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# Global Social Knowledge Management: From Barriers to the Selection of Social Tools

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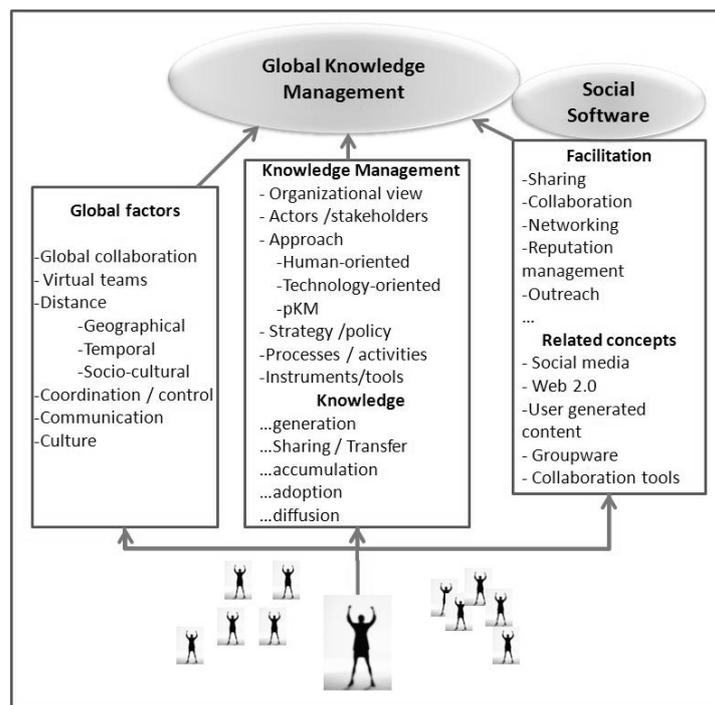
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**Abstract:** Web 2.0 and Social Software revolutionize the knowledge exchange within and between organizations. This is one of the claims consultants and software vendors in the field have made. But have the promises been kept and has evidence been achieved so far, in particular for knowledge management in globally distributed settings? As a starting point, our paper introduces the field of Global Social Knowledge Management (GSKM). We see this area as one of the main research area for future research in the Knowledge Management domain. A variety of social software applications have already been seen promising and incorporated into the context of knowledge management (Avram 2006; Zheng and Zheng 2010; Levy 2009). One main assumption is that social software could bridge the traditional gap between human- and technology orientation (Avram 2006:1; Fiedler & Welpel 2011). However, there is so far only anecdotal evidence how these applications work in globally distributed organizational settings. Within this paper, we present the key issues for GSKM and elaborate on transferability of these aspects to differing contexts. The main research domains related to GSKM are Social Software and Global Knowledge Management. We present a brief review of state of the art research for these domains and focus in detail on Social Software supported knowledge activities. As one of the first efforts, we perform a mapping of Social Software to KM activities and major barriers. Additionally, we will illustrate through a case study how to contextualize the GSKM approach for educational application area. The paper is a starting point for discourse on this promising field, outlining the research field of globally distributed Social Software-supported Knowledge Management and discussing current research efforts on the main components. By this paper we intend to contribute towards a research agenda for Global Social Knowledge Management.

**Keywords:** global social knowledge management, social software, barriers, distributed teamwork, contextualization, cultural influence

## 1. Global social knowledge management: State of the art

Managing knowledge in a global environment can be problematic. The potentials and challenges Social Software poses are not fully understood in leveraging knowledge between individuals and organizations. Here we lay our conceptual foundation for the study and describe the key components of Global Knowledge Management and Social Software (Figure 1).



**Figure 1:** Focus points for GSKM

As a starting point, we define Global Social Knowledge Management as the research discipline on strategies, management and processes utilizing social software systems and tools to enhance knowledge management in globally distributed settings. The main idea is to bridge the gap of human- and technology orientation as well as facilitating inter- and intra-organizational knowledge processes.

## **1.1 Global knowledge management**

Global Knowledge Management (GKM) contains processes, systems, and stakeholders for Knowledge Management in globally distributed settings. Thus, GKM is the main concept for cross cultural knowledge exchange and collaboration amongst people and organizations. Working within global contexts raises challenges that need to be understood and addressed (Nunamaker et al, 2009: 113). Conquering the challenges of virtual teams and global collaboration remain to be crucial research topics (Huang and Trauth 2007: 114; Sivunen and Valo 2006: 57). These challenges include time zone differences, cultural differences, different working styles as well as loss of communication richness (Nunamaker et al, 2009: 114). Studying collaboration and global team aspects within the research domain can help us to achieve a good comprehension of underlying challenges caused by distributed work settings and bring us closer to overcome the challenges.

Knowledge Management in an organization could be defined to comprise of the phases of knowledge generation, transfer, accumulation, adoption, and diffusion (Disterer 2001: 1). Several approaches for managing knowledge in organizations have been proposed in the recent years. Some of the approaches present a more human-driven approach, some focus more on technological support (Choi & Lee 2002: 173). Knowledge sharing has been raised as a crucial, but not yet fully understood factor in Global Software Development (GSD) projects and teamwork (Storck 2000). There are also many similar KM life cycle models as presented by Nissen et al (2000: 30). A significant part of the KM literature is about knowledge sharing/transfer which has been continuously raised as the cornerstone of KM strategy of (globally acting) organizations (Disterer 2001; Bureš 2003; Riege 2005).

