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Issues for the long-term management of Social Business Documents

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Abstract:

Social business documents are currently one of the fastest growing content types within organizations. As carriers of important business information they require systematic management to ensure their content is available, accurate and protected over the long-term. To achieve this requires a deep understanding of their structure, nature and use. In this paper we present the findings of a preliminary study of social business documents. The aim of the study is to understand how social business documents are structured and to identify the issues and challenges that surround their management. Through an analysis of social business documents in four different systems we identify and compare their structural components from a user perspective. From this cross document/cross system analysis we develop a conceptual model for social business documents and identify issues for their long-term management. Our findings also identify the need for more in-depth modeling for which we propose methods to assist in understanding the syntactic and semantic structure of social business documents and how these change over the life of a social business document.

Keywords:

social business documents; compound documents; document modelling; enterprise information management; enterprise collaboration systems; enterprise social software.

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1. Introduction

Enterprise Collaboration Systems (ECS) are software platforms built around a combination of Enterprise Social Software (ESS) components (e.g. social profiles, tags, wikis, blogs) and classical groupware components (e.g. e-mail, group calendars, document libraries, workflow engines) [1], [2]. These “socially-enabled” collaboration systems are predicted to transform the digital workplace and are generating much interest for researchers and practitioners [3]–[5]. They have the potential to enhance collaborative work by improving communication, supporting joint work within and between business teams, coordination of workflows and tasks, and enhancing information sharing and the management of information and knowledge assets. Such systems are now generating large volumes of information in the form of social content, which is currently one of the fastest growing content types within organizations [6]. These large volumes of social content are comprised of a wide variety of documents (e.g. wiki entries or blogs posts), many of which contain important business information that requires systematic management. However, a recent survey of organizations reveals that whilst many organizations have clearly defined enterprise information management (EIM) programs for traditional document types, social business content is not yet included in such programs and remains largely unmanaged [7].

In this paper we focus attention on social business documents and their management. We present the findings of a preliminary study to investigate the nature and structure of social business documents. The work is part of a wider research program that explores the long-term management of social content. Our aim is to understand how these newer forms of information artifact are structured and to identify the issues and challenges that surround their long-term management. The paper is organized as follows. Section 2 provides background and context to enterprise collaboration systems and social business documents and their importance as carriers of business information. In section 3 we present the current study to examine the structure and nature of social business documents, its aims and objectives and the research design. This is followed by a presentation and discussion of the study findings and the implications for further work.

2. Enterprise collaboration systems and social business content

Enterprise collaboration systems are socio-technical systems that support collaborative work within a company. They are comprised of hardware, software, people and their work practices, organizational procedures and business processes. ECS are information infrastructures that combine multiple traditional groupware and content management components with enterprise social software components. They are usually implemented as a single integrated ECS suite or platform (e.g. IBM Connections, Microsoft SharePoint, Atlassian Confluence and Alfresco). However, ECS may also be built up as a portfolio of more loosely coupled stand-alone collaboration tools (e.g. specialized software for wikis, blogs from multiple vendors/sources) that may (or may not) be integrated with each other [8]. Rather than functioning as a communication delivery channel, ECS provide a platform upon which social interaction can occur [2, p. 2]. This interaction and the collaborative business activities that ECS support were initially termed Social Business [9], [10] or Enterprise 2.0 [11] to emphasize their social media-like nature. However, the social-media like components are only a part of an ECS. The strengths of ECS cannot only be found in the interactions that are supported, but also through their possibilities to transform work by combining existing technologies to coordinate activity streams, schedule tasks and events, and repositories and libraries of documents to capture and share information and knowledge. Documents are central to all the communication, coordination, collaboration and information sharing activities that take place using an ECS, and it is to the topic of social business documents that our attention now turns.

2.1 Social business documents

The incorporation of social media/Web 2.0 functionality into enterprise collaboration systems has resulted in the creation of new types of documents which we have termed ‘social business documents’ [12]. In using the term document to describe such artefacts we follow the work of scholars in the Library and Information Sciences cf. [13],

[14]. Defining a document as “any concrete or symbolic indexical sign, preserved or recorded toward the ends of representing, of reconstituting, or of proving a physical or intellectual phenomenon” [13, p. 10].

