Analyzing the Literature on Knowledge Management Frameworks: Towards a Normative Knowledge Management Classification Schema

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Recommended Citation
ISBN 978-3-00-050284-2
http://aisel.aisnet.org/ecis2015_cr/51

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ANALYZING THE LITERATURE ON KNOWLEDGE MANAGEMENT FRAMEWORKS: TOWARDS A NORMATIVE KNOWLEDGE MANAGEMENT CLASSIFICATION SCHEMA

Complete Research

Nora Fteimi, University of Passau, Passau, Germany, nora.fteimi@uni-passau.de

Abstract

Knowledge Management (KM) is a young and interdisciplinary subdomain of the IS discipline and it covers a considerable number of different topics. Due to its interdisciplinary character, a common understanding of KM is still missing. Several studies have already focused their efforts on harmonizing the discipline’s topics by developing KM frameworks. The purpose of this paper is to explore and integrate these frameworks in order to contribute to a common KM understanding. The procedure is twofold: 74 studies are identified through a structured literature review and compared using a concept matrix. The studies discuss already existing KM frameworks from research and practice or present the results of reviewing the KM domain through the development of frameworks. Based on these results, a normative KM classification schema is introduced. This schema comprises seven main KM categories and offers a summary of the common grounds in the domain of KM frameworks. The study provides guidance where to focus future research efforts and helps to identify potentially relevant topics, which, despite their relevance to the KM field, have not been considered up until now. Moreover, businesses can use the schema to get an overview of existing frameworks, which can be adapted in their organization.

Keywords: Knowledge Management, Normative Classification Schema, Structured Literature Review

1 Introduction

Knowledge management (KM) is an emerging (Rubenstein-Montano et al. 2001) and interdisciplinary subdomain of the IS discipline (Dalkir 2013). The KM literature offers a fast-growing collection of topics (Guo and Sheffield 2006), which comprise a large volume of elements (Scholl et al. 2004) including various theories (Crane 2013), different schools of thought (Earl 2001) and a prominent number of knowledge definitions (Wallace et al. 2011; Kane et al. 2006). Related reference disciplines and organizations interpret and implement KM in different ways depending on its understanding and the underlying context. As a result, diverse terms are used synonymously to explain similar concepts due to the lack of KM taxonomy (Nie et al. 2009).

The preceding remarks illustrate how heterogeneous KM is, both as a research discipline and from a practical perspective. A main challenge in research is therefore the consolidation and harmonization of the various existing streams and trends of the discipline to reach a common KM understanding (Vorakulpipat and Rezgui 2008). A common understanding supports the KM discipline in the establishment of its identity, which is a crucial issue for a scientific discipline such KM. This identity is formed by a combination of the discipline images, which are developed by the different stakeholders and the sum of activities formed by the stakeholders to comply with these images (Serenko 2013; Serenko et al. 2010).

One of these activities is the development of a KM framework. The absence of a consensus on KM has led to the development of many different frameworks. However, the frameworks lack conceptual integration and a cumulative tradition (Guo and Sheffield 2006). So far, there is no generally accepted
framework for KM. The advantages of such a framework for research and practice can be twofold: First, it can guide researchers in their behavior and influence their research activities (Serenko 2013). Second, businesses can rely on consistent methods and approaches to successfully implement KM in their firms. The latter still remains a challenging and important task for many organizations (Wong and Aspinwall 2004, Drucker 1993).

This study presents a first approach towards a common KM understanding and introduces a normative KM classification schema, which organizes the literature on KM frameworks and depicts the most relevant KM topics by comparing the frameworks’ main findings and organizing them according to consistent categories. The schema gives a summary of the common grounds in the domain of KM frameworks and contributes to a shared understanding of terminology, concepts, activities and methods used in KM. This grants guidance where to focus future research efforts. In addition, it helps to identify potentially relevant topics, which, despite their relevance to the KM field, have not been considered up until now.