Through the Knowledge Management component we can achieve more specific view on the organizational as well as individual challenges arising in collaborative distributed settings. These include situations where knowledge is being created, shared and adopted by groups of people.

## **1.2 Social software**

Social Software has recently been applied in various organizations as a tool for managing knowledge and collaboration but the barriers for adoption have been evident (Kärkkäinen et al, 2010; Zheng et al, 2010). As indicated by Kärkkäinen et al (2010: 229), studies on the adoption of these technologies in organizations and specific business functions is currently limited while the changes towards utilizing Social Software are very rapid in organizations. Thus, not all challenges are understood neither the solutions. Challenges for Social Software have been identified for different settings: managing knowledge in business to business sector (Kärkkäinen et al, 2010: 229), supporting knowledge evolution, use and sharing (Zheng et al, 2010), managing reputation in academia (Matešić et al, 2010) or sharing knowledge in schools by teachers and students (Agarwal et al, 2007).

Although the term Social Software is frequently used, there is still no commonly agreed definition. One way of describing Social Software is that it enables interactive collaboration, managing content and networking with others. It supports the desire of users to be pulled into groups in order to achieve their personal goals (Wever et al, 2007: 512). From this description, we can say that Social Software denotes *applications that involve various collaborators in social interaction where new meanings, contents or discussions are created.*

As a conclusion, we see Global Social Knowledge Management as a promising field for current and future research. However, various unexplored areas remain. It is not clear which Social Software tools (and corresponding processes and activities) can support globally distributed knowledge management. As pointed out by Fiedler and Welpé (2011: 31), it is crucial to look further and study how Social Software could be taken up successfully in specific KM processes and activities of global organizations.

## 2. Global social knowledge management: finding social software for KM barriers and activities

As elaborated above, it is crucial to clearly understand which tools and applications can support KM in global settings. We follow a simple approach of KM architectures for this purpose looking at the key components of global KM settings: we start with challenges and problems which might keep actors away from engaging actively in KM activities. Secondly, we identify core KM activities. As the main outcome, we map Social Software tools: identifying tools supporting versatile KM activities and mapping these to major challenges. This is a crucial task towards overcoming barriers, especially in globally distributed, culturally diverse settings. From this, we derive the following research questions:

- Which are the main Social Software categories in the current literature and which are the key functionalities for these tools?
- To which type of knowledge activities these tools apply and which are the main GSKM barriers to be overcome?
- How to contextualize the GSKM focus for a specific application area?

Based on these key questions, we have chosen the methodology: we base our approach on the Global Knowledge Management Framework (GKMF, Pawlowski & Bick 2012) which identifies the key components of global KM settings and their interrelations. Based on this initial framework, we have performed a literature analysis with a systematic approach (Fink 2005) aiming at identifying relations between barriers, activities and tools (interventions). Secondly, we perform a design-oriented, constructive approach (Dodig-Crnkovic 2010) to build a framework in order to provide guidance for Social Software interventions aiming at 1) identifying and overcoming major barriers, and 2) identifying and supporting knowledge activities with a global and culture-aware focus. The third question will be applied through a case study approach. The methodology for the contextualization process will be described later in this paper.

As a starting point for the topic, it is essential to recognize and understand barriers to GSKM.

### 2.1 2.1 Barriers in GSKM

In many publications, barriers are discussed from the viewpoint of an individual or group of people, like university students (Sclater et al, 2001) or company employees working in virtual teams (Noll et al, 2010). Barriers can relate to social interaction and as an example to factors that hinder or challenge knowledge exchange (Disterer 2001). They also might relate to challenges and risks when adopting or using a specific technology (Baltatzis et al, 2008). Existing studies also diagnosed challenges set by diverse workers, hierarchies and cultural influences within an organization (De Long and Fahey 2000). Barriers are also in many cases tied to a specific context. This can relate to a specific technical platform (Sclater et al, 2001) or more loosely defined context, like collaboration of employees in global software development projects (Noll et al, 2010).

Based on the previous characteristics of barriers in IS literature, we define *a barrier as any challenge, risk, difficulty, obstacle, restriction or hindrance that might prevent a single person, a group or an organization to reach an objective and success in a specific context when the challenge is related to acting or working in a collaborative cross border setting.*

A comprehensive literature review was conducted for GSKM barriers to identify the major barrier categories and show the interdependencies between the research domains (global KM and Social Software) (see Pirkkalainen & Pawlowski 2012). The key categories are presented in Table 1 with a sample barrier per category. For each category, many barriers exist and have been identified.

**Table 1:** Barrier examples categorized (Pirkkalainen & Pawlowski 2012)

Barrier	Context - References
Organizational / contextual dimension	
Geographical /temporal barrier	Global teamwork - (Noll et al. 2010) ...
Lack of company resources for staff	Organizational knowledge sharing - (Riege, 2005)
Support from the organization	
Lack of policy or regulations for Social Media	Social Media in organizations - (Husin & hanisch 2011)
Fitness to task	
Lack of compatibility between diverse IT systems and processes	Organizational knowledge sharing - (Riege, 2005) Sociability influences for Social Software

