnen Wort. Für das Dokumentenmanagement helfen sie ihnen somit nicht direkt weiter.

Im Bereich des Dokumentenmanagement gibt es verschiedene standardisierte Schnittstellen. Würde IBM Connection die Möglichkeit bieten, Inhalte über Schnittstellen an ein DMS weiterzugeben, könnte die KDZ diese nutzen um KDZ Connect Inhalte in nscale abzulegen.

Eine weitere Idee wäre es, beim Management und Export von IBM Connections Inhalten nicht nur einzelne Dokumente betrachten zu können, sondern eine ganze Community, wie einen Explorer-Ordner, in ein Archiv verschieben zu können.

Zusätzlich wäre ein Management Dashboard in IBM Connections sehr hilfreich. Derzeit ist es niemandem ersichtlich, in welchen Communities ein Mitarbeiter schon drin ist. Erstellt nun zum Beispiel eine Führungskraft eine neue Community und lädt andere Personen ein, sieht diese nicht, dass es schon ähnliche Communities zu diesem Thema gibt, die er vielleicht nutzen könnte. Es gibt keine Übersichten auf Personenbasis, in welchen Communities eine Person ist.

3.5. Zukunft

Im Bereich des Dokumentenmanagements von IBM Connections Inhalten sind noch viele Fragestellungen offen, die beantwortet werden müssen. Je länger und intensiver KDZ Connect genutzt wird, desto mehr Anforderungen an das Dokumentenmanagements entstehen. Um zum Beispiel auf die veränderten Anforderungen durch die EU-Datenschutzgrundversorgung reagieren zu können wir die KDZ eine neue Compliance Arbeitsgruppe einrichten, welche dem schon bestehenden Risk-Management zuarbeiten wird, denn es müssen in den nächsten 1 ½ Jahren viele Verträge und Unterweisungen etc. angepasst werden.

Des Weiteren wird aufgrund des fehlenden Bewusstseins bei Mitarbeitern, Dokumente aus KDZ Connect zu managen indem sie gelöscht oder nach nscale exportiert werden, derzeit überlegt, ob es sinnvoll wäre hierfür Mitarbeiter speziell zu schulen beziehungsweise spezielle Guidelines zu erstellen.

Allgemein ist für Dokumente geplant, dass deren Zugriffsrechte in Zukunft nicht mehr anhand der Datenbank physikalisch geregelt werden, sondern virtuell über die Einstufung in die Vertraulichkeit und Verfügbarkeit über ihre Dokumenten- und Objektklassen abgebildet werden. Da diese Einstufungen jedoch nicht auf IBM Connections Dokumente übertragen werden können, kann auch dieser Schritt in Zukunft erst nach der Übertragung der Inhalte ins nscale Archiv auf KDC Connect Dokumente angewendet werden.

„Compliance-regulatorische Vorgaben werden auch künftig Unternehmen stärker betreffen und hier wird es für [IBM] Connections eng.“ Daher ist es wichtig und notwendig, sich frühzeitig und umfassend mit dem Dokumentenmanagement in IBM Connections zu befassen. Die KDZ Wiesbaden hat dieses erkannt und bereits erste Schritte in die Richtung KDZ Connect Inhalte zu managen unternommen.

Appendix C:

Interview Codes

The coding process has been outlined and described in sections 8.2.2. Within the following two excerpts of the coding table are shown, before the full list of codes is presented below.

Example of Coding Table

Category/Area: Documents within IBM Connections

Sub-Category/Aspect	Code	Own Definition	Reasoning	Transcript	Linking and Comments
HISTORY	"Protocols" („Protokolle")	Record of meeting minutes which outlines who and what happened, was said or decided at which point in time.	Protocols fix what have been decided and discussed and serve as an information documents and as a piece of evidence.	„Gebloggt sind z.B. Besprechungs- und Entscheidungsprotokolle“	*evidence

Category/Area: Requirements for the management of documents in IBM Connections

Sub-Category/Aspect	Code	Own Definition	Reasoning	Transcript	Linking and Comments
INFORMATION SECURITY	"confidentiality" („Vertraulichkeit")	Preventing unauthorized modification of information. Protection goal of information security.	Depending on the confidentiality of a document different management aspects need to be taken into account.	„die Dokumentenklasse definiert Vertraulichkeit, Verfügbarkeit und Integrität.“	--> challenge *document class