The results presented in this paper can be used as a starting point towards the harmonization of the KM discipline because they provide an overview of already existing frameworks and integrate their main findings. To the best of the author’s knowledge, the classification schema with its categories is the first attempt in KM research to aggregate and organize the variety of literature on KM frameworks into a classification schema by considering multiple KM dimensions and perspectives (e.g. KM models, KM technologies, knowledge artifacts, KM influencing factors) on such a level of detail and complexity. Contrary to previous frameworks and reviews, this study depicts a holistic view on the summary of existing frameworks and organizes them according to categories resulting in a normative classification schema.

The remainder of this paper is structured as follows: Section 2 provides an overview of the research objectives and the research design in this paper. Section 3 sheds some light on different streams of literature. Subsequently, a proposal of a classification schema for corporate knowledge management including two examples of application is presented. The last section concludes with a summary of the main results, limitations of the study and some directions and implications for future research.

## 2 Research Approach

The general purpose of this paper is to contribute to a common ground of relevant research topics in the domain of KM frameworks through the development of a normative KM classification schema. The study’s primary objectives are:

- Identification of existing KM frameworks
- Identification of the consensus regarding the identified frameworks by introducing a classification schema, which evokes the common and most discussed topics in the frameworks and thus contributes to a shared understanding regarding the different presented KM topics.

The research question followed by this study is:

*Is there common ground in the domain of KM frameworks and if so, what do the investigated KM frameworks have in common?*

The focus of this study lies primarily on the discussion and harmonization of studies presenting a more general KM framework, rather than KM frameworks with a special focus on a concrete discipline or a concrete KM topic. For instance, the author of this study considers papers, which present a holistic framework for KM, KM implementation frameworks but also frameworks with a focus on knowledge management systems or KM models in general. Papers, which investigate for example KM topics in the psychology discipline, in the context of disaster management or in small and medium sized enterprises, have not been selected. In addition, the author did not consider papers, which review the litera-
ture on a single specific knowledge element (e.g. studies with a special focus on a single knowledge activity like knowledge sharing).

The study follows a conceptual approach with the main objective of creating a normative KM classification schema. This schema can be considered from a meta-perspective because it helps to classify and integrate the different frameworks in literature. This leads to the conclusion of choosing the term “classification schema” instead of terms like “framework” or “model”. The normative character refers to the holistic view on the KM discipline and the coverage of different topics and insights. This means that the focus of the classification schema lies not only on a single special KM topic (e.g. theories, models, systems) rather than on the sum of all these KM topics and their interplay.

In order to develop the classification schema, a structured literature review was conducted to examine and analyze already existing KM frameworks in literature. The review adapts the five phases framework (cf. figure 1) introduced by vom Brocke et al. (vom Brocke et al. 2009).

The definition of the review scope (phase1) can be facilitated by following a taxonomy presented by Cooper and adjusted by vom Brocke et al. (Cooper 1988; vom Brocke et al. 2009). In his taxonomy (cf. table 1), Cooper proposed six characteristics, each consisting of several categories that can be adapted for the literature review. All fields in this table shaded in grey were adapted for this paper.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Categories</th>
</tr>
</thead>
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<tr>
<td>Focus</td>
<td>Research outcomes</td>
</tr>
<tr>
<td>Goal</td>
<td>Integration</td>
</tr>
<tr>
<td>Structure</td>
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<tr>
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<td>Audience</td>
<td>Specialized scholars</td>
</tr>
<tr>
<td>Coverage</td>
<td>Exhaustive</td>
</tr>
</tbody>
</table>

Table 1: Taxonomy for literature reviews (Cooper 1988, vom Brocke et al. 2009)

The focus of the literature review lies on research outcomes, as well as on adapted research methods and applied theories in the analyzed studies. Applications of the frameworks are not in the focus of this study, since they do not provide further information about the frameworks’ content itself. Moreover, this study aims to integrate central issues discussed by other researchers in their frameworks. The author followed a conceptual structure to organize the literature and its different findings. This review addresses scholars as well as practitioners who are interested in KM and it tries to espouse a neutral perspective. The degree of coverage of sources is selective (cf. next paragraph).
After topic conceptualization (phase 2), literature search (phase 3) starts, followed by the analysis and synthesis of literature (phase 4) and the proposition of a research agenda (phase 5). The latter is represented here in form of the KM classification schema and is discussed in detail in section 4.