Barrier	Context - References
	- (Gao et al., 2010)
Social Dimension	
Lack of interpersonal awareness	Organizational knowledge sharing - (Riege, 2005)
Skills	
Skills and capabilities to partake in virtual teams	Global teamwork - (Pallot et al., 2010)
Cognitive / personal	
Diversity setting (different backgrounds) – creates cognitive distance	Global teamwork - (Pallot et al., 2010)
Technical Dimension	
Availability	
Shortage of appropriate infrastructure supporting sharing practices	Organizational knowledge sharing - (Riege, 2005)
Interoperability	
Lack of interoperability of tools and systems	Global teamwork - (Pallot et al., 2010)
Privacy / security	
Reliability and security of information exchange	Social networking in Large enterprises - (Baltatzis et al. 2008)
Misuse	
Unacceptable behaviour by user	Facebook for lecturers - (Cloete et al. 2009)
Quality	
Usability	Sociability influences for Social Software - (Gao et al., 2010)
The extent to which the information obtained in the system can fulfil the user's needs	Sociability influences for Social Software - (Gao et al., 2010)
Legal Dimension	
Ownership	
Unclear IPR and copyrights	Global teamwork - (Pallot et al., 2010)
Cultural Dimension	
Cultural distance between collaborators	Global teamwork - (Huang & Trauth 2006)

A key challenge for GSKM settings is to manage / understand cultural influences in interpersonal knowledge sharing efforts. As barriers in Knowledge Management clearly focus on interpersonal and technological barriers, the roles of cultural and language distance as well as temporal and geographical issues have been overlooked. The role of culture has been highlighted as the most crucial for KM and Global IS barriers (Pirkkalainen & Pawlowski 2012). As shown within their analysis, these challenges are persistent in nature and require careful and sustainable attention. We recognize this crucial matter and emphasize it further in the next chapter where we show a mapping between Social Software, KM activities and barriers.

## 2.2 Mapping barriers to knowledge processes and Social Software

One of the key issues of Social Software for KM is to understand in which context these tools are useful. In the following, we present a framework for Social Software which aims to support 1) overcoming certain barriers and 2) to identify corresponding KM processes. By this systematic mapping, we provide a first step and a basis for a clear and well justified tool selection process for organizations.

We recognize the fact that Social Software in general has potentials for supporting various tasks such as knowledge identification and sharing as well as collaboration in globally acting organizations (Zheng & Zheng 2010; Fiedler & Welpel 2011). However, it is crucial to be more specific how these versatile tools actually fit the differing KM activities and which are the barriers emerging in these

settings. Table 2 presents how some of these crucial interrelations between Social Software, KM processes and barriers could occur.

The Social Software tool categories and purpose were derived from the 4C classification of Cook (2008: 39), taking into consideration collaboration technologies from the extended Groupware classification by Borghoff & Schlichter (2000) which are referenced under Social Software literature and finally enriching the merged categories by "Social Software in KM" literature. The key end user functionalities were extracted from three most popular services per category, which we identified by using eBizMBA and Alexa Global Traffic Ranking of services and websites. The barriers and activities are derived from the main KM and Social Software literature and present some of the main findings for both.

**Table 2:** Social Software framework; mapping the tools to KM activities and major barriers

Tool category	Purpose	Key End user Functionality	KM Activities & processes	Main Barriers
Blogging tools	Communication	<ul style="list-style-type: none"> <li>-Post writings</li> <li>-Comment on writings</li> <li>-Share writing (external/internal)</li> <li>-Evaluate writings</li> <li>-Extend with plugins / integrate to other systems</li> <li>-RSS (alerts)</li> </ul>	<ul style="list-style-type: none"> <li>-Active &amp; passive exchange of professional information (Fiedler &amp; Welpel 2011).</li> <li>-Acquire / capture / create, Apply/share/transfer. Incentive for (Reuse/innovate/evolve/transform), alerting (Avram 2006)</li> <li>-Knowledge Evolution (Zheng &amp; Zheng 2010)</li> <li>-Idea-generation and problem-solving (Zhang 2010)</li> <li>-Externalization, combination (Chatti et al, 2007)</li> <li>-Creation, codification, sharing, collaboration, organization (Razmerita 2009)</li> </ul>	<p><i>Organizational, Cultural, Social</i></p> <p>Organizational (Zhang 2010), Fitness to task (Thom-Santelli 2010) Cognitive (Kim 2008)</p>
Micro-blogging tools	Connection / awareness.	<ul style="list-style-type: none"> <li>-Post micro writings</li> <li>-Comment / share / evaluate micro writings</li> <li>-Share material / Information via micro writings</li> <li>-Manage profile (notifications (RSS), privacy)</li> <li>-Follow other users</li> <li>-Send direct messages</li> </ul>	<ul style="list-style-type: none"> <li>-Retrieve knowledge for use (Zheng &amp; Zheng 2010),</li> <li>-Enhancing information sharing (easy to identify information updates), building common ground, sustaining connectedness among colleagues, supporting informal communication (Zhao &amp; Rosson 2009)</li> <li>-Alerting, informing users of changes (Levy 2009; Avram 2006)</li> <li>-Socialization, combination (Chatti et al, 2007)</li> </ul>	<p><i>Organizational, Social</i></p> <p>Fitness to task (Thom-Santelli 2010), Social (trust) (Zhao &amp; Rosson 2009)</p>
Social networking tools	Awareness, communication, sharing, (collaboration), (identification)	<ul style="list-style-type: none"> <li>-Add / delete friends / groups / events</li> <li>-Post short writings to f/g/e</li> <li>-Share material / information with f/g/e</li> <li>-Manage profile (notifications (RSS), privacy)</li> <li>-Send direct messages</li> <li>-Instant messaging (p2p/group)</li> <li>-Extend with plugins / integrate to other systems</li> </ul>	<ul style="list-style-type: none"> <li>-Building personal networks leading to creation of organizational memory (Fiedler &amp; Welpel 2011)</li> <li>-Scan/Map, Acquire/capture/create, store, Apply/share/transfer, alert (Avram 2006)</li> <li>-Social presence in Knowledge sharing, expert finding (Zheng &amp; Zheng 2010)</li> <li>-Socialization, combination (Chatti et al, 2007)</li> </ul>	<p><i>Organizational, Social, Cultural</i></p> <p>Fitness to task (Thom-Santelli 2010), Social (Cloete et al, 2009), (Dimicco et al, 2008) Communication (Thom-Santelli 2010) Cultural (Cloete et al, 2009)</p>