Full List of Codes

Sub-Category/Aspect	Code	Own Definition
IBM Connections Usage Reasons		
COMMUNICATION	Acquire information	Getting information through the system.
HISTORY	evidence	Proof of activities that have been conducted.
	recording information	Fixing information in e.g. written form for later reference.
	"Documentation" („Dokumentation")	Recording processes in a fixed form.
COORDINATION	"Project Management" („Projektmanagement")	The initiation, planning, execution, monitoring and closure of a temporary series of activities with a specific objective (Kerzner, 2013).
	decision making	Agreeing on a common understanding.
	"Task planning" („Aufgabenplanung")	Deciding and fixing a piece of work.
	"Event Management" („Eventmanagement")	Dealing with all aspects around planning and conducting a happening.
	planning tool	System to decide and arrange things in advance.

	"Dissemination" („Verbreitung“)	Spreading information among people.	
	"Knowledge management" („Wissensmanagement“)	Dealing with all aspects around keeping and spreading information among people.	
Documents within IBM Connections			
HISTORY	"Protocols" („Protokolle“)	Record of meeting minutes which outlines who and what happened, was said or decided at which point in time.	
COMMUNICATION	Reports	Informational outline on a specific subject.	
COORDINATION	"Work instructions" („Arbeitsanweisungen“)	Outline how something should be done.	
	Tasks	Description of a special piece of work.	
COMPLIANCE	"Guidelines" („Richtlinien“)	Document outlining rules, rights and obligations.	
Purpose of long-term management			
HISTORY	history	Documentation about past events.	
	reasoning	Outlining why something was done how it was done.	
	documentation	Recording processes in a fixed form.	
	evidence	Proof of activities that have been conducted.	
COORDINATION	"Knowledge management" („Wissensmanagement“)	Dealing with all aspects around keeping and spreading information among people.	
ARCHIVING	"auditable" („revisionsicher“)	'Verifiability and traceability of processes around the management of documents within a software system.	
COMPLIANCE	"legal conformance" („rechtssicher“)	Meeting the requirements of law.	
	risk management	'Assess and minimise the possibilities of situations that involve exposure or danger.	
	"compliance" management	Processes which address the aspects that needs to be taken into account in order to be in accordance with legal and organisational requirements.	
ORGANISATIONAL	business viability	Condition to conduct business.	
	ensure quality	Meeting a performance standard.	
	keep value	Storing content in order to save the knowledge in it for further usage.	
Requirements for the Management of Documents in IBM Connections			
TECHNICAL _FUNCTIONALITY	Data access/rights management	Ability of users to see and/or work with content within a software system.	
COMPLIANCE	"legal conformance" („rechtssicher“)	Meeting the requirements of law.	
	"compliance" management	Processes which address the aspects that needs to be taken into account in order to be in accordance with legal and organisational requirements.	
	deletion obligation	Legal duty to erasure content after a special time or occurrence.	
	Regulations, Guidelines and Specifications	- GDPdU	Administrative tax/fiscal code which describes requirements for tax audits.
		- EU-DSG	EU Commission regulation for data protection.
		- "NDA" („Vertraulichkeits erklärung“)	Legal contract between partners to clarify rights and obligations.
		- "Privacy Policy" („Datenschutzrichtlinie“)	Describes the protection of individuals with regard to the processing of personal data.
		- "archive policy" („Archivrichtlinie“)	Outlines aspects around the long-time storage of documents.
		- "deletion policy" („Löschkonzept“)	Outlines which content should or needs to be deleted at which point in time.
		- usage policy	Set of rules that outlines how a user should behave when working with a software system.
		- "Digital agenda 21" („Digitalen Agenda 21“)	The digital agenda for Europe describes a strategy for the better usage of ICT in Europe.
- e-Government-regulation		Regulation for the unified usage of IT systems within public administration.	