Social business documents are a class of digital business document, found alongside emails, business reports, webpages, podcasts, etc. Examples of social business documents include blog posts, wiki entries, social profiles, comments, etc., each of which contains business-related information (Table 1). A characteristic that distinguishes social business documents is that they are collaboratively developed and shared; a network of interactions and activities is built up and surrounds the core content of the document. As instances of digital documents, social business documents inherit all the characteristics of digital documents, however their social nature adds further complexity, which make them more challenging to control and manage.

Table 1: Examples of Social Business Documents.

Name	Description	Purpose/Aim
Wiki entry	One page of a wiki which includes information in the form of text, links, images and videos.	To collaboratively capture and share business information and knowledge.
Discussion/Forum message	Entry on a particular topic that is open for discussion. It can include text, images and links.	To capture and exchange ideas and opinions and support business decision-making.
Blog post	Entry on a particular topic from one user. It can include text, images and links.	To capture information and share opinions on specific topics.
Status message	Text message communicating a recent update.	To update and inform colleagues within the enterprise network.

2.2 Social business documents as compound documents

Social business documents are examples of compound documents; that is, they consist of more than one component, for example, the main text, tags or comments [12]. Asprey and Middleton [15, p. 11,57] have discussed this characteristic in the context of emails and HTML web pages. An email, which contains text, attachments and links to other documents, is a combination of content, which together forms a compound document. Similarly for HTML pages, if an HTML page contains links to other documents such as pictures or downloadable pdf files, server side includes etc. then the whole object should be seen as a compound document. Asprey and Middleton [15, p. 317] use the term compound document and refer to “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”. We apply the concept of a compound document as an analytical tool to examine the different components in social software in the study reported in Section 4.

2.3 Social business documents and social content

Not only are social business documents compound documents they also contain materially different types of content (see Table 2 for examples). For example, a blog post contains the main content, which is the core information (e.g. a post about a new product, project etc.) and is the reason the post is created. This core information is then socially enhanced through, for example, the addition of comments to the original content, liking, sharing and tagging. These ‘attached’ elements are important parts of the document in context. Comments are, in themselves also social business documents (they can be liked, tagged, etc.) –they contain information that may be of value to an organization. For example, a comment might show how a topic developed, essentially capturing the discourse around the topic. Whilst comments are a social business document unit in themselves they are not of value unless attached as context to the thing that is being commented on (i.e. the post). There is also social content that is not, by definition a document but also contains important information about the main content. For example, a like shows that someone has (most likely) read a

post and agrees with it. A like is not content in itself but it is part of the social milieu that surrounds a social business document, in effect a like is a form of workplace awareness showing what another user has done. From an audit or records management point of view these peripheral social elements to a blog post are part of the post and should be managed together.

Table 2: Examples of attached social content.

Name	Description	Purpose/Aim	Why it is not a social document
Like	Expression of favor for some specific information.	Recommend content; Shows consent	If seen alone the context of the like is gone and it no longer relates to any information. All likes are the same, the difference is in what someone likes. When attached to a wiki entry as an example, it becomes part of that social document.
Tag	A keyword or index term attached to other documents.	Clustering content for better resource discovery	A tag alone is just a word and has no context or explanatory power. It becomes part of a social document when it is attached to it and is rather a special kind of metadata.
Comment	Written annotation related to another social document.	Adds opinion, concerns or ideas to something	A comment itself might include important information and could be seen as a document. However, comments are always attached to something and thus are a contextual component of a social document.

The majority of social business documents are *born-social*; that is, they are created within enterprise social software with the express intention of being interactive and collaborative. When created within the system, a wiki entry already has the functionality of version control, of commenting and collaborative tagging. However, some documents may *become-social* through being opened to collaborative interactions. ‘Traditional’ digital documents such as pdfs or office documents do not have collaboration features as standard; when created in their original systems (e.g. Open Office or Microsoft Office) there is no possibility to collaboratively tag or like the file. However, when they are uploaded into an ECS these collaborative features become possible, the document becomes embedded in a collaboration space. The document is now a social business document. Thus, even though we are primarily focusing on examples of born-social documents such as a wiki entry or a blog post, it important to note that traditional digital documents, e.g. spreadsheet, a CAD file or an image, can become social business documents consisting of the content/file itself and the individual social components.