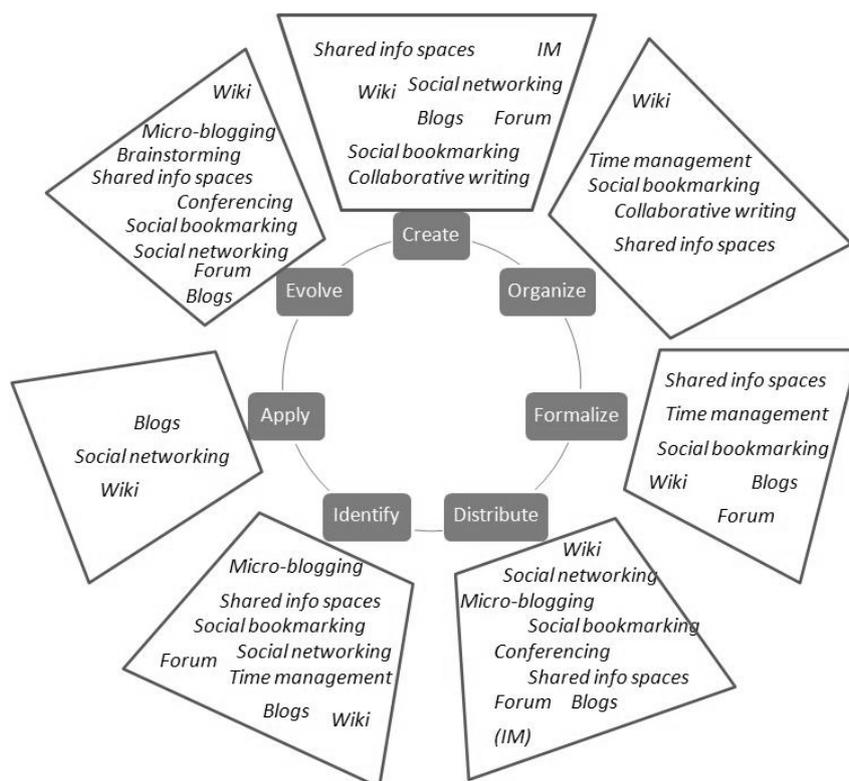
Tool category	Purpose	Key End user Functionality	KM Activities & processes	Main Barriers
Social bookmarking tools	Identification, collaboration, sharing	<ul style="list-style-type: none"> <li>-Save links / bookmarks for personal/ community use / sharing (social tagging)</li> <li>-Comment on pages / bookmarks / links</li> <li>-Include saving options for browser or to mobile device</li> <li>-Follow users activities</li> <li>-Include feeds (RSS) / notifications</li> </ul>	<ul style="list-style-type: none"> <li>-Scan/Map, Acquire/capture/create (Avram 2006),</li> <li>-Collaborative building of a knowledge structure (Cayzer 2004)</li> <li>-Alerting, informing users of changes (Levy 2009; Avram 2006)</li> <li>-Combination (Chatti et al, 2007)</li> <li>-Sharing, collaboration, organization (Razmerita 2009)</li> </ul>	<p><i>Organizational, Social</i></p> <p>Conceptual / fitness to task / knowledge sharing (why to use, what are the benefits) (Millen et al, 2006)</p>
Wiki	Collaboration, sharing, identification, communication.	<ul style="list-style-type: none"> <li>-Collaborative page writing / editing</li> <li>-Cross-linking pages/ concepts/ information</li> <li>-Managing page versioning</li> <li>-Commenting on pages</li> <li>-Notifications (RSS)</li> <li>-Wide extension and integration possibilities</li> </ul>	<ul style="list-style-type: none"> <li>-Active &amp; passive exchange of professional information (Fiedler &amp; Welpel 2011)</li> <li>-Scan/Map, Package / codification / representation, Apply / share / transfer, Reuse / innovate / evolve / transform, alert (Avram 2006)</li> <li>-Idea-generation and problem- solving (Zhang 2010)</li> <li>-Externalization, combination (Chatti et al, 2007)</li> <li>-Creation, codification, sharing, collaboration, organization (Razmerita 2009)</li> </ul>	<p><i>Technical, Social</i></p> <p>Social (Cowan et al, 2009), Cognitive (Cowan et al, 2009), Skills, Usability (Cowan et al, 2009)</p>
Synchronous / Collaborative writing	Collaboration	<ul style="list-style-type: none"> <li>-Collaborative document / presentation writing / editing</li> <li>-Managing page versioning</li> <li>-Instant messaging between authors</li> </ul>	<ul style="list-style-type: none"> <li>-Acquire / capture / create, store (Avram 2006)</li> </ul>	<p><i>Technical</i></p> <p>Skills, usability (Brodahl et al, 2011)</p>
Instant messaging and chat tools	Communication	<ul style="list-style-type: none"> <li>- Add / delete contacts</li> <li>-Send private / group messages</li> <li>-Add awareness information (short status updates, availability)</li> <li>-Video calls</li> </ul>	<ul style="list-style-type: none"> <li>-Building personal networks leading to creation of organizational memory (Fiedler &amp; Welpel 2011)</li> <li>-Knowledge sharing for quick questions and clarifications (Quan-Haase et al, 2005)</li> <li>-Externalization (Chatti et al, 2007)</li> <li>-Creation, sharing (Razmerita 2009)</li> </ul>	<p><i>Organizational, Social, Cultural</i></p> <p>Creates distance (used for difficult decisions or sensitive topics) (Quan-Haase et al, 2005)</p>
Time management	Collaboration, awareness	<ul style="list-style-type: none"> <li>-Create and share calendars</li> <li>-Organize meetings/events</li> <li>-Make to-do lists</li> <li>-Polling, voting, survey</li> </ul>	<ul style="list-style-type: none"> <li>-Scan/Map (Avram 2006)</li> <li>-Awareness activities (Munkvold 2003)</li> <li>-Codification, organization (Razmerita 2009)</li> </ul>	<p><i>Organizational, Social</i></p> <p>Support for organization or individual? (Munkvold 2003)</p>