	- MaRisk	Administrative directive of the BaFin. Concerned with the risk management of German financial institutions.
	- "Code of conduct"	The code of conduct can be seen as a guideline which specifies the usage of the system.
	- TR- Resiscan	BSI guideline for replacement scanning.
INFORMATION _PREPARATION	"indexing" („Indizierung“)	Mapping a piece of content to a unique identifier.
ARCHIVING	preservation	Maintaining content.
	"auditable" („revisionsicher“)	Verifiability and traceability of processes around the management of documents within a software system.
INFORMATION _SECURITY	"sensitive data" management („sensible Daten“)	Processes to protect and work with specific critical data such as personal data.
	„information security“ („Informationssicherheit“)	Features that ensure the protection of confidentiality, availability and integrity.
	"user management" („User-Verwaltung“)	Creating users and setting the rights in a software system for a specific person.
	content protection	Safeguard information.
	"availability" („Verfügbarkeit“)	Prevention of system failures. Protection goal of information security.
	"confidentiality" („Vertraulichkeit“)	Preventing unauthorized modification of information. Protection goal of information security.
	"integrity" („Integrität“)	Preventing unnoticed changes of information. Protection goal of information security.
	risk management	Assess and minimise the possibilities of situations that involve exposure or danger.
ORGANISATIONAL	"findability"	The possibility to re-use a document.
Challenges with the Management of IBM Connections Documents		
HUMAN FACTOR	human carelessness	People do not care or pay attention to guidelines or specified processes and are neglecting processes.
	raise "acceptance" („Akzeptanz“)	Willingness of people to act as proposed.
	raise awareness	Enlarge the perception of people that something is important.
TECHNICAL _STRUCTURE	compound documents	Social documents often consist of more than one component which together create a compound document.
	inflexible system structure	The system itself is quite static and not flexible to adopt to changes.
	technical consistency	Conformity of structure within the system.
	storage location	Place where data is saved.
	data storage structure	The way how information are saved in the system backend.
	"Reorganisation" of Content („Reorganisieren“)	Impossibility to move, link or merge content between hierarchical layers and application.
	content re-use	Using the same information more than once.
	Content Transformation	- content conversion
- content export		Getting content out of the system
- content "replication" („replizieren“)		Copying content and keeping the same format.
TECHNICAL _FUNCTIONALITY	software "interface" („Schnittstelle“)	Common language used between two or more systems to exchange data.
	system integration	Bringing together the content and/or functions of different systems.
	insufficient functionality	Not enough possibilities to work with content.
	data exchange	Giving and receiving data between systems.
INFORMATION _PREPARATION	informational consistency	Equal data and equal processing possibilities available for similar content.
ORGANISATIONAL	responsibilities	Duty to manage content.
	transparency	Comprehensible, understandable and clearly known processes.
	currentness	If document are up-to-date.
	duplicity	The occurrence of the same content for several times.

	durability	Time communities should be available or members are active in the community/system
	notifications	Alert messages which are send by the system if content was e.g. edited or created.
protect document responsibility	- permissions	Authorisation for using content.
	- "copyright" ("Urheberrecht")	Exclusive legal right of using content.
	- liability	Names the responsible person of content, especially when it comes to litigation.
	- determine ownership	Setting rights and duties of content.
	- determine stewardship	Administration of content.
	map business complexity	Try to show the business structure within the software system so that it can be worked with.
ARCHIVING	capturing "metadata" („Metadaten")	Data about Data
	implementing document life-cycle	Stages of documents from creation to disposition.
	implement "retention periods" („Aufbewahrungsfristen")	Time, something is captured.
	Implement "audit trail"	Traces the transactions around content.
	- organise	Arrange into a structure.
	- key term/defining argument („Ordnungsbegriff")	Criteria by which data such as information about a customer is sorted. Different term for object class.
	- "register" („Register")	Different name for business processes.
	- "business processes" („Geschäftsprozesse")	Different series of actions within a business brought together to accomplish a common goal. Different name for register.
	- "object class" („Objektklasse")	Criteria by which data such as information about a customer is sorted. Different term for key term.
	- "document class" („Dokumentenklasse")	Criteria which is established through the categorisation of integrity, availability and confidentiality.
INFORMATION _PREPARATION	- "document type" („Dokumententyp")	Categorisation of different documents with the same characteristics.
	- assigning "key words" („Schlagworte")	Word(s) that describe the content.
INFORMATION _SECURITY	- "availability" („Verfügbarkeit")	Prevention of system failures. Protection goal of information security.
	- "confidentiality" („Vertraulichkeit")	Preventing unauthorized modification of information. Protection goal of information security.
	- „integrity" („Integrität")	Preventing unnoticed changes of information. Protection goal of information security.
COMPLIANCE	legal adjustments	Adaption to new or changing regulations.
Management Processes		
COMLIANCE	"NDA" ("Vertraulichkeitserklärung")	Legal contract between partners to clarify rights and obligations.
HUMAN FACTOR	usage policy	Set of rules that outlines how a user should behave when working with a software system.
TECHNICAL_ FUNCTIONAL	standardisation	Unification of processes.
	content conversion	Changing the format of content.
	content export	Getting content out of the system.
	removing users	If a community is 'finished' nearly all users get removed, so that they do not have access anymore.
Management Ideas		
ORGANISATIONAL	holistic view	Having a broad and complete picture on something.
	guidelines	Documents outlining rules, rights and obligations.
	dashboard	Overview page in IBM Connections.
TECHNICAL_ FUNCTIONAL	"indexing" („Indizierung")	Mapping a piece of content to a unique identifier.
	assigning "key words" („Schlagworte")	Word(s) that describe the content.