With the primary focus on specific knowledge management journals and related databases, the author performed a selective coverage of sources. The literature search criteria for inclusion were English literature consisting of the top ten KM journals according to the ranking by Serenko and Bontis (2008, 2013) and articles retrieved from the following databases: Aisel, Inform, IEEE Xplore and EBSCO database. Backward search was performed by running through the references of relevant papers and looking for additional relevant papers. Further papers were identified through references in other KM papers without a special focus on KM frameworks. All articles published until the 20th of October 2014 were considered in the search procedure. Non-academic research as well as KM books (e.g. Meier 2004, Nonaka and Takeuchi 1995 or McElroy 2002) and publications in other languages were excluded. The literature was searched based on relevant keywords by combining the term “Knowledge management” with each of the terms “Meta analysis”, “State of the Art”, “Framework”, “Review”, “Classification”, “Categorization” and “Taxonomy”. The decision to use this list of keywords was taken in order to retrieve as many appropriate search results as possible. In addition, the author recognized that several studies present their results using terms like classification or review instead of framework. The overall hitlist results in 535 references. In a first step, initial hits were reduced by analyzing their titles. In a second synthesizing step, abstracts were analyzed to check their relevance with regard to the objectives of this paper. Twenty-eight papers were selected based on backward search and through reading additional KM papers. The overall resulting hitlist contains 88 relevant references. Fourteen papers were listed in multiple sources, which resulted finally in 74 unique hits. These papers were read in detail to extract the main results regarding the proposed frameworks and integrate them into a normative KM classification schema.

Table 2 shows the summary of the conducted search procedure. Numbers in brackets represent the relevant number of hits for a particular journal and a particular keyword. Two notices should be added at this point: whereas all listed sources had implemented an advance search, this was not the case for the Journal of Knowledge Management Practice (Source ID 8). Therefore, the author ran through all the search results and checked the titles of the suggested papers. In addition, the result list of the International Journal of Knowledge Management (Source ID 6) was too long with only few relevant hits. Therefore, only hits with a relevance factor higher than 15% were considered in the search procedure.

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<th>FTS</th>
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Table 2: Search procedure with hit results

TS = Title Search, AS: Abstract Search, FTS: Full Text Search, R. Hits: Relevant Hits,
3 Literature Review

Over the past years, several attempts have been made to consolidate and restructure the considerable collection of content in the KM discipline by presenting self-proposed KM frameworks or reviewing and classifying already existing frameworks. The authors of these studies adapted different research methods and reviewed the KM discipline from different points of view.

Table 3 on page six presents a concept matrix that summarizes the results of the structured literature review (cf. section 2) and highlights the 74 reviewed papers together with their main insights.

The concept matrix elements listed on the horizontal axis were grouped according to five main categories. Type of study refers to the kind of study, which was performed by the authors of the reviewed papers to present their results. Some of the studies conducted a meta analysis on KM papers and investigated general issues and topics concerning KM such as most frequently used definitions of knowledge, frequently used research methodologies and most cited related work or productivity rankings of e.g. authors and countries. For instance, Nie et al. (2007) published a meta analysis to answer questions about the importance of KM, actions and operations in the KM field, factors that enable the “birth” of KM, ways of implementing and supporting KM and applications of it. Another example is an attempt of Heisig (2009) to harmonize KM frameworks by comparing and analyzing 160 frameworks with regard to source, origin, type, knowledge definition, frequent KM activities as well as critical success factors. Other studies proposed an integrated KM framework or a KM model by consolidating core insights in literature. Some of the studies presented their frameworks in form of a classification approach for a concrete KM element like knowledge management systems (KMS) (e.g. De Carvalho and Ferreira 2011) and others focused on a literature review to shed light on different investigated topics in KM (e.g. Crane 2013).

The adoption of different approaches demonstrates the tremendous interest of KM researchers and practitioners to focus their efforts on harmonizing the discipline.