2.4 Documentary practices

A wide range of document types and document-related practices mediate work in an ECS. For example, working on tasks such as collaborative writing/editing in a wiki, sharing documents in libraries, updating status messages, commenting on posts, liking, etc. Many of these practices are collective-practices with multiple authors working on the same document. This can mean that some social business documents are always *in-the-making*, published before they are a final version, frequently updated with comments, and/or with no expectation of a final version but rather a continuous evolution of their content.

Social business documents have the properties (prolonged state of incompleteness, their durability, their fragmentation, the diverse commitments of their authors, the evolving nature of their content, etc.) of what Zacklad [16, p. 206] has defined as Documents for Action (DofA). These properties present a number of document management challenges, especially with regards to traditional views of the information lifecycle.

As discussed earlier these digital documents still require management to ensure that important business information is effectively organized, stored, used and disposed of, and this is not currently occurring [7]. To manage social business documents in ways that account for their more fragmented and evolutionary character we need to know much more

about their nature, structure and uses. In the remainder of the paper we present a study to investigate the nature and structure of social business documents, propose a strategy for analyzing them and examine the implications for social business document management.

3. Research approach

This study aims to provide a deeper understanding of the structure and nature of social business documents. The findings will contribute to the specification of functional requirements for social business documents and to the design of processes and strategies for their long-term management, which are goals of our wider research program. A preliminary definition of social business documents and their characteristics have already been identified (see [12]); these are briefly discussed in section 2 above. In order to develop the capability to manage social business documents effectively an understanding of what social business documents are, where they occur and how they are constructed needs to be established and forms the basis of the study reported in this paper. Social business documents are analyzed by examining their nature and structure through the following research steps outlined below (see Fig. 1).

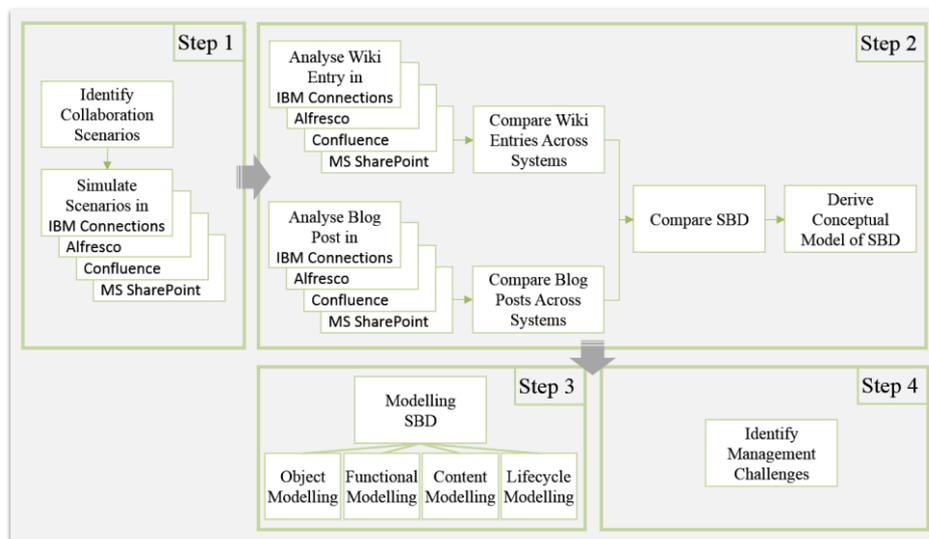


Fig. 1. Research Steps

Step 1: Identify Collaboration Scenarios. Key collaboration scenarios were developed to guide the analysis of social business documents. The scenarios illustrate how groups and individuals within organizations use collaboration tools to work together. Two of these collaboration scenarios are discussed in this paper. They were created to illustrate information exchange and communication during the use of i) a wiki and ii) a blog application. Each collaboration scenario was then simulated within four of the most widely used ECS: IBM Connections, MS SharePoint, Alfresco and Atlassian Confluence (see section 4.1).