Tool category	Purpose	Key End user Functionality	KM Activities & processes	Main Barriers
Shared information spaces /media sharing (video, audio, images, presentations )	Identification, collaboration, communication sharing	-Share information (P2P, group, community) -Comment on information -Follow users -Notifications (RSS)	-Scan/Map, Acquire/capture/create (Avram 2006) -Knowledge sharing (Bafoutsou & Mentzas 2002) -Storage/retrieval (Alavi & Leidner 2001) -Combination (Chatti et al, 2007) -Codification, sharing, organization (Razmerita 2009)	<i>Organizational, Social, Cultural, Technical</i>  Privacy, security, misuse, administration effort, Unwillingness to share (judged by others) (Kietzmann et al, 2011)
Conferencing	Communication	-Organize small to big group calls -Webinar / webcast / conference -Whiteboarding -Screensharing -Document sharing -Record / share session	-Human presence- and overview of activities in distributed tasks (Bafoutsou & Mentzas 2002) -Early stages of teambuilding (Munkvold 2003) -Externalization (Chatti et al, 2007)	<i>Social</i>  Knowledge sharing (Munkvold 2003)
Brainstorming tools (separate or in a GDSS)	Collaboration	-Idea structuring -Whiteboarding -Mind mapping -Voting / ranking	-Activities that are similar to take normally place in business meetings, decision support (Bafoutsou & Mentzas 2002) -Combination (Chatti et al, 2007)	<i>Social, organizational, cultural</i> Evaluation apprehension, free riding, cognitive inertia (Shih et al, 2009)
Discussion Board / Forum	Communication	-Create threads / discussions With peers / groups / communities -Create / browse profiles -Comment on threads / discussions -Assign notifications	-Forming knowledge networks (those who seek information and those who can provide it), knowledge identification/ creation/ sharing (Alavi & Leidner 2001; Razmerita 2009) -Combination (Chatti et al, 2007)	<i>Organizational, Social</i>  Fitness to task (Bafoutsou & Mentzas 2002)

The table above presents some of the researched aspects around barriers on different tools and the application of these technologies in knowledge activities and processes. The highlighted barriers indicate some of the strongest challenges when applying the tools in the KM activities. Overcoming these challenges is crucial for a successful usage. The key area of challenge for GSKM is the social dimension which in many cases leads to unwillingness to share or only some people of the key stakeholders contributing. As indicated by several authors, the cultural influence to personal or organizational behaviour is crucial. This has been raised as the top challenge for globally distributed work as for KM (Pirkkalainen & Pawlowski 2012). However, as depicted by Dafoulas & Macaulay (2001: 11), modelling and building variables from cultural factors (especially national), is extremely difficult and risky. We share the view that it is more essential to understand the effects of culture on working settings. We realize the fact that several authors imply, Social Software provides mechanisms for KM and social collaboration and strives for the lowest effort in adoption and use, but, as indicated by Riege (2005: 28), knowledge sharing embracing organizational cultures requires mechanisms around the technology itself for succeeding. Later in this paper we will demonstrate how to apply this framework in a case study.

It is not a surprise that most Social Software have been stated to support knowledge exchange in particular. As shown in table 2, Social Software is being widely used for purposes beyond this. In fact all the basic phases of knowledge life cycle are covered by Social Software while the focus points for specific tools can be identified from the framework. In Figure 2, we highlight to which knowledge activities Social Software has been mapped in existing literature. We have adapted the life cycle

model of Nissen et al (2000: 30), including a further step of “identifying” knowledge which has been raised as a crucial step in Social Software literature.