The remaining four categories of the concept matrix belong to the core elements covered by the presented frameworks. The category called knowledge contains knowledge-related elements and artifacts (e.g. knowledge definitions, knowledge types, knowledge flows). Similarly, the category Knowledge management subsumes a variety of KM elements (e.g. KM taxonomy, KM theory, KM implementation strategies) comprised by the reviewed frameworks. Almost half of the reviewed papers (43%) integrated the technical component within their frameworks, which builds the fourth category of the concept matrix called KMS. The coverage of IT and KMS in particular is not surprising because IT as an enabler of KM is one of the main pillars of KM (Biloslavo 2004). Finally yet importantly the category critical success factors summarizes all success factors (e.g. culture, leadership, people, organizational structure) discussed by the frameworks as components which affect KM implementation. That 26% of the reviewed papers referred to these factors indicates their relevance to KM. Due to their primary focus, the author categorized the reviewed frameworks according to the following two subcategories:

1. Holistic KM frameworks: A part of the analyzed frameworks focused on the KM discipline in general and discussed different elements of KM, which should be considered together. This category contains all the frameworks, which take a holistic perspective on KM. A representative of this stream is the global KM framework of Pawlowski and Bick (2012). The framework is described in its core by processes (knowledge processes, business processes, and external processes). These processes are related to several other components like KM strategies, stakeholders, culture as well as KM instruments and result in summary in outcomes like performance or valuable knowledge. Another example is the study of Handzic (2003), who proposed an integrated KM framework that comprised the following KM elements: working knowledge, which is used in an organization, knowledge processes, and knowledge enablers, which can be subdivided into organizational environment- and technological enablers.
### Table 3: Concept matrix of references with main results

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<tr>
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2. Specific KM frameworks: Other frameworks focused on few concrete KM elements (e.g. knowledge definitions, KM theories, critical success factors of KM implementation, KM models or knowledge management systems) and not on the overall KM discipline. One example for such frameworks is the study of Tzortzaki and Mihiotis (2014). Based on a literature review of KM theories, the authors divided the theories into the following categories: positivistic, interpretive with a resource-based orientation, interpretive with a knowledge-based orientation and organic approaches. Other examples are studies with a specific focus on KMS discussing different classification proposals for technologies used in KM. The results were presented in form of a KMS framework. Some of the approaches described KMS according to their support for the processes in the knowledge lifecycle or the SECI model (e.g. Alavi and Leidner 2001, De Carvalho and Ferreira 2011). Other approaches followed a strategy-oriented perspective and classified KMS according to their support for strategy (Saito et al. 2007) or according to different KM perspectives like the transactional KM, process-based KM or analytical KM (Binney 2001).

4 Normative Knowledge Management Classification Schema

The concept matrix in the previous section (cf. table 3) shows the diversity and heterogeneity of existing KM frameworks. While each of the reviewed frameworks depicts concrete perspectives on KM, none of the frameworks subsumes the others (Handzic 2003). This heterogeneity underlines the need for a more comprehensive common KM understanding, but also for a consolidation of the different results and topics of the frameworks (Heisig 2009, Vorakulpipat and Rezgui 2008, Handzic 2003).

4.1 Preliminary work

This section builds on the preliminary concept matrix in table 3 (first objective of the paper) and addresses the paper’s second objective, which is the aggregation of the commonalities between the reviewed KM frameworks and their integration into a KM classification schema. The schema provides an overview of the common ground in the domain of the frameworks. At the same time, it helps to identify potentially relevant topics, which, despite their relevance to the KM field, have not been considered up until now. This grants guidance to future research efforts.

The integration procedure was initiated by analyzing the developed concept matrix for KM frameworks. Subsequently, the frameworks were divided into subgroups according to their main focus topics (section 3). In order to develop the classification schema, the author followed the approach of inductive categorization, which is one of the main approaches in qualitative content analysis (Mayring 2013). Starting from the study’s research question, the available material (reviewed papers) must be analyzed to iteratively determine appropriate categories. This procedure should be repeated stepwise until all relevant data material has been categorized. For the purposes of this study, the author extracted the most common subtopics, which were discussed by more than one study and aggregated them according to certain categories (e.g. subcategory A.1. knowledge definitions). The application of this methodology results in seven main classification schema categories (e.g. category A: Knowledge and knowledge management artifacts), which reflect the frameworks’ main aspects. Two of the categories (knowledge management reference disciplines and research design and research method) were separated from the other five categories. Although both categories are not specific KM components (as knowledge management systems), they do have indirect effects and relationships with concrete KM elements.