Step 2: Analyze social business documents. Adopting a user perspective, an analysis was undertaken to identify the components that can be added to the wiki and blog applications in each system. The findings about the two document types (wiki entry and blog post) were compared to i) identify the presence/absence of specific components and ii) to compare the similarities and differences between the two document types both within and between the four systems.

Finally, a conceptual model was developed, outlining the social business document components identified in the analysis (see section 4.2 and 4.3).

Step 3: Modelling social business documents. Following the preliminary analysis the two social business document types and their components are examined in more detail, using four different modelling approaches: object, functional, content and lifecycle modelling. The different views of social documents are developed in order to understand how they are constructed from both a technical and an organizational level. The different modelling perspectives are outlined in section 4.4.

Step 4: Identifying management challenges. Given the complex, compound nature of social business documents, step 4 begins the work of identifying the challenges of managing social business documents. Through the implementation of the collaboration scenarios and the analysis of social business documents a number of issues for their long-term management are identified. These will be further investigated and developed in later stages of the project through in-depth case studies of ECS in use (see section 5).

The research follows an exploratory research approach with the aim of providing an understanding of the nature and structure of social business documents. The findings form the foundation for future in depth analyses. Based on insights from previous work and the industry case studies (future work), we will identify requirements, strategies and practices for the long-time management of social business documents.

4. Components of social business documents

As outlined above (section 2), the idea of compound documents is not new and can be found in descriptions of, for example, e-mails or web pages. Social business documents also have the characteristic of being compound documents [12]. Using the compound document concept as a basis, the following sections use two collaboration scenarios to examine social business documents in more detail. Each scenario is simulated in four different ECS and the findings are analyzed in order to develop a conceptual model for social business documents. Finally, we discuss different modelling approaches that provide additional perspectives on understanding social business documents.

4.1 Collaboration scenarios for SBD

Schubert and Glitsch (2015) present an approach to defining use cases and collaborative scenarios within enterprise collaboration systems. They “refer to *use cases* for activities that are unpredictable in their exact sequence (and thus flexible)” [17, p. 164] and define 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)” [17, p. 163]. Use cases express wider organizational activities and consist of one or more scenarios. 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 [18].

In order to analyze social business documents two different collaboration scenarios representing typical information exchange and communication were developed. The scenarios are set in an organization that works together with companies all over the world and has its own representatives in different countries and therefore depends on collaboration support. In order to extend their portfolio the company is planning a new service offering. The two collaboration scenarios outlined in Table 3 are included in this use case.

Both scenarios described within the table above could be performed using word processing tools to capture the information, shared drives to store the documents and e-mails to distribute additional information to the responsible employees. However, only assigned employees would have access to the information and the possibility to make new contributions. With the use of wikis, blogs, etc. collaboration and information exchange becomes much easier [19]. Communication is more transparent and visible for a broader user group and it is possible to create and use different kinds of content. In order to outline this different content and to analyze the use of social business documents, the collaboration scenarios were simulated in four different enterprise collaboration and enterprise content management

systems. Based on the scenarios outlined above, social business documents created in the wiki and blog are further analyzed. Below we present the findings from two of the four systems: IBM Connections is used as an example of an ECS and Alfresco as an example of an ECMS.

Table 3. Collaboration scenarios examples.

Scenario	Developing a program outline	Searching for Partner: keep employees up to date
Description	The company needs to create an outline of a travel program providing a short overview of each day. This information will later 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.
Application	Wiki	Blog
Tasks involved	<ul style="list-style-type: none"> ▪ Create & capture program information, to inform employees about the outline ▪ Update information, enabling all project members to work on the outline ▪ Comment information, to reason updates ▪ Improve findability 	<ul style="list-style-type: none"> ▪ Create & capture update information ▪ Disseminate information to employees ▪ Edit information because of a mistake ▪ Comment information ▪ Improve findability

4.2 Analyzing social business documents

Scenario 1 – Wiki usage

When using IBM Connections as a platform for information organization and exchange a community is opened to organize the new offering. The program outline is written within a wiki entry, which consists of the main content itself, comprising text and pictures and its metadata such as the creator, creation and update date etc. However, the pictures are not stored within the content object, they are integrated via a link to the attachment of the wiki entry. Furthermore, different employees could edit the outline, with each change leading to a new version, which can be viewed and restored. In order to explain the edits made to the outline, the wiki comment functionality was used. In addition, the entry was tagged with different terms for better findability and employees who saw the entry have ‘liked’ it to show their consent.