	capturing "metadata" („Metadaten“)	Data about data.
Risks of not Managed Content		
-	litigation	Process of taking legal actions.
-	penalty	Punishment for braking or not compliance with a rule.
-	loss of intellectual value	Damage because of missing knowledge.
-	information loss	Damage because of missing information.
-	crocess change	Altering work procedures.
Overarching Code		
"long term archiving" („Langzeitarchivierung“)		

Appendix D:

Survey

Page 1:

INDUSTRYCONNECT
engaged + industry + research

Management von "Social Business Documents" in IBM Connections

Management von "Social Business Documents" in IBM Connections

Im Rahmen von IndustryConnect haben wir in den letzten Workshops mehrfach an dem Thema des Managements von Inhalten aus IBM Connections („Social Business Document Management“) gearbeitet und es gibt auch bereits eine erste Fallstudie zu diesem Thema (Fallstudie). Darüber hinaus beschäftigt sich auch meine Doktorarbeit mit den Herausforderungen für das Langzeitmanagement von IBM Connections Dokumenten. In der folgenden Umfrage möchte ich nun abschließend die bereits gewonnenen Erkenntnisse aus der Praxis (von Euch) und der Theorie (Literatur) vertiefen und validieren. Ziel der Umfrage ist es somit, herauszufinden, ob und welche Prozesse Ihr zum Management Eurer IBM Connections Inhalte nutzt bzw. welche Herausforderungen Ihr hierbei seht.

Die Fragen, beziehungsweise Antwortmöglichkeiten, sind aus den vorangegangenen Erkenntnissen entstanden. Ziel der Fragen ist daher nicht immer die vollständige Bestandsaufnahme (außer dort, wo nach weiteren Aspekten gefragt wird), sondern die Validierung der bisher gewonnenen Erkenntnisse. Einige der Fragen beziehen sich auch auf Euer gesamtes Unternehmen. Mache die Angaben in diesem Fall einfach so gut Du kannst. Mehrfachantworten desselben Unternehmens sind willkommen.

Den Fragebogen sollten alle, auch ohne weiteres Hintergrundwissen aus vorangegangenen Workshops, beantworten können. Bei Fragen oder Anregungen könnt Ihr mir aber sehr gerne über IBM Connections oder per Mail (vhausmann@uni-koblenz.de) schreiben.

Hinweis: Mit Dokumenten in IBM Connections sind nicht nur hochgeladene PDFs usw. gemeint, sondern auch und vor allem Wiki Einträge, Blog und Forum Posts, usw.

Vielen Dank!
Verena Hausmann

Diese Umfrage enthält 18 Fragen.