To ensure the validity of the developed classification schema with its different categories and hierarchies (e.g. used terminology, KM topic assignment to the categories and applicability of the schema), two KM workshops with KM experts from research and practice (nine experts with at least five years of KM experience each) were carried out at the author’s home institute. The discussions provided helpful suggestions for improvements regarding the performed assignments to categories and chosen
Normative Knowledge Management Framework Classification Schema

B.1. Orientation (e.g. Luria 2008)
B.1.1. Human oriented models
B.1.1.1. Creating knowledge - Behavioural school
A. Organisational school
B. Spatial/Social school
C. Strategic school
B.1.2. Technology oriented models
B.1.2.1. Managing knowledge - Technocratic school
A. Systems school
B. Cartographic school
C. Engineering school
B.1.2. Mixed models
B.1.2.1. Measuring knowledge - Economic school

B.2. Breadth (e.g. Kokabaei et al. 2003)
B.2.1. Descriptive
B.2.2. Descriptive/Normative
B.2.2.1. Hybrid
B.2.2.2. Specific

B.3. Origin (e.g. Wong & Aspinwall 2004)
B.3.1. Academic
B.3.2. Consultancy
B.3.3. Business

E. Critical success factors (e.g. Hicks 2009)
E.1.1. Human oriented factors
E.1.1.1. Culture
E.1.1.2. People
E.1.1.3. Leadership
E.1.1.4. Training
E.1.2. Organization
E.1.2.1. Process
E.1.2.2. Structure
E.1.2.3. Financial resources
E.1.3. Technology
E.1.3.1. Infrastructure and applications
E.1.4. Management process
E.1.4.1. Strategy
E.1.4.2. Measurement
E.1.5. Motivation and incentives (e.g. Kanawal 2012)

E.2. Results and Outcomes (e.g. Chaouvel & Despres 2002)
E.2.1. Costs
E.2.2. Benefits

C. Knowledge Management Systems
C.1. Knowledge & KM Processes / Activities (e.g. Alavi and Leidner 2001)
C.1.1. Knowledge Processes in the Knowledge Lifecycle
C.1.1.1. Knowledge creation
C.1.1.2. Knowledge storage
C.1.1.3. Knowledge transfer
C.1.1.4. Knowledge retrieval
C.1.1.5. Knowledge application
C.1.2. Knowledge Processes according to the SECi-model (e.g. Becerra-Fernandez & Sabherwal 2011)
C.1.2.1. Socialisation
C.1.2.2. Externalisation
C.1.2.3. Combination
C.1.2.4. Internalisation
C.2. Strategy (Saito et al. 2007)
C.2.1. Codification (technology oriented)
C.2.1.1. Component technologies
A. Collaboration
B. Dissemination
C. Discovery
D. Repository
C.2.1.2. KM applications (A-D)
C.2.1.3. Business applications (A-D)
C.2.2. Personalization (human oriented)
C.2.2.1. Component technologies
A. Collaboration
B. Dissemination
C. Discovery
D. Repository
C.2.2.2. KM applications (A-D)
C.2.2.3. Business applications (A-D)
C.3. System type (e.g. Zuck 1999)
C.3.1. Integrative (Distributive)
C.3.2. Interactive (Collaborative)
C.4. Application domain (e.g. Liao 2003)
C.4.1. Knowledge based systems
C.4.2. Business intelligence systems
C.4.3. Information and communication systems
C.4.4. Expert systems
C.4.5. Database systems
C.4.6. Modeling systems
C.4.7. Knowledge management systems
C.4.8. Web 2.0 systems

C.5. Learning perspective (Utter & Pouloudi 2008)
C.5.1. Locus of knowledge
C.5.2. Learning content
C.5.3. Knowledge structure

A. Knowledge and Knowledge Management artifacts
A.1. Knowledge Definitions (e.g. Hevij 2003)
A.2. Knowledge Type (e.g. Argote et al. 2003)
A.3. Knowledge resources (e.g. Castells & Courreuil 2014)
A.4. KM Theories (e.g. Tsoukot &致富 2014)
A.5. KM Implementation strategies (e.g. Chaouvel & Despres 2002)
A.6. KM Measurement (e.g. Rogob & Arishia 2013)
A.8. KM architecture (e.g. Imai et al. 2009)
A.7. KM Measurement
4.2 Knowledge management classification schema categories

