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Perspectives on Knowledge Management Systems Theoretical Framework and Design of an Empirical Study

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Abstract- This paper deals with “Knowledge Management Systems” (KMS) which are seen as a new kind of information systems supporting organizational information processing. KMS result from the application of advanced database and network technologies to support organizational learning and knowledge management approaches. A perspective-based view of organizational memory systems is used to define KMS and forms the theoretical basis for the definition of the research model used in the empirical study “Knowledge Management Systems ‘99”. The research model is explained in detail and provides measurable dimensions and variables for the following constructs: goals, business environment, budget, organizational results and the concept of the use of KMS which in turn consists of the organizational design of the use of KMS, organizational culture, knowledge management systems and the content of the organizational memory. The paper is concluded by an outlook on the main research questions which we intend to address in our research.

I. INTRODUCTION

A. Motivation

Knowledge Management (KM) and Organizational Memory (OM) are concepts well known from organization science and learning theory. These concepts are seen as instruments for systematic interventions into an organization’s way of handling knowledge. Main goal of these interventions for an organization is to cope with the following three changes in the business world (for a detailed discussion of the significance of OM see [46]):

- the increased complexity, dynamics, fragmentation and decentralization of knowledge or knowledge development,
- the increased complexity of organizational structures and the permanent need to change these structures,
- the increased amount of non-traditional data to be managed, e.g. (hyper-text) documents, links, multimedia documents, communication acts.

Many approaches have been developed which claim to guide organizations to use their common or shared memory in a more efficient way (for an extensive survey of existing KM or OM approaches see [23]). Existing approaches focus on organizational issues and consider the OM as a resource, which has to be managed like capital or labor. With the advent of advanced database technologies (e.g. knowledge discovery and bases, data mining, distributed data base systems, multimedia and hypermedia data bases, intelligent agents as well as management and decision support systems) and net and communication technologies, especially the so-called “Intranet”- or “Web”-technologies, as well as specialized systems, such as knowledge management systems (KMS, e.g. DOCS Fulcrum System, Knowledge X Analyst, Livelink V, GrapeVine, Business Knowledge Navigator, see [25]) or learning environments, sound information technologies exist to support

organizational processes of generating, institutionalizing, retrieving and disseminating knowledge.

Aims of this paper are:

- to present a perspective-based approach to organizational memory and KMS which is intended to bridge the gap between the disciplines involved in the study of this phenomenon,
- to show how these perspectives can be used to derive a definition for KMS usable for investigations into the application of such systems in organizations,
- to present a research model to analyze the state-of-the-art of the use of KMS.

II. ORGANIZATIONAL MEMORY AND KNOWLEDGE MANAGEMENT SYSTEMS

A. Organizational Memory As Underlying Concept

In general the term memory is defined as a system capable of storing things perceived, experienced or lived beyond the duration of actual occurrence, and then retrieving them at a later point in time. Learning is not possible without memory. Accordingly, organizational memory is repeatedly proposed as a prerequisite for organized learning in this context. Thereby, however, the term “organizational memory” should in no way be considered analogous to a “brain” to which organizations have access. The term is simply meant to imply that the organization’s employees, written records, or data contain knowledge that is readily accessible (see [34], 53).

Various management approaches and scientific disciplines have played a role in the development of the theory of organizational memory, some of which enjoy a long and respected tradition of their own. These include but are not limited to: organizational learning (OL) and learning organization (LO), organizational intelligence (OI), knowledge management as well as the concept of organization as knowledge and/or information processing system, organization and personnel development (OD), organizational change, management of change, innovation management, organizational culture, theory of the evolution of organizations, organized chaos, system theory and system dynamics, artificial intelligence (AI) and cognitive psychology, organizational psychology, social psychology and organizational sociology (see [20], [23], [33]).