Similar to communities in IBM Connections, sites can be set up in Alfresco. These are used as a kind of project room and a wiki entry for the program outline is added. The functionality of the two systems differs, so does the structure of the wiki entries. However, similar content components can be found within the wiki entry in Alfresco. The wiki entry in Alfresco consists of the main content, its metadata, the uploaded pictures, different versions and tags. In contrast to the wiki entry in IBM Connections, the Alfresco wiki entry cannot be commented on. Further, pictures are not uploaded through attachments, but are either linked from an external file or uploaded through the document library and linked internally.

Fig. 2 shows what the Scenario 1 wiki entries look like in IBM Connections (left) and Alfresco (right).

Further analyzing wiki entries in Atlassian Confluence and Microsoft SharePoint reveals similar components. Table 4 summarized the findings of the wiki analyses across the four systems and provides an overview of similarities and differences between them.

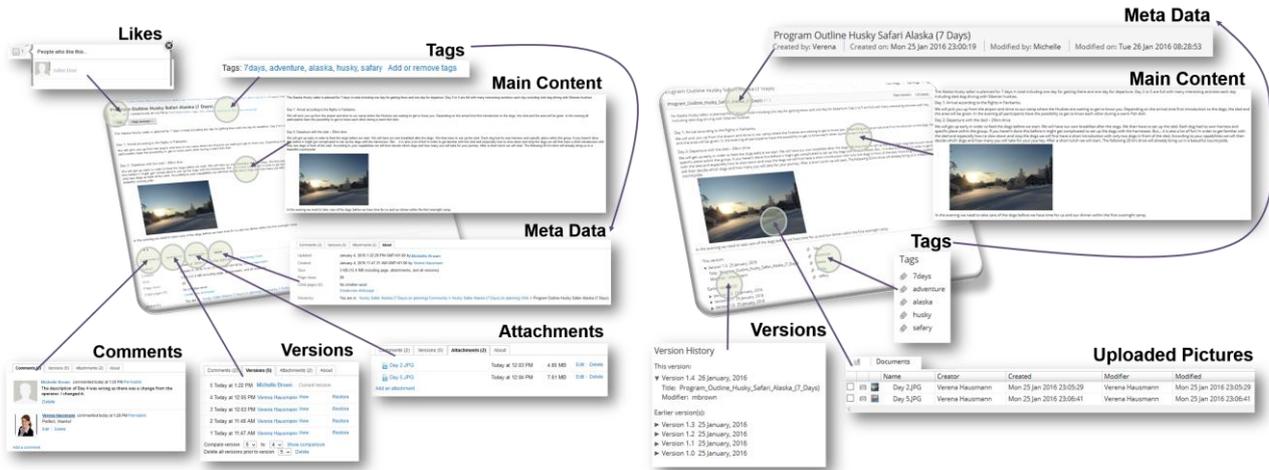


Fig. 2. Wiki entries in IBM Connections (left) and Alfresco (right)

Table 4. Wiki entry components in the different systems

	IBM Connections 4.5	Alfresco Community 5.0	Atlassian Confluence 5.8.14	MS SharePoint 2013
Content	X	X	X	X
Versions	X	X	X	X
Comments	X	-	X	X
Attachments	X	-	X	-
File uploads	(X)	X	(X)	X
Notifications	-	-	X	-
Tags	X	X	X	X
Likes	X	-	X	X
Likes to Comments	-	-	X	-
Picture etc. to comment	-	-	X	-

Note board

x = available - = not available (x) = attachments are uploaded to a file directory in the background

Scenario 2 – Blog usage

The purpose of a blog is different to that of a wiki [19], consequently the functionality is different, with a different set of components. However, analyzing the blog posts reveals similar results as for the analysis of the wiki entries. In both systems, the blog posts are set up in the same community/site as the wiki entries. They also comprise text and pictures and are tagged for better findability in both systems.