[Weiter](#)

[Zwischengespeicherte Umfrage laden](#) [Umfrage verlassen und Antworten löschen](#)

Page 2:

1. Dokumente in IBM Connections und ihr Wert für Dein Unternehmen

Der folgende Abschnitt dient der Erhebung der unternehmenswichtigen Dokumente in Eurem IBM Connections und erfragt, ob diese ausschließlich dort gespeichert sind und falls ja, wie kritisch diese Dokumente für Euer Unternehmen sind. Hierdurch kann erkannt werden, ob Dokumentenmanagement-Aktivitäten in Eurem Falle sinnvoll/wichtig wären.

Sind in IBM Connections in Deinem Unternehmen unter anderem die folgenden Informationen gespeichert?

	Ja	Nein	nicht sicher	keine Antwort
Arbeitsaufträge (Tasks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Berichte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Dienstanweisungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Richtlinien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Protokolle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verträge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Mitarbeiterdokumente wie z.B. Stundenzettel oder Leistungsbeurteilungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Steuerrechtliche Informationen wie z.B. Rechnungen oder Lohn- und Gehaltsabrechnungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

The following question only appeared if the according answers of the question before have been "yes" (ja).

Werden die gerade ausgewählten Informationen ausschließlich in IBM Connections gespeichert?

	Ja	Nein	nicht sicher	keine Antwort
Arbeitsaufträge (Tasks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Berichte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Dienstanweisungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Richtlinien	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Protokolle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verträge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Mitarbeiterdokumente wie z.B. Stundenzettel oder Leistungsbeurteilungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Steuerrechtliche Informationen wie z.B. Rechnungen oder Lohn- und Gehaltsabrechnungen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

The following question only appeared if the according answers of the question before have been "yes" (ja).

Sind diese Informationen wiederum kritisch für Deine Arbeit, sodass Du ohne sie nicht lange weiter arbeiten kannst?

	Ja	Nein	keine Antwort
Arbeitsaufträge (Tasks)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Berichte	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Dienstanweisungen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Richtlinien	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Protokolle	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verträge	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Mitarbeiterdokumente wie z.B. Stundenzettel oder Leistungsbeurteilungen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Steuerrechtliche Informationen wie z.B. Rechnungen oder Lohn- und Gehaltsabrechnungen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Gibt es in Deinem Unternehmen einen Business Continuity Plan (Plan zur Aufrechterhaltung des Geschäftsbetriebs)?

ⓘ Bitte wählen Sie eine der folgenden Antworten:

- Ja
- Nein
- nicht sicher
- keine Antwort

The following question only appeared if the answer of the question before has been “yes” (ja).

Sind die Inhalte und Dokumente aus IBM Connections hierin enthalten?

ⓘ Bitte wählen Sie eine der folgenden Antworten:

- Ja
- Nein
- nicht sicher
- keine Antwort

Werden über IBM Connections auch Informationen mit externen Parteien ausgetauscht?

ⓘ Bitte wählen Sie eine der folgenden Antworten:

- Ja
- Nein
- nicht sicher
- keine Antwort

Zurück

Weiter

[Später fortfahren](#) [Umfrage verlassen und Antworten löschen](#)

2. Dokumentenmanagement-Prozesse

Fast alle von Euch haben in unserer Umfrage zu Use Cases angegeben, dass in Euren Unternehmen Teams/Abteilungen und Projekte mittels IBM Connections gemanagt werden. Beispiele für Aktivitäten im Rahmen der Team- und Projektorganisation waren damals im Mini-Survey die gemeinsame Aufgabenverwaltung und Vorbereitung sowie die Dokumentation von Meetings. Denke daher nun an Deine bestehenden Projekt-Communities in Deinem IBM Connections. Über die Zeit sind hier verschiedenste Informationen (wie auf der vorherigen Seite angegeben) in Wikis, Blogs, Dateien usw. erstellt und abgelegt worden. Das Projekt ist jetzt zu Ende.

Werden nun bzw. wurden die folgenden Aktivitäten mit den Dokumenten/Informationen aus den Communities durchgeführt?

	Ja	Nein	keine Antwort
Klassifizierung der Dokumente/Informationen (z.B. in Vertraulichkeit, Integrität,...)	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Einpflegen von zusätzlichen Metadaten	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Hinterlegung eines Workflow zum weiteren Management	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Versionierung	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Überführung des Dokuments/der Information in ein Dokumentenmanagement-, Records- oder Archivsystem	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Löschen der Dokumente	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

The following 2 questions only appeared if at least one of the answers of the question before has been "yes" (ja).