All definitions and attempts to explain OM can be found along a spectrum that runs from concept to construct. These two dimensions’ basic properties are each characterized by one of their proponents. “OM is a concept that an observer invokes to explain part of a system or behavior that is not easily observed” (Krippendorff 1975, quoted from [38], 333-334). OM “...is the know-how of a business recorded in documents (reports, ideas, concepts, etc.)” ([29], 19).

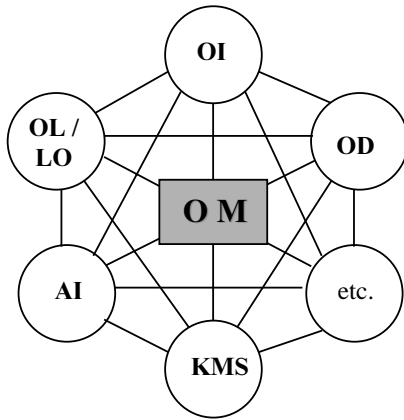


Figure 1: Organizational memory as it intersects with the disciplines and concepts in question

Organizational memory has a common and meta-status for all these concepts, but especially for organizational learning and knowledge management. It is essential for the understanding of organizational memory systems. Figure 1 illustrates the interrelationships of these disciplines and approaches in question. The approaches still lack integration even though they address similar issues from different perspectives. The organizational memory, however, can be seen as the common basis which is used by all of these approaches.

Regardless of the position one assumes, organizational memory has to do with either something abstract (theory, explanatory model, thought schema, concept) or something concrete (e.g. documents, data base, knowledge base, repository).

The idea of organizational memory in relation to economic and technological developments led to an intense debate in the relevant literature. Not to be ignored are the numerous similar or synonymous terms that can be gleaned from the intensity of the discussion that revolves around a common level of knowledge and the phenomena associated with it. Examples of terms in use are: organizational memory, corporate memory ([48], [38]), corporate, organizational or enterprise-wide knowledge-base (e.g. [11], [36], [17]), organizational or corporate knowledge (e.g. [14], [11]), institutional, collective, or systemic knowledge, cooperative memory ([38]), social memory ([48]), collective mind, collective intelligence, corporate intelligence (e.g. [4]), corporate genetics ([35]), transactional or transactive memory ([49]), group memory, group mind (e.g. [32], [9], [27]), meeting memory ([41]), team memory ([28]). Further variations found in practice are: shared knowledge base (SKB), knowledge warehouse ([42], 64-65), corporate repository ([31]), corporate memory ([22], 168), technological knowledge ([2]), know-how database (KhDB) ([40]).

The fact that there is still no clear or unified use of terms is a sign of the liveliness and novelty of the research topic. As the discussions have shown, the meaning of the terms is also not always identical because they originate in part from different disciplines and therefore also have different aims as far as knowledge is concerned. Figure 2 summarizes the current status of terminology usage as they are related to each other.

B. Perspectives on Organizational Memory Systems

Even though there is considerable confusion about what exactly management of an organizational memory or knowledge

management is about¹, both, researchers and practitioners agree on the importance and usefulness of these approaches to overcome the shortcomings of current practices of business engineering with respect to organizational effectiveness (see [39], 13, [45], 1). As shown above there are a number of approaches to the definition of organizational memory systems or knowledge management systems respectively.

In order to solve this dilemma, a perspective-based approach is introduced (see [23]). This allows different views to be regarded as explanations of equal importance without playing them off against one another. At the same time, it allows for the heterogeneous and even somewhat contradictory features associated with organizational memory systems to be systematically described. Until now this problem has not received sufficient attention in the literature. It has only been dealt with directly once by Buckingham-Shum ([5]). Here, the constructive character and the need to create a common understanding are clearly discussed. It is for this very reason that an attempt is made here to establish such a foundation. On the basis of the current level of knowledge, the following perspectives are proposed (see [23]):

- OMS as a new type in the use of application systems
- OMS as a concept
- OMS in a functional view
- OMS as a feature of information systems
- OMS in a behavioral view
- OMS in a technological view

The individual perspectives are not at all mutually exclusive and are briefly explained and summarized in the definitions below.