Within the blog post in IBM Connections, the pictures are not directly uploaded as attachments to the post, but automatically uploaded to a file system and linked within the post. This is a different process than in the IBM

Connections wiki. The IBM Connections blog post offers the possibility to notify people about the post itself. Thereby it is possible to send additional information through an e-mail message produced via the system. Furthermore, it is not only possible to comment on a post, as with the wiki, but also to like the comment. Whilst the IBM Connections wiki entry allows version control, the blog post does not. Even though the metadata of the blog post captures who created the post at which time and which person last edited it, the system does not provide information about what was edited and what happened between the content creation and the last edit. Comparing the IBM Connections blog post to the blog post in Alfresco shows less functionality and there are fewer components in the Alfresco blog post. In Alfresco we can only find the content with its metadata, tags, comments and uploaded files. Fig. 3 illustrates what a blog post looks like in IBM Connections (left) and in Alfresco (right).



Fig. 3. Blog Post in IBM Connections (left) and Alfresco (right)

Table 5 shows the components available in the blog post in all four systems under analysis.

Table 5. Blog post components in the different systems

	IBM Connections 4.5	Alfresco Community 5.0	Atlassian Confluence 5.8.14	MS SharePoint 2013
Content	X	X	X	X
Versions	-	X	X	-
Comments	X	X	X	X
Attachments	-	-	X	-
File uploads	X	X	(X)	X
Notifications	X	-	X	-
Tags	X	X	X	X
Likes	X	-	X	X
Likes to Comments	X	-	X	-
Picture etc. to comment	-	-	X	-

Note board

x = available - = not available (x) = attachments are uploaded to a file directory in the background

The examples of the wiki entry and the blog post outlined above are representative examples of social business documents in the different systems and reveal various aspects of the structural differences and complexity of the documents, the different kinds of implementations within the systems, the different terminology used within the systems and richer content capture capabilities.

One example of the structural differences of social business documents as compared with traditional digital documents is the implementation of a comment. As for a wiki entry, it is also possible to comment an MS Word document. However, with the MS Word document, the comment is embedded directly within the file itself, a comment to a wiki is attached to the wiki entry. As collaboration tools often allow the capture of additional content such as a like which is not available within traditional documents, they offer possibilities for richer, more expressive content. This increases the volume of content created as well as the complexity of the documents being compound documents.

All these characteristics lead to interesting challenges for social business document management. It is necessary to not only view the main content as valuable information that must be protected and managed, but also the different components attached to it. For example in the case of legal discovery or audit, the comment attached to a blog post may be of equal material or contextual value.

Tags are additional descriptive metadata and a like is an example of awareness information that shows that a person has accessed the document and most probably agrees with the content. Similarly with a comment, it depends on the perspective and the interpretation whether the like is a valuable component for the document. Most of the time it may not be important, however, if it is used as an indicator for consent to a decision, it might then be important.

A conceptual model of social business documents can assist us in understanding their general structure. However, because of variations in the ways different systems implement these structures it is also necessary to understand the individual system implementations in order to manage social business documents in ways that meet legal and organizational requirements.

4.3 Conceptual model of social business documents

Although the specific functionalities within the software offerings differ, as do the implementations within the various systems, the general notion that a social business document consists of more than its main content and additional metadata holds for all systems. Building upon our analysis outlined above, we developed a representation of a conceptual information model of social business documents including their possible components (see Fig. 4).

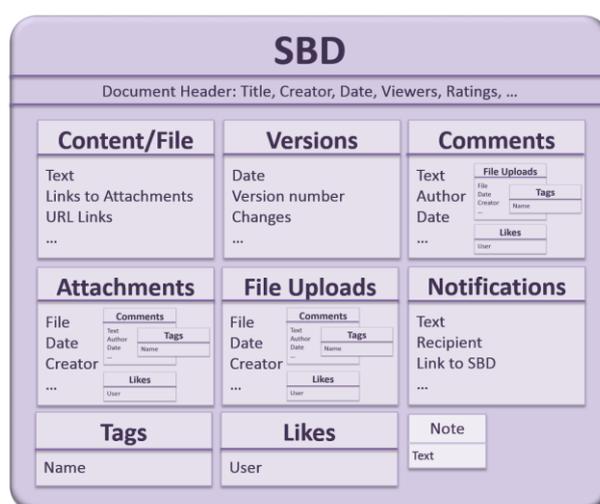


Fig. 4. Conceptual model of social business documents.