**Figure 2:** Social Software in a knowledge management life cycle

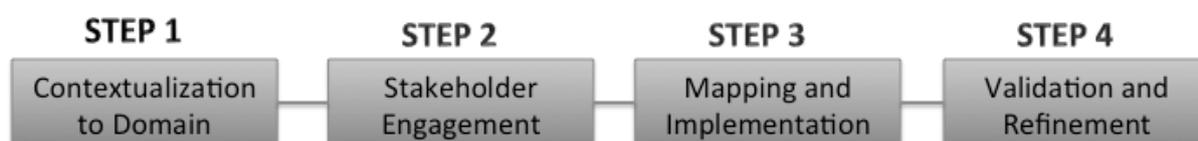
Our approach provides a first step towards mapping the key components of Global Social Knowledge Management (GSKM) to barriers (also representing global and cultural challenges and issues), activities and Social Software tools. Our initial mapping is not – and does not intend to be – complete. However, it is a first step to develop a clear understanding and guidance of how Social Software tools can be utilized in a promising, successful way. Figure 2 should be taken only as a visual representation and a mental image to understand the connection while the actual knowledge steps are much more intertwined and unordered.

### 3. Contextualization of the GSKM analysis

During our inquiry both from literature and practice, we have noted the complexity of addressing the challenges of GSKM for finding a balanced combination of human- and technological interventions in a particular context. Within this section, we describe how the GSKM approach can be contextualized and present a case study where the approach is undertaken. Previously, we discussed aspects the global organizations have in general. However, different domains and areas of expertise have their own unique qualities and naturally challenges. In order to select or create solutions for an application area, one must understand these qualities and domain specific challenges. We discuss contextualization as a process to apply the barrier analysis and Social Software framework in a specific application area, taking in to account the implications to move from a general focus to a specified one.

#### 3.1 Methodology for the contextualization approach

The contextualization process will be described through four major steps.



**Figure 3:** Main steps of the GSKM contextualization process

Each of the steps of the process requires methodological decisions which impact the sequential steps but also the outcome of the inquiry. In the following sections, we describe how we addressed those steps but also elaborate on transferability and limitations of the approach. As a part of our previously described methodology, we will extend on the constructive approach and apply the contextualization approach in a case study. Thomas (2011: 512) defines case studies as *analysis of persons, events, decisions, policies, institutions and so on. The case is the subject of the inquiry and can be seen as an instance of a class of phenomena, setting the frame (boundaries) for the study.* We have applied the approach in a European project Open Discovery Space. The project deals with open educational resources (OER), re-use of resources and community building for teachers in European schools. UNESCO (2002) described OER as *“technology enabled, open provision of educational resources for consultation, use and adaptation by a community of users for non-commercial purposes”*. The project develops a Social Software -portal that serves as a knowledge sharing and social networking platform for teachers across Europe. The portal will offer customization support for setting up networks for local schools, making it possible to bring parents and students to collaborate on planning lectures and studies. The development will start only after the needs and requirements are captured. The major concern that the project wants to avoid is developing a Social Software platform that does not respond to actual or real needs of the users. This would very likely lead to low usage or sustainability. This is why the approach has been taken to apply the GSKM components as the basis to understand the major challenges for adopting the practices around applying, using and sharing OER.

Once we started exploring the OER movement in educational domain, it became obvious that it held various challenges that a more generic framework could not comprehend. This is why we extended on the literature review process to study the challenges specific for this application area.

### 3.2 Contextualization to domain

As explained, we used the GSKM barrier framework of Pirkkalainen & Pawlowski (2012) as the basis for the categorization. Table 3 presents the result from our literature review for the main barriers of the OER domain. When addressing these challenges together with the GSKM barriers we have better possibilities to reach a holistic impression of the real problems in the domain.

**Table 3:** Barriers for OER

OER barriers - Organizational / contextual dimension	
Barrier	context identified in / focus - References
Lack of resources for sustaining services, content and infrastructures	OER - (Atkins et al. 2007)
Lack of time for production and localization of OER	OER factors of re-use – (Hatakka 2009) OER in developing countries – (Humbert et al. 2008)
For sharing OER, Need for Rewards and Acknowledgement.	Knowledge sharing and OER - (Agarwal et al. 2007)
Lack of business model for open content initiatives	OER in developing countries – (Humbert et al. 2008)
Too many resources to choose from	OER factors of re-use – (Hatakka 2009)
Hard to find suitable material – where to look from	OER factors of re-use – (Hatakka 2009)
Lack of knowledge and awareness of open content	OER factors of re-use – (Hatakka 2009)
Lack of knowledge and awareness of learning object repositories	OER factors of re-use – (Hatakka 2009)
Lack of contextual information for the resources – how can be used or modified	Cultural factors on OER - (Davis et al 2010)
Difficulty level of content – found materials not suitable for specific students	OER factors of re-use – (Hatakka 2009)
Open content do not fit the scope of the course	OER factors of re-use – (Hatakka 2009) OER - (Chen 2010)
Granularity of the materials	OER factors of re-use – (Hatakka 2009)
Matching the resources to own curricula is problematic	OER quality - (Clements & Pawlowski 2011)
The effective use of OER is quite complicated and unclear	OER - (Chen 2010)
Lack of training how to apply and re-use resources	OER factors of re-use – (Hatakka 2009)
Lacks policy support from the institutional level	OER - (Chen 2010)