1) Perspective 1: OMS as a new type in the use of application systems

Of course, the introduction and use of the term "organizational memory system" come from our understanding of organizational memory. Proceeding from the concept of real, existing information systems created in part or supported by this organizational memory (e.g., a distributed database system connected through an Intranet or a workflow system with groupware functions), the following definition is made:

Definition 1: An organizational memory system (OMS) is a system that either creates parts of the organizational knowledge base using information and communication technology (class 1) and/or a system that creates or supports the tasks, functions, and processes associated with the use of organizational memory (class 2). The concept of organizational memory must be taken into consideration explicitly or implicitly in the objectives for the use of OMS as well as in the system architecture.

¹ Some authors (see e.g. [39], 31 and the literature cited there) even question the possibility of knowledge management in general ("illusion of controllability of knowledge").

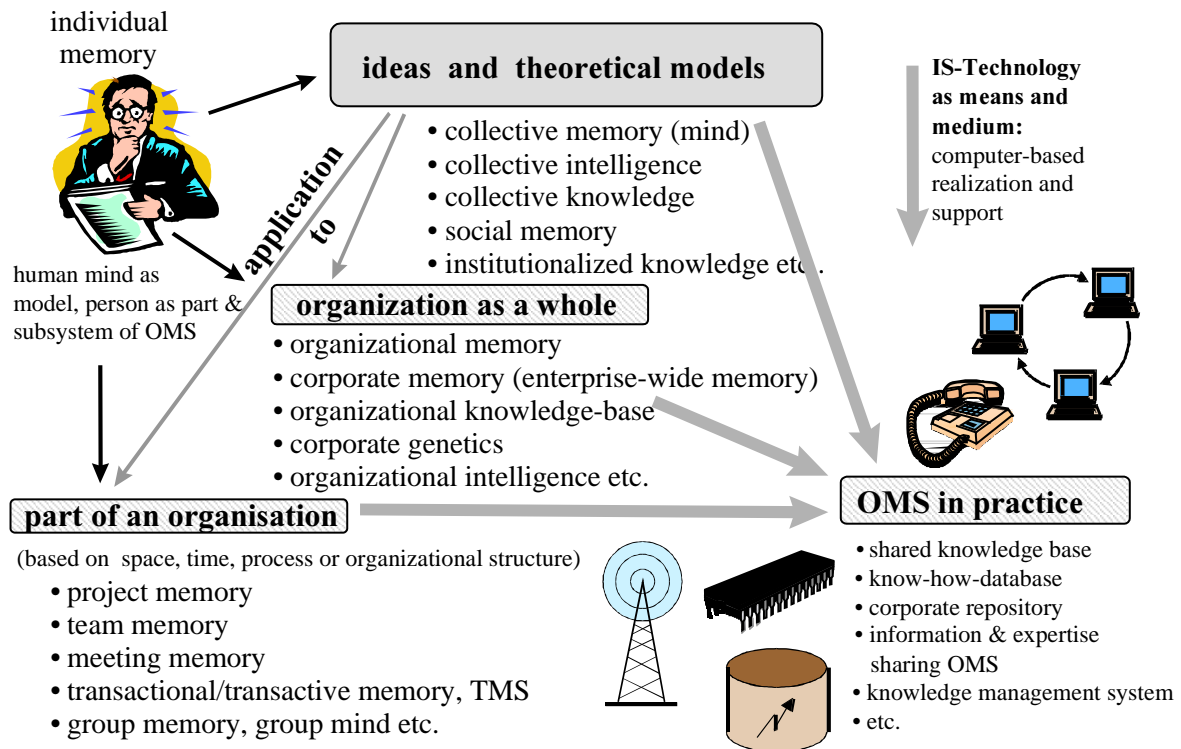


Figure 2: Relationship of OM-related terms to each other (source: [23])

One difficulty with this perspective certainly occurs in delineating or defining the presupposed organizational knowledge base. At first glance, the definition also has the disadvantage that no conscious distinction is made to traditional information and database systems. On the basis of class 1, such systems would at least be categorized as OMS. Yet, including these systems in the definition is intentional and considered significant, since these systems make up an integral component of organizational memory. However, the difference and the added value compared to the traditional use of technology make organizational memory systems a topic in their own right.