4.4 Modelling social business documents

Presented above is the user view of social business documents as compound documents. As Asprey and Middleton outlined, compound documents consist of “components from several digital sources in different formats” [15, p. 317]. Salminen et al. [20, p. 644] posit that a well-grounded document analysis is needed in order to define effective standards for digital documents. Therefore, the existing documents and their management practices need to be studied and described.

In order to understand social business documents in more depth and to identify strategies for their management more knowledge about their technical implementation, as well as their organizational instantiation is required. Document engineering approaches provide methodologies for developing new documents. However, they can also assist in analyzing existing documents. Guided by the approach of Glushko and McGrath [21] we defined four different modelling processes to represent different views of social business documents: object modelling; functional modelling; content modelling; and lifecycle modelling. Table 6 provides an overview of the aim, outcome and contribution of each approach for the research study. All diagram notations identified as outcomes from the different modelling approaches are adapted to fit the needs to describe the aspects for managing social business documents.

Table 6. SBD modelling approaches

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

Object Modelling

Object modelling enables the analysis of social business documents from the technical, system perspective. The aim of object modelling is to identify the structural information models of different social business documents. To achieve this, the instantiated documents within the systems need to be analyzed in their actual implementations within the different systems in order to understand their characteristics. In object modelling the structure of social documents is analyzed by identifying the different components and their attributes, along with their relationship to each other in the database.

We will use the UML class diagram representation in order to analyze how social business documents and their components are stored within the databases. The Unified Modelling Language (UML) is widely used for modelling software designs and analysis and can be seen as a de-facto standard. 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 [22], [23, p. 71,73]. By describing

the syntactical structure we can examine where content is stored, how the different components of a social business document are linked to each other and what metadata exists and where it is stored. While UML class diagrams can describe the dynamic aspects of a system by including attributes and methods, Entity-Relationship (ER) [24] diagrams focus on a static view of the system. Therefore ER diagrams will also be used in order to model SBD in a more abstract way.

By analyzing social documents in different stages of their lifecycle, the object modelling will identify changes to the document from the system perspective. The object modelling will contribute to understanding the structure of social business documents in order to reveal possible issues arising with their long-term management. For example, analyzing a wiki entry with the help of the object modelling in IBM Connections revealed that the main content of the wiki entry and its attached files are stored as files in the filing system, whereas all other content such as the metadata or tags are stored within a database. Creating database backups for archival activities or security reasons without saving the files in the file system would in the example presented here lead to a loss of information.

Functional Modelling

Functional modelling investigates what can be done to and with a social business document. Through analyzing social business documents from a user perspective the functional modelling aims to determine the functional information model of social business documents and thus their processing and modification possibilities.

The UML activity diagram is a behavioral modelling technique [22, p. 141] which draws ideas from Petri nets, event diagrams and SDL state modelling techniques. Activity diagrams can be used for describing workflows and behavior. The main element is an activity which can, dependent on the perspective, be some kind of task or a method for a class [22, p. 129]. Within the functional modelling for social business document we take the conceptual perspective in which an activity describes a functions/task you can perform. Whereas a flowchart can only depict sequential processes, activity diagrams can outline parallel processes [22, p. 131].

The functional model will contribute to understanding the user-side modifications to social business documents that are possible over their lifetime. Potential problem areas could be revealed, by showing that, for example, a blog post that has been written and commented on can be still edited after the comment was made. The problem here is, if there was no version control on the post the original version of the post to which the comment was attached may not be visible anymore. In order to discover these issues, a mapping of the functional modelling and the changes to the object models during their lifetime is necessary.

Content Modelling

While the object modelling analyses the syntactical aspects of social business documents, the content modelling should enhance the structural information model with semantic aspects. The content modelling approach will provide further insights into organizational aspects of SBD. To achieve this the general metadata kept within the different systems for each SBD will be analyzed. Furthermore, audit related information, which might be important for SBD will be identified.