OER barriers - Organizational / contextual dimension	
Regulations on national or institutional level might hinder the adoption	OER factors of re-use – (Hatakka 2009)
Text book dependency	OER factors of re-use – (Hatakka 2009)
Social dimension	
Lack of trust towards unknown authors or systems where resources retrieved from	OER factors of re-use – (Hatakka 2009)
Lack of motivation to share resources or information around those resources	Knowledge sharing and OER - (Agarwal et al. 2007) Knowledge sharing in schools - (Disterer 2001)
Absorbing knowledge and sharing nothing in return (“knowledge parasites”)	Knowledge sharing and OER - (Agarwal et al. 2007)
Wish to avoid external parties from assessing the quality of their knowledge	Knowledge sharing and OER - (Agarwal et al. 2007)
“Not invented here” notion. Hesitation to receiving knowledge someone else has created	OER factors of re-use – (Hatakka 2009)
Language of the resources	Cultural factors on OER - (Davis et al 2010) OER factors of re-use – (Hatakka 2009)
Lack of ICT skills to use and produce OER	OER factors of re-use – (Hatakka 2009) OER in developing countries – (Humbert et al. 2008)
Technical dimension	
Lack of hardware (broadband, infrastructure, software)	OER in developing countries – (Humbert et al. 2008) OER - (Chen 2010) OER factors of re-use – (Hatakka 2009)
Lack of support from top management and IT practice for using and producing OER	OER in developing countries – (Humbert et al. 2008)
Reliability of the systems	OER factors of re-use – (Hatakka 2009)
Quality dimension	
Lack of awareness of quality content	OER - (Yuan et al. 2008)
Hard to assess the quality and relevance	OER factors of re-use – (Hatakka 2009) OER- (Hylén 2006); (Atkins et al. 2007)
Legal dimension	
Unclear Intellectual property rights (IPR) and copyrights (lack of awareness)	OER quality - (Clements & Pawlowski 2011) OER- (Hylén 2006); (Atkins et al. 2007) Cultural factors on OER - (Davis et al 2010) Knowledge sharing and OER - (Agarwal et al. 2007)

### 3.3 Stakeholder engagement

Identifying the specific challenges of a domain served as one part of the contextualization process. However, in order to study the challenges and finding correct interventions that address the needs and requirements of the teachers, ways of inquiry must be specified.

As each participating country from the consortium will run workshops with the teachers in their own area, a decision was made to apply a focus group method to discuss the topic with the teachers. Kitzinger (1995) described focus groups as a *group interview that focuses on group communication for exploring the knowledge and experience of the participants*. While focus group approach provided a way to engage with the teachers, survey attached to the sessions was selected as the method for capturing the opinions of the participants. The survey would consider a barrier selection that would aim to comprehend the significant challenges for the respondents. The survey would also consider potential interventions to overcome these challenges. The following would serve as the method of inquiry not just for the potential solutions but to find connections to activities and processes.

As the initial step for the inquiry, the experts from the project were presented with the extended classification of barriers in the OER domain. The classification above was merged in to the overall GSKM list of challenges. A dedicated workshop was held where the entire classification was discussed with the partners ranging from pedagogical experts to technical developers. The three-hour session concluded with the selection of barriers (Table 4) which are most probably the most significant challenges for the teachers to apply and use the Social Software platform for the educational knowledge resources.

**Table 4:** Selected barriers for the inquiry

Lack of time to search or use resources from a repository
Lack of time to learn and use tools/services in the repository
Lack of training how to use the repository for my work
Lack of reward for the efforts made (e.g. not getting paid extra to use resources from the repository)
Lack of support from management level on how to use or apply open content
Lack of technical support within my organization how to use or apply tools and services for open content
Lack of Policy and guidelines (within your organization) for using resources in your work
Lack of Policy and guidelines (within your organization) for social tools (open services and tools such as social networking, wikis, collaborative features for editing materials etc.)
No training on how to use resources from a repository for my work
No training on how to use tools and services around the resources for my purposes
Incompatibility of resources with existing work styles (e.g. the pedagogical approaches used in the repository are not what I want to use in my classroom)
Incompatibility of repository tools and services with existing work practices (e.g. don't support the learning environment in our school (Moodle etc.))
Lack of Learning object repositories good practices in my own country
The IT infrastructure in my school is not sufficient (not enough computers for students, the network is not fast enough etc.)
Resources in the repository are not available in own language
Language problems when collaborating online (misunderstandings when not sharing same mother tongue etc.) (collaboration can mean for example producing educational resources together)
Differences in national culture or ethnic background (values and beliefs etc.) affects negatively online collaboration with globally distributed peers
Impact of cultural and geographical distance on trust between collaborators working together over distance
Resources I found are too dependent on a specific culture (viewpoints, perceptions, terminology etc.) for my own use
Lack of educational resource sharing culture within my organization
Resources I found do not give enough information on the context where it is / was created and used
It is too problematic to be dependent (or to build) on resources developed by others (in general)
Lack of motivation to share information (in form of sharing own contents or contributing to discussions around open contents)
I am not sure what I can use or modify the resource to my own needs, I am not sure about the licensing details. I don't want to share resources that someone else own rights to etc. (IPR issues in general (intellectual property rights))
Finding resources that would match the curriculum of my country is demanding or impossible matching open content to own curriculum is demanding or impossible
Contents in repository X are not fitting to the learning styles of my students
I am worried about my professional reputation: if I use someone else's resources instead of making my own from scratch. Teachers at are not used to discuss the quality of curriculum and course contents with their peers
Relevance of content (hard to find contents fitting to own needs)
Hard to judge the quality of material
Hard to judge the quality of tools
The current teaching practice doesn't support the use of educational resources

As most probable barriers why teachers would not adopt the system we identified 31 challenges. This collection and outcome of the expert workshop was applied to a survey with one statement corresponding to one barrier. A likert scale was applied to study the significance of a barrier for the respondent personally.