4.2.1 Category A: Knowledge and knowledge management artifacts

This category was chosen to be the core of the classification schema because of its fundamental relevance to the KM field. Given that most of the analyzed frameworks shed light on the discussion of the term knowledge and different knowledge artifacts, this important role could be affirmed. Hence, category A subsumes most common and discussed topics with relation to knowledge and knowledge management artifacts. This includes and is not limited to the discussion of knowledge definitions (e.g. Heisig 2009), knowledge types as internal and external knowledge (e.g. Argote et al. 2003) and knowledge and KM processes (e.g. Alavi and Leidner 2001). In addition, this category covers theories used in the field of KM to describe concrete phenomena (e.g. Tzortzaki and Mihiotis 2014) or measurement-related activities and strategies (e.g. Ragab and Arisha 2013).

4.2.2 Category B: Knowledge management frameworks and models

Models or frameworks are an instrument, which can be used to describe the core elements of a research discipline. KM comprises several models, which are used by research and practice to describe, implement and evaluate KM (Heisig 2009). Therefore, KM frameworks and models are the second main category of the classification schema.

The introduced classification schema builds on Lloria’s study (2008) and proposes to classify models and frameworks according to three categories: Orientation, breadth and origin of model/framework. The literature review supports Lloria’s claim of the good suitability of her framework to cover most of the available models and frameworks. Therefore, it was adapted for the classification schema in this paper with few modifications and extensions made to the structure of the subcategories and their naming.

According to the category orientation models can be assigned to human oriented models, technology oriented models or mixed models. Lloria stated human oriented models to be focused on the creation of knowledge. This perspective relates to the behavioral school, which can be divided into the organizational, the social and the strategic school. Technology oriented models deal with the management of knowledge and reflects the viewpoint of the technocratic school with its subgroup systems, cartographic and engineering schools. Mixed models are concerned with knowledge measurement activities represented by the economic school. The different schools of thought were discussed by different frameworks (e.g. Earl 2001), which used sometimes the term KM implementation strategies.

In addition to the orientation perspective and as suggested by Holsapple and Joshi (1999), models are with regard to the perspective breadth descriptive or prescriptive (Lloria (2008) used the term normative synonymously). Holsapple and Joshi proposed to split the descriptive category into broad and specific models. The classification schema in this paper extended this point of view and suggests adapting the same refinement for prescriptive models because of the numerous available prescriptive models.

With regard to the origin perspective, models can have their roots in the academic (e.g. Wong and Aspinwall 2004) or the consultancy perspective initiated by consultants for concrete problems. The third subcategory business comprises such models and frameworks, which evolve within a concrete company to solve occurring KM problems. This category did not appear in Lloria’s frameworks and was added to the schema by the author of this paper to consider this type of models.

4.2.3 Category C: Knowledge management systems

KMS can be classified according to five different categories, which emerged during reviewing the frameworks: Process, strategy, system type, application domain and learning perspective.
The process category subsumes approaches, which describe KMS according to their support of
knowledge processes in the knowledge life cycle (e.g. sharing, distributing and storing knowledge). Calling
this category process-oriented is in line with the selected sources in the literature review. The
authors of these sources investigated several KMS in terms of their support to the processes in the
knowledge chain (e.g. Alavi and Leidner 2001) or in terms of their support to the SECI model (e.g.
Becerra-Fernandez and Sabherwal 2011). Each of the processes can be facilitated using several tech-
nologies.

The strategy-oriented categorization, as proposed by Saito et al. (2007) classified KMS according to
their support of a certain strategy into a technology-oriented or human-oriented approach. The first
approach represents the codification of knowledge and puts the focus on technology support for KM-
related tasks especially the creation and transfer of knowledge. The human-oriented approach focuses
primarily on the personalization strategy and on creating and transferring knowledge between individ-
uals. Saito et al. distinguished between component technologies, KM applications and business applica-
tions and proposed that each one of these technologies can be supported by special collaboration-
dissemination-, discovery- and repository technologies.