2) Perspective 2: OMS as a concept

Objects have noticeable, concrete features that allow them to be described. Concepts have no such features. They are abstractions that are created or developed for specific purposes. Frequently, they serve to describe or analyze complex phenomena systematically. A well-known example of such a concept is human intelligence, or rather the intelligence quotient. With the help of the intelligence concept, particular observations of human abilities can be classified and scientific activities can be coordinated.

Definition 2: An organizational memory system (OMS) is a concept that allows particular phenomena and capabilities in organizations to be described and explained. The latter are particularly linked to learning ability, intelligence, knowledge management, etc. The concept can be used to evaluate and improve the performance of these capabilities. The technical realization of sub-functions is included in this abstract concept.

The concept, however, is only significant in connection

with these facts. Outside of this context, it does not exist (see [30], 354). In a similar fashion, organizational memory systems can be understood as a concept. With the help of this concept, the analysis or selective operation of particular parts of an organization (e.g., structures or processes) are thought to be supported.

3) Perspective 3: OMS in a functional view

Another way to understand organizational memory systems is to take as a starting point the functions that such systems perform (or should perform). Defining a system functionally is possible by referring to existing systems or to knowledge-management architectures (examples can be found in [15], [3], 5; [13]). All the suggestions concerning the basic functions of knowledge management found in professional publications can also serve as a starting point. On the basis of such an understanding, an OMS can be defined as follows:

Definition 3: An organizational memory system (OMS) is a computer-based system that, with the help of software, supports at least the following basic functions: the generation and acquisition, storage, search for and utilization of knowledge, as well as its distribution and updating.

4) Perspective 4: OMS as a feature of information systems

It should already be clear from what has been said above that OMS do not necessarily have to be systems that support a clearly defined purpose or task. The designation "OMS" may also be regarded as a feature that, next to other features (e.g., decision-making and group support), belongs to a system. The feature itself, as well as its level of importance, may vary. It is useful, among other things, when it is important to determine the contribution that existing information systems make to

organizational memory. In other words, it underlines the overall significance of this contribution.

Definition 4: An information system is called an organizational memory system (OMS) when it supports the search for, automatic storage and retrieval of a portion of information as well as explicit knowledge required in the process of determining a company's performance. The OMS qualification does not prevent other features and designations from being used to define the system more precisely.

5) Perspective 5: OMS in a behavioral view

With the behavior-oriented perspective, an especially important aspect is stressed, namely the influence that information technology has on behavioral patterns. Here, the behavior of both the individual as well as that of entire organizations (collective behavior) is meant. The link between technology and behavior, or rather behavioral changes, has been a subject of investigation for a long time, but consensus has yet to be reached on the direction of that influence. In connection with OMS, the situation is looked at more closely, since the principal concern is not changes brought about by technology, but rather attainable, instrumental effects. The following definition is proposed:

Definition 5: First of all, organizational memory is defined as the totality of all components, data, documents, events, information, functions, mental concepts, and other entities in an organization that influence the particular behavior or the behavioral disposition of the organization's members. An OMS is a computer-based system used to create or support some of these functions, components, etc., and directly influences the behavior or one or more of the organization's members (or entire entities of the organization). Therefore, one can also speak of an electronic environment that provides stimuli relevant to behavior.

6) Perspective 6: OMS in a technological view

The technological understanding of OMS is probably the easiest way to understand such systems. Implied here is that certain technologies exist that are either developed or used for these kinds of systems. Such a perspective corresponds to an extent to the technological concept of organizational memory. The following definition is proposed:

Definition 6: An OMS is a system developed using dedicated technologies or tools. Among these are, in particular, document-management systems, OMS tools such as Fulcrum, Answer Garden or Knowledge Garden, and platforms such as Lotus Notes, as well as combinations of these.