Woher kommen die „Regeln“, die die oben beschriebenen Aktivitäten anstoßen?

Bitte wählen Sie einen oder mehrere Punkte aus der Liste aus.

- Allgemeine Dokumenten-/Archivregeln und Konzepte
- Spezielle IBM Connections/Social Content Regeln und Konzepte
- Fachbereichs-/Abteilungsregeln und Konzepte
- Eigeninitiative
- Andere:

Wie werden die durchgeführten Aktivitäten im System umgesetzt/Wie sind sie implementiert?

Führst Du sonst/darüber hinaus irgendwelche Aktivitäten zum Management von IBM Connections Inhalten durch oder weißt Du von anderen, die das tun?

📌 Bitte wählen Sie eine der folgenden Antworten:

- Ja
- Nein
- keine Antwort

The following question only appeared if the answer to the question before has been “yes” (ja).

Was sind das für Aktivitäten?

Zurück

Weiter

[Später fortfahren](#) [Umfrage verlassen und Antworten löschen](#)

3. Herausforderungen

Im Folgenden sind potenzielle Herausforderungen für das Management von IBM Connections Dokumenten und Inhalten allgemein und aus Deinen Communities gelistet. Auch hier gehen wir wieder davon aus, dass z.B. ein Projekt vorbei ist, oder zum Beispiel ein Mitarbeiter ausscheidet und Du die Dokumente und Informationen in IBM Connections vielleicht managen willst.

Sind hierbei die folgenden Punkte Herausforderungen für Dich? Wenn Du bislang noch nicht über den jeweiligen Punkt nachgedacht hast, lasse die Frage einfach unbeantwortet.

	große Herausforderung	Herausforderung	keine Herausforderung	keine Antwort
Fehlende Metadaten Man hat nicht alle Informationen, um zu entscheiden, was mit dem Dokument passieren soll.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Systemintegration Es ist keine einfache Übernahme der Dokumente in ein anderes System möglich.	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Export Beim Downloaden oder Drucken von Inhalten gehen Informationen verloren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Statusinformationen Dokumente und Communities können nicht in z.B. aktiv und passiv eingestuft werden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Awareness Mitarbeiter denken nicht darüber nach, dass Inhalt in IBM Connections gemanagt werden sollte.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verantwortlichkeiten Die Verantwortlichkeiten für verschiedene Dokumente sind nicht klar.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Ende des Lebenszyklus Bei Social Business Documents ist es sehr schwer, zu bestimmen, wann ein Dokument „fertig“ bzw. „abgeschlossen“ ist und so z.B. archiviert werden kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Zurück

Weiter

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4. Anforderungen

Durch verschiedene Gespräche in unserer IndustryConnect Gruppe sind einige Aspekte aufgekommen, die Anforderungen an das Dokumentenmanagement widerspiegeln. Welche der folgenden Aspekte sind hierbei für Dich und Deine Arbeit mit IBM Connections sowie dem Managen von IBM Connections Inhalten erforderlich, wünschenswert oder nicht benötigt? Diese Frage ist unabhängig davon, ob diese Anforderungen bereits realisiert sind oder nicht.