The system type is the third subcategory. According to Zack (1999), some technologies support doing
and processing tasks integrative (distributive working environment), whilst others are better suited for
interactive (collaborative working environment) tasks. Examples of integrative oriented KMS are data
warehouse systems, data mining systems and databases, whereas groupware and instant messaging
systems need to be used interactively in order to deliver the requested results.

The fourth subcategory defined in the classification schema distinguishes KMS according to their ap-
lication domain (e.g. Liao 2003). This covers for example business intelligence systems for managing
organizational data, database systems for knowledge storage or special KMS for supporting
knowledge activities.

4.2.4 Category D: Knowledge management ecosystem

The category ecosystem, which subsumes the different KM stakeholder groups, was selected as one of
the schema’s main categories because of the crucial role people play in KM (Biloslovo 2004). The KM
ecosystem is defined by its stakeholders, who perform KM activities and implement KM using the
available instruments, methods and tools. The ecosystem consists at the lowest level of individuals,
who perform KM within an organizational context by building groups of interest. Altogether, the sum
of organizations builds the whole society on the upper level of the ecosystem. The ecosystem category
occurred for example in the framework proposal of Pawlowski and Bick (2012).

4.2.5 Category E: Influencing factors

As the concept matrix shows, a great deal of the analyzed frameworks discussed and investigated criti-
cal success factors of KM. Heisig (2009) proposed the distinction between human-oriented factors,
organizational factors, technological factors and managerial factors. This categorization fits well and
comprises all success factors (e.g. processes, strategy, leadership, reward systems, training, structure,
culture and technological infrastructure) mentioned in the frameworks. The prevailing culture, people
and leadership within an organization can be seen from a more human-oriented perspective. The sub-
category training (e.g. Sanghani 2009) was added to the classification schema to distinguish it from the
people subcategory, which focuses more on the human being and its role in KM. In addition, the
success of KM initiatives depends on the organizational processes and structures, the balance between
these components, as well as on the implemented infrastructure and applications to support any KM
initiative. The subcategory financial resources (e.g. Holsapple and Joshi 2003) were added to the cat-
egory to stress the role of budget in KM initiatives. The managerial perspective, which consists of the
proposed strategy and the measurement instruments, builds the fourth critical success factor of KM. In
addition, the author of this paper added a category called *motivation and incentives* (e.g. Kamhawi 2012) as well as a category called *results and outcomes* (e.g. Chauvel and Despres 2002) in order to point out their relevance and importance. The former includes reward systems in order to motivate people to engage in KM implementation. The latter subsumes all forms of output, which derives from KM implementation strategies. This can be success, publicity, financial profit but also negative output in form of financial losses and reduced customer satisfaction.

### 4.2.6 Category F: Knowledge management reference disciplines

KM is a young research discipline with strong relations to several other reference disciplines like computer science, human science or economic science. KM can be interpreted and implemented from different points of view depending on the underlying context. For instance, KM in the computer science discipline takes a more technical perspective focusing on the use and implementation of KMS (Dalkir 2013). The human science focuses in contrast more on the communication and cooperation processes between individuals (Maier 2004).

### 4.2.7 Category G: Research design and research method

Publications in the field of KM follow different research methodologies according to quantitative and qualitative approaches. Some of the studies in literature were conducted based on a mixture of both methodology types. This category was investigated in some of the studies, which were carried out in form of a meta analysis. For instance, Serenko (2013) provided a list with research methods used in the field of KM. Category G lists 20 research methods mentioned in appropriate studies.

### 4.3 Two application examples of the classification schema

In order to demonstrate how the schema was developed, this section sheds light on two examples, which demonstrate how the frameworks were classified into the schema.

The first example is the paper of Alavi and Leidner (2001), which can be assigned to the following categories respectively subcategories (*category descriptions in brackets*): The paper reviews KM literature (*G.17.*) regarding knowledge definitions (*A.1.*) and knowledge types (*A.2.*) and presents a classification of KMS, which support the diversity of knowledge process categories (*C.1.*). The second exemplar is the paper of Tzortzaki and Mihiotis (2014). The authors discussed KM theories (Subcategory *A.4.*) by conducting a literature review (*G.17.*). The review accounts for the historical development of KM theory and proposes to categorize scholarly contributions into several theoretical approaches.