C. Concluding Remarks and Definition of Knowledge Management Systems

In accordance with these trial definitions, a company may have (or does have) several parallel OMS. These systems can operate independently of each another or be connected through a network (e.g., by means of technical interfaces, overlapping at the user level, or common areas of knowledge and application).

In addition to the term OMS many authors use the term KMS to describe systems with quite similar intentions and functions. This is all the more the case in the practitioner's literature and in descriptions of respective software tools and systems which are readily available on the market where the term KMS has gained wide acceptance (see [24]).

Knowledge management systems in our view are a subset of organizational memory systems which have a tendency to focus on the more static documentation (retention, maintenance, search and retrieval) and distribution parts of organizational memory systems. This holds true for most of the systems offered on the market which lack functionality to support the dynamics of an organizational memory, that is organizational learning. Information systems explicitly focussing organizational learning are different from KMS, however, both types of systems can be called OMS. As previously mentioned, OMS is thought of as the superset including all those systems developed with different perspectives on OM in mind, e.g. organizational learning, organizational intelligence or knowledge management respectively (see Figure 1).

Summing up, the perspective-based view is intended to provide orientation in a dynamic research field by means of an instrument which can be used to position concrete research projects or questions. Main advantages of applying this approach are a) to help compare and relate research projects and findings from different disciplines to each other and b) to support a quicker understanding of concrete research objectives by means of relating e.g. working definitions to the corresponding perspectives. The latter advantage will be laid out in the following as we will use the perspective-based view to position our empirical study on knowledge management systems.

The perspective-based view is also applicable for investigations into knowledge management systems. Our definition of knowledge management systems as used in our study corresponds to perspective 3 - the functional view combined with perspective 1 - OMS as a new type in the use of application systems. For the further discussion which concentrates on KMS we use the following working definition:

A *Knowledge management system (KMS)* is a dynamic system which provides functions to support the identification, acquisition, retention, maintenance, search and retrieval, distribution, selling and logistics of knowledge, which is seen as information plus context, the aim of which is to support organizational learning and organizational effectiveness.

III. EMPIRICAL STUDY: KNOWLEDGE MANAGEMENT SYSTEMS '99

Little is known about how these systems are applied in organizations and what results can be seen in terms of organizational effectiveness. There have been a number of studies,

mainly in the US, on the application of knowledge management in organizations. So far the studies in general either distilled “best practices” out of a number of “success stories” (case studies) or studied the notion of knowledge management in a very broad and general way (see e.g. [6], [7], [21], for an

overview see [23]). However, none of them focussed on the technological support for knowledge management – KMS – without neglecting the other important points of intervention of a knowledge management effort, namely people, organizational design and culture.