	erforderlich	wünschenswert	nicht benötigt	keine Antwort
Bestimmung des führenden Systems Wenn mehrere Kollaborations- und/oder DM-Systeme im Einsatz sind sollte entschieden werden, welches das führende System sein soll.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Integration Es sollte möglich sein, Dokumente zwischen verschiedenen Systemen austauschen zu können.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Audit Trail (Historiendokumentation) Die Historie von Dokumenten sollte immer gespeichert werden (z.B. wer, wann erstellt; wer, wann, was verändert,...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Automatische Löschung Es sollte möglich sein, dass Dokumente automatisch (z.B. nach einer gewissen Zeit) gelöscht werden können.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Status-Funktionen Dokumente und Communities sollten in z.B. aktiv und passiv kategorisierbar sein.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Dokumente einfrieren Es sollte möglich sein, Dokumente als nicht mehr veränderbar (nicht editierbar und nicht durch z.B. Kommentare erweiterbar) zu markieren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Wiederherstellen von Dokumenten Gelöschte Dokumente sollten wiederherstellbar sein.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Abstellen von Social Features Bei einzelnen Dokumenten sollte es möglich sein, Kommentare, Likes etc. abzuschalten.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Zusammenführen und Austauschen von Dokumenten Es sollte möglich sein, Dokumente zwischen Applikationen (z.B. Wiki und Blog) und zwischen Communities auszutauschen und zusammenzuführen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Export von Dokumenten und allen Komponenten Es sollte möglich sein, ein Dokument mit all seinen Komponenten, also z.B. ein Wiki mit allen Kommentaren und Anhängen, zu exportieren.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verantwortlichkeiten Verantwortlichkeiten sollten klar definiert werden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Klassifikation Eine Klassifikation von Dokumenten in z.B. Vertraulichkeit, Integrität und Verfügbarkeit sollte in IBM Connections hinterlegbar sein.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Community Management Es sollte möglich sein, auch ganze Communities verwalten (z.B. archivieren) zu können.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Mitarbeiter-Training Es sollte Mitarbeiter-Training in Bezug auf die Pflichten und das Vorgehen vom Management mit SBD geben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Schlagworte Es sollte möglich sein, vorgegebene Schlagwörter zu benutzen, die für eine Klassifizierung genutzt werden können (anders als selbstgesetzte Tags können diese auch großgeschrieben werden und vorgegeben sein).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Mehr Metadaten Es sollte möglich sein, im System mehr Metadaten für Dokumente zu hinterlegen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Guidelines Es sollte Guidelines für das Management von Social Business Documents geben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

The following question only appeared if the answer to the Guideline-question before has been “required“ or “wish“ (erforderlich oder wünschenswert).

Was sollte aus Deiner Sicht in diesen Dokumenten Management Guidelines geregelt werden?

	sollte enthalten sein	sollte NICHT ent- halten sein	keine Antwort
Eigentumsrechte	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Verantwortlichkeiten	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Vertraulichkeit	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Zugriffsrechte	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Aufbewahrungsfristen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Löschvorgehen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Archivierungsvorgehen	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Gibt es abschließend noch weitere Aspekte, die Du zum Thema Management von IBM Connections Inhalten und Dokumenten beitragen möchtest?


Zurück

Weiter

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5. Teilnehmerinformationen

Du füllst den Fragebogen für folgendes Unternehmen aus:

 Bitte wählen Sie eine der folgenden Antworten:

Bitte auswählen..

Dein Name ist:

 Diese Information wird nicht weiter gegeben und dient lediglich für eventuelle Rückfragen.

Vielen Dank, dass Du Dir für meine Fragen Zeit genommen hast. Da ich gerne noch tiefer in die Herausforderungen und Anforderungen des Managements von IBM Connections-Inhalten einsteigen würde, wäre es toll, wenn ich, falls vorhanden, mit dem bei Dir im Unternehmen Zuständigen für Informations-/Dokumentenmanagement oder sonstigen Interessierten an diesem Thema sprechen dürfte.

Falls es Personen gibt, die Deines Erachtens mit mir sprechen könnten/würden, wie heißen diese und wie sind ihre Kontaktdaten?

Zurück

Absenden

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Own Publications

Through the work within the scope of this dissertation it was possible to publish the following conference papers and journal articles within the last years:

2013:

Williams, S.P., Hausmann, V., Hardy, C., Schubert, P., 2013. Enterprise 2.0 Research: Meeting the Challenges of Practice. BLED 2013 Proceedings, pp. 251–263.

2014:

Hausmann, V., Williams, S.P., Hardy, C.A., Schubert, P., 2014. Enterprise Information Management Readiness: A Survey of Current Issues, Challenges and Strategy, in: Procedia Technology, Conference on ENTERprise Information Systems– Aligning Technology, Organizations and People, CENTERIS 2014. Presented at the Conference on ENTERprise Information Systems, pp. 42–51.

Williams, S.P., Hausmann, V., Hardy, C., Schubert, P., 2014. Managing enterprise information: meeting performance and conformance objectives in a changing information environment. International Journal of Information Systems and Project Management 2, pp. 5–36.