### 5 Discussion and Conclusion

This paper presents a classification schema for KM, which summarizes the main topics covered by KM frameworks. Through a systematic literature review on 74 studies, a concept matrix was proposed, which pointed out the main results of the reviewed studies according to five categories. By analyzing the commonalities between the frameworks, a normative classification schema, which consists of seven main categories with different subcategories, was introduced. Each of the seven categories reflects the shared understanding regarding its most common discussed topics. The elements of the classification schema can be multidimensional. This means, that it is possible to assign elements of the schema to more than a single category. Assume for example a research paper, which classifies social web technologies according to their support of knowledge processes in the knowledge life cycle. This paper can be linked to each one of the subcategories *A.1., C.1. and C.4.8.* However, multiple occurrences of same elements (e.g. *Organization* in *D.1.2.* and *E.1.2.*) are limited to the minimum where it is necessary due to a different context (e.g. *Organization* as an influencing factor vs. *Organization* as an ecosystem group).
The schema provides by organizing the literature on KM frameworks an overview of the common grounds between the frameworks as well as guidance where to focus future research efforts. At the same time, it helps to identify potentially relevant topics which, despite their relevance to the KM field, have not been considered up until now. With regard to the practical impact, businesses can use the concept map and the classification schema to get an overview of already existing frameworks, their main issues, and the topics covered by research. This can simplify the search process for suitable solutions to solve problems, which may occur in their companies during the implementation of KM.

5.1 Limitations of the study

The study has a few limitations, which should be mentioned at this point: The classification schema focused on highlighting the commonalities between the reviewed frameworks. Core topics were extracted into a concept matrix and consolidated into a classification schema. However, it would be interesting to shed light on the disagreements and the differences between the frameworks to identify potential topics, which need further research efforts. This aspect is not covered by the classification schema in this study and will be an issue for further research.

Another limitation concerns the number of studies considered in this research. The author performed a selective literature review (c.f. section 3) and focused on papers, which presented as a result general KM frameworks or a summary of reviewing the KM domain. The latter includes for example the results of scientometric analysis, literature reviews or content analyses. Papers which presented a framework with a special focus on a particular KM topic or KM domain (e.g. KM in the supply chain industry or a literature review of knowledge sharing activities in small firms) were not in the focus of the paper. However, the author is confident that the classification schema covers a representative body of KM research. Future research can test its applicability by considering further literature on specific KM topics and domains. For instance, the papers of King and Marks Jr. (2008) or Manhart and Thalmann (2015) provided a literature review (G.17) on knowledge activities (A.5). The former discussed the effects of motivational factors (E.1.5) on the individual’s knowledge sharing behavior (D.1.4) when using KMS (C). The latter identified the role of IT (C), adapted theories (A.4) as well as proposed measures (A.7) to implement knowledge protection activities.

5.2 Conclusion and implications for further research

The classification schema represents the result of a mainly conceptual research procedure and does not represent an exhaustive KM framework yet. The idea is to set up the schema as a starting point of an iterative process, until reaching the expected and desired final and common KM framework. The next steps are performing a content analysis on publications (research and practice-oriented publications) within the KM field in order to identify main topics of interest. The results of the analysis will be used as input to iteratively develop a common KM framework with an appropriate level of categories, which reflect the topics identified during content analysis. Once the framework has been developed, the results will be evaluated again, together with KM experts using the Delphi technique. To demonstrate the structure and applicability of the evaluated framework, a technical solution (e.g. a wiki system) will be developed, which enables KM researchers to search for papers according to the provided categorization.

Concluding, this paper contributes to research by presenting a first step towards consolidation and obtaining a shared understanding of the KM discipline. A common view helps to reflect the research field with its core values, assumptions and attitudes, and supports a cumulative research process in this field. The systematic comparison and the proposed classification schema can be used as a starting point for further research in order to get an overview of the state of the art, to identify research gaps and to classify new research projects.
References