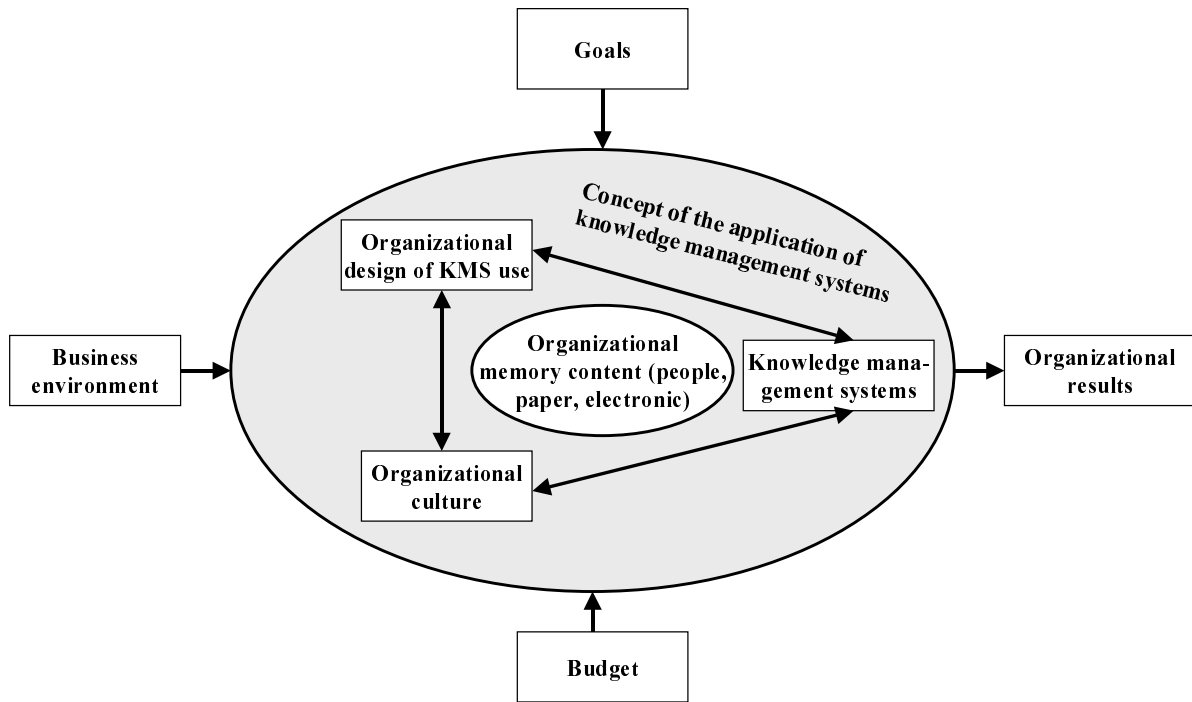


Figure 3: Research model

This is where our empirical study starts from, thus contributing to a better understanding of the potentials, strengths and weaknesses of the joint application of organizational learning approaches and advanced information and communication technologies in organizations.

A. General Research Design and Procedure

Main goals of the research project “Knowledge management systems ‘99” are the investigation of the state-of-the-art of the use of knowledge management systems in big German companies and the development of concepts, scenarios and reference models for the management of KMS in organizations. Figure 3 shows the research model that will be used in the empirical study which is targeted at the 500 largest companies and the top 50 banking and insurance companies in German speaking countries. The questionnaire (in German) together with related material and publications can be downloaded from the URL:

<http://www-wi.uni-regensburg.de/~oms>.

The research model structures the organizational memory into organizational memory content and the concept of the application of KMS. The OM content consists of the knowledge of the members of the organization, documented knowledge which can be paper based and/or in electronic form. The contents can be structured according to an organization-wide knowledge structure (e.g. tree, semantic net). The OM concept in turn influences how the organization deals with its content. The OM concept consists of the organizational design of KMS use (structuring of tasks and processes, roles, scope of the

application of KMS), organizational culture (especially values, rules and norms concerning knowledge sharing) and knowledge management systems. The concept is the main unit of analysis in this study. This concept is managed by a knowledge management unit which sets the goals for the concept of the application of KMS. It is dependent on the business environment, especially on the general organizational design (e.g. degree of centralization), the size and sector of the organization. The concept is also dependent on the budget provided and will result in a certain degree of organizational effectiveness as well as results concerning management and handling of knowledge in the company (which is captured by a number of OM measures).

In the following the eight parts of this model are investigated in detail. Each part consists of a list of dimensions which will be used to measure certain aspects of each part. The dimensions are in turn measured by variables. For a detailed description of the dimensions and variables and the theoretical approaches which they are derived or taken from see [24].