2015:

Hausmann, V., Williams, S.P., 2015. Social Business Documents, in: Procedia Computer Science, Conference on ENTERprise Information Systems, CENTERIS 2015. Presented at the Conference on ENTERprise Information Systems, pp. 360–368.

2016:

Hausmann, V., Williams, S.P., 2016. Issues for the long-term management of Social Business Documents. International Journal of Information Systems and Project Management 4, pp. 45–61.

2017:

Williams, S.P., Hausmann, V., 2017. Categorizing the Business Risks of Social Media. Procedia Computer Science, Conference on ENTERprise Information Systems, CENTERIS 2017. 121, 266–273.

Curriculum Vitae

Verena Hausmann, M.Sc.

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Personal Data

Date of Birth:	13.06.1987
Place of Birth:	Neuss
Nationality:	German

Studies

Since 04/2012	Doctoral Program at the Research Group Enterprise Information Management, University of Koblenz-Landau, Campus Koblenz, Germany
04/2010 – 03/2012	Studies Information Management (Master of Science) University of Koblenz-Landau, Campus Koblenz, Germany Master thesis topic: „Developing a Framework for Web Analytics“
01/2011 – 05/2011	Semester abroad at the Turku School of Economics, Finland
10/2006 – 03/2010	Studies Information Management (Bachelor of Science) , University of Koblenz-Landau, Campus Koblenz, Germany
07/2009 – 12/2009	Bachelor thesis at the University of South Australia, Adelaide, Australia, Topic: „Effective ICT-Enabled Transformation in Non-Profit Organisations and the Impact on Workforce Motivation“,

Grants and Awards

2011 ERASMUS Scholarship for studying abroad, Finland

2009 DAAD Scholarship for scientific training abroad, Australia

2006 Award for the best high school performance at the high school, Berufsbildungszentrum Grevenbroich, Germany

Work Experience

Since 11/2016	Assistant to the Vice President for Research, Transfer, Internationalisation & Digitalisation, University of Koblenz-Landau, Campus Koblenz, Germany
04/2013 – 10/2016	Research Assistant at the Research Group Enterprise Information Management, University of Koblenz-Landau, Campus Koblenz, German
04/2012 – 03/2013	Research Assistant at the Research Group Business Software University of Koblenz-Landau, Campus Koblenz, Germany
03/2013	Research Exchange with the Department of Business Information Systems, University of Sydney Project title: Information Capability Study
10/2011 – 12/2016	Student Agent, IBM Deutschland Management & Business Support GmbH , Germany
04/2010 – 09/2012	Student assistant at the institute for IS research University of Koblenz-Landau, Campus Koblenz, Germany
07/2010 – 10/2010	Internship IBM Deutschland GmbH , Düsseldorf, Germany Department Technical Sales Competitive (Lotus)
01/2008 – 07/2009	Student assistant at the Research group Business Software University of Koblenz-Landau, Campus Koblenz, Germany
08/2008 – 10/2008	Internship abroad at the University of South Australia in corporation with UnitingCare Wesley Adelaide Inc., Adelaide, Australia Project title: Towards an Information Strategy – Adolescent Services
03/2002 – 11/2005	Athletics coach, SG Neukirchen Hülchrath

Further Experience

Since 06/2017	Member of the board of directors of DNUG e.V.
Since 02/2016	Member of the University Council, University of Koblenz-Landau, Koblenz, Germany
2015 - 2017	Chairwoman of the Förderverein Informationsmanagement e.V. (Association for friends of the Study Program Information Management), University of Koblenz-Landau, Koblenz, Germany
2015	Member of the committee for assigning a new professor, Institute for IS Research, University of Koblenz-Landau, Koblenz, Germany
2013 – 2016	Internationalisation Coordinator, Faculty of Computer Science, University of Koblenz-Landau, Koblenz, Germany
2010 – 04/2012	Member of the student association Information Management, University of Koblenz-Landau, Campus Koblenz, Germany
2012	Member of the committee for assigning a new professor, Institute for IS Research, University of Koblenz-Landau, Koblenz, Germany
04/2008 – 03/2012	Student representative for the institute for IS Research, University of Koblenz-Landau, Campus Koblenz, Germany
07/2011	Participation at the IBM EMEA Best Student Recognition Event, La Gaude, France