### 3.4 Mapping and implementation

The phases of literature analysis on the educational domain, expert workshop for finding the key focus as well as the teacher workshops for studying the significance of barriers and identification of key interventions comprehend the key steps for the contextualization process. The aim of the process in this particular case is to find out which interventions can support teachers overcoming the most

critical challenges they have related to using the ODS - Social Software portal. The implementation and validation process for the interventions will be further discussed in this section.

The teacher workshop results for inspection of the barrier significance will not be discussed in this article in detail as the process is underway and workshops are still running. However, the intermediate results highlighted the following interventions:

**Table 5:** Intermediate interventions mapped to knowledge activities and barriers

Intervention	Focus - Activities	Addressing barriers of
Training needed	Strategic – human oriented activities for concrete training events. Online support and tutorials	Lack of time Lack of training Incompatibility of resources
Support from the top management	Strategic – human oriented activities, concrete support in the form of resources, training, practices etc.	Lack of policy Lack of support
Facilities to upload and share learning materials	Functional – technology oriented. Support for whole knowledge life cycle on OER	Lack of support Lack of awareness Not enough quality content
Tools to facilitate teacher collaborations	Functional- technology oriented. Facilitating creation, evolving and sharing knowledge	Lack of awareness Lack of training
Localized versions of the portal	Functional – technology oriented. Supporting regional, national and international activities	Lack of awareness Lack of support Language barrier
Various filtering options for materials (age, learning goals, level etc.)	Functional – technology oriented. Search, acquisition, identification of knowledge	Incompatibility of resources Language barrier Lack of awareness

The table presents not only the suggested interventions but also the focus of the interventions towards human- or technology orientation, the main activities supported as well as barriers addressed. The intermediate results on intervention identification reveal that overcoming the barriers does not imply only technological innovations. The interventions in many cases require human-driven changes in the context where the stakeholders operate. These changes require larger movement and sustainable support towards the stakeholders. However, the results give clear signals towards the technical side as well. The initial findings for mapping the interventions to knowledge activities and barriers do point out that the system must address the whole knowledge life-cycle in terms of OER usage and sharing. The key findings feed in to the requirements analysis of the project and the findings for functional, look & feel and access will be implemented in the portal. For each intervention, in-depth discussions were accomplished in the workshops where the teachers themselves described their understanding for the intervention. The development team of the project critically reviewed all interventions and the feasibility to implement those.

The validation of the interventions will be accomplished in a later stage of the project with similar workshop approach, covering at least the same amount of teachers as the on-going workshop process.

### **3.5 Transferability of the contextualization approach – a guideline**

Within this case study, we have described the entire procedure for contextualizing the GSKM approach. While the process is still on-going for the implementation and validation, elaboration for the validity and transferability of the approach can be reflected on.

The selected process for contextualization has roots in constructive research and especially in design science research methodology (Peppers et al. 2006). The method selection for each step of the process was heavily influenced by the ODS project and the pre-planned activities for teacher engagement. The approach was adapted to reach stakeholders across Europe and to derive the needs and requirements for the portal development based on the GSKM framework. We suggest considering the following during the contextualization process:

- Stages for GSKM contextualization – While the stages could differ in another context, we encourage to build on the constructive approach and to understand the domain challenges before

initiating the inquiry. Focus not only on technological aspects but also on environmental, organizational, social, types of knowledge created and shared in the application area etc.

- Methods for GSKM contextualization – The selection of the methods were in this case applied based on the project planning. We encourage involving the users in the inquiry, not just assuming their needs. An expert workshop or a focus group session is a good way narrowing down the focus from the GSKM framework that is extended with domain knowledge. Consider targeting the users with a very condensed selection of potential challenges, aiming for a deeper understanding on the challenges and extensions to potential other factors. Presenting the participants with concrete examples and versatile cases of Social Software usage can foster capturing valuable information around the interventions that could overcome the main challenges.
- Deriving implementation and validation plan for interventions – Base trust on the user feedback. However, deriving a clear requirement from an identified barrier is not trivial. Use additional means, as explained in the previous example, to understand what works and could reduce such barriers. Accomplish the mapping of interventions to knowledge activities and processes based on the key activities of the domain and the case at hand. Finally, apply more stages to the contextualization process if the setting demands so.

#### 4. Conclusion and outlook

Within this paper, we have provided a focus for Global Social Knowledge Management research. We provided a survey of successful approaches and for the first time in globally focused KM research, we have mapped Social Software to knowledge activities and major barriers based on the existing literature. This exemplary mapping effort provides a first glance to recognize the crucial influence the global or multicultural component brings to managing globally distributed knowledge activities through Social Software support. Our inquiry indicated the need to adapt the framework based on the context where it is addressed. We argued for a contextualization process for the GSKM approach and demonstrated this through a case study in the open education context. The framework constructed for this paper can be seen as starting points for organizations to recognize how Social Software interventions can be managed in versatile KM processes. This becomes highly important taking in to consideration that most KM initiatives are struggling to succeed. It is crucial to study the GSKM in differing contexts to meet the complex needs of a particular setting.

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