In order to discover information resources, Burk and Horton [25, p. 57] outline a method for creating an information inventory. An information inventory should show who (sources) holds which information (document such as annual reports, trade publications etc.), who is responsible for them, etc. It provides an overview of all information available and provides detail about their nature and management requirements

With content modelling we adapt the idea of an information inventory in order to develop general models, which outline the important information that should be kept with/about social business documents. By describing the instantiation of the documents, not only the metadata information provided by the systems, but also information such as stakeholders, responsibilities etc. are analyzed. Such information can also be seen as metadata of social business documents and categorized into: administrative, descriptive, preservation, technical and use metadata [26].

This organizational view of the content modelling will assist in identifying the audit related information required for managing social business documents.

Lifecycle Modelling

Finally, the lifecycle modelling will provide a holistic view of social business documents over time. To achieve this the findings of the object, functional and content modelling will be combined in order to understand which components and elements of social business documents change over their lifetime and how they change. These insights can assist in identifying different management requirements of social business documents at different points in time.

The modelling approaches outlined above and the connected views are necessary to understand how social business documents are constructed, both, technically and organizationally in order to be able to formulate functional requirements and be able to adequately manage them. Burton and Horton [25] have previously noted that we have to know the different elements of information in their context in order to be able to manage information.

5. Issues for long-term management

As outlined at the beginning of this paper, wiki entries, blog posts and all other social business documents can contain valuable business information that requires systematic management. Thus, not only is the structure, design or form important for defining value, but most important is the content itself. As with other digital content, social business documents are legally discoverable information and thus can become evidence in legal proceedings [27]. It also needs to be managed in terms of knowledge management and preservation, information quality, operational risks, etc. However, the nature and structure of social business documents, their characteristics, the system they are created/captured with and organizational requirements add to these management challenges.

Characteristic and content issues: Even though many of the characteristics of social business documents such as the multiple authoring, easy shareability and location independency lead to positive opportunities when working with social documents, many characteristics also bear challenges and risks [12]. When managing, archiving or deleting social business documents it is important to consider the compound document, including all the components of the social document.

Furthermore, the lifetime/durability of social business documents is often not well defined. Because of their interactive nature and their possibility for further editing, it remains unclear when a document is finished/terminated. If not locked for further editing, new comments, more likes etc. can emerge years after the document was created. The question of when to archive or delete a document remains open.

System-related issues: Depending on the system type where social business documents are captured, (e.g., ECS or ECMS, and even ERP Systems) different levels of information and document management capabilities can be found. However, most of the document management methods such as content types, declaring a record or retention periods cannot be applied to, are not implemented for social business documents.

Organizational issues: 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. Further, many organizations do not have a strategy for managing social business documents [28]. Guidelines outlining how to proceed with this content are missing, and if in place at all, the archiving and deletion aspects in particular are not being addressed [8]. Questions such as, who is the owner of a document brings challenges. Is it the author of the document, even though someone else subsequently edited the document? And what about the attached components? Who is responsible for them?

The following list summarizes the problem areas identified within our preliminary analysis of long-term management issues:

- Compliance issues;
- Records management issues;
- Loss of information quality;
- Knowledge management;
- Operational risks (not finding information);
- Exporting (transferability);
- Archiving.

There are many open issues when it comes to managing social business documents. However, how something should be managed, whether it should be deleted or retained, and when and for how long, should be dependent on the content, not the medium. If the same information in paper can be given a retention period and be archived or deleted, so too should social business documents. The challenge is in finding the best strategies and practices for achieving this.

6. Conclusion and implications for future work

The aim of this study was to understand how social business documents are structured in order to identify the issues and challenges that surround their long-term management. Given their characteristic nature as compound documents we began by analyzing the components of social business documents in different systems. In terms of generalizability we developed a conceptual model of social business documents outlining their components and the occurrence of nested components. However, because of the different implementations and approaches within the software systems we also outlined the need for more in depth modelling methods to i) identify how social business documents are implemented from a technical perspective, ii) understand functional possibilities for their change and iii) understand lifecycle issues.

This paper provides first insights into the user view of social business documents. The modelling approaches will especially address the technical implementations. In order to examine organizational issues and requirements to/with social business documents, industry case studies will be performed as a next step of the overall research project.

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