B. Business Environment

The business environment consists first of all of the environment of the organization as a whole:

- 1) industry environment (not knowledge intensive-very knowledge intensive): knowledge intensity of the industry, complexity of the industry, product life cycle
- 2) organization environment: size of the company (medium-large), complexity of the organizational design (simple-

complex), size of the information technology function (metric), fluctuation (low-high), experience with knowledge management (little- much)

C. Goals

There are a number of goals that companies can direct their KM efforts to. Generally there are two different strategies which can be applied in the implementation of knowledge management in companies: the codification and the personalization strategy (see [18], 109). The codification strategy focuses on the documentation and institutionalization of (explicit) knowledge (see e.g. [51] who defines a framework for the management of explicit knowledge and expertise). The personalization strategy supports the direct communication link between individual (human) experts and knowledge users. The list of goals the importance and achievement of which is assessed subjectively in our empirical study covers both of these strategies. The list is derived from case studies documented in the literature (see e.g. [7] who derive a list of objectives of knowledge management projects) as well as empirical data found in studies focussing broadly on knowledge management (e.g. [21], [6]):

- identify existing knowledge/make existing knowledge transparent,
- improve documentation of existing knowledge (both in terms of the quality of the content and structure),
- change (parts of) the organizational culture (e.g. willingness to share knowledge),
- improve communication and co-operation (both, within and between formal work groups/teams),
- turn implicit, “subjective” knowledge into explicit, “objective” knowledge,
- improve education, training and networking of newly recruited employees (both, job starters, such as trainees, apprentices, graduates, and newly hired experienced employees, experts),
- improve training and education of all employees (personnel development),
- improve retention of knowledge (e.g. in the case of employees leaving the organization),
- improve access to existing sources of knowledge,
- improve acquisition or purchasing of external knowledge,
- improve distribution of knowledge,
- improve management of innovations (= research and development, e.g. more innovations, patents, faster innovations, avoid multiple development of the same concept),
- reduce costs (e.g. reduce organizational redundancy, reduce the use of paper, reduce travel expenses),
- sell knowledge (e.g. licensing, consulting, access to KMS).

D. Organizational Design of the Use of Knowledge Management Systems

Knowledge management is supposedly an ongoing effort in organizations which is not a completely new phenomenon. All the tasks related to knowledge management and carried out in an organization are called the knowledge management function. Successful organizations have always organized their knowledge resources efficiently (see [39], 13). However, in many organizations the relevant activities have rested in the hands and minds of talented individuals. New is the system-

atic approach to the management of the knowledge resource which requires organizational design. Therefore we examine who (which role) is responsible for what knowledge management tasks. The list of knowledge management tasks does not cover all tasks thinkable (see e.g. [37], [43]). The functions are derived from the definition of knowledge management systems (see section II.C) and our model of organizational information processing (OIP model, see [24]): knowledge identification, acquisition of external knowledge, release of knowledge elements (formal approval of institutionalization), storing of knowledge elements, knowledge classification, updating/extending of existing knowledge structure (ontology), knowledge distribution, knowledge quality management, refinement, repackaging of knowledge, knowledge deletion, archiving, knowledge selling.

The following dimensions of the organizational design of the knowledge management function are distinguished:

- 1) scope of knowledge management activities (narrow-broad): number of supported participants (users), authors, teams/work groups, communities/groups of shared interests, number of business processes supported, number of sectors of the company supported,
- 2) regulation of access to knowledge management systems (liberal-restricted): access to parts of the system from the work place, access to parts of the system from outside the work place,
- 3) centralization of knowledge management tasks (laissez-faire (participants)- decentral- central): centralization of selected tasks, responsibility for selected tasks,
- 4) organizational positioning of a knowledge management unit (low-high): organizational design of a separate unit (no - project – staff – functional unit), level of reporting of the organizational unit “knowledge management”, number of employees working for knowledge management,
- 5) organizational design of knowledge management processes (unstructured/no routine-structured/routine): design of specific knowledge processes in the sense of service processes.

E. Knowledge Management Systems

There are a great number of systems on the market which claim support for organizational memory, organizational learning or knowledge management respectively. The field is still immature, though, in the sense that there are no classes of systems that the literature has agreed on. So far there are several proposals for classifications of systems which mostly lack completeness and also exclusiveness in the sense that one system fits into one and only one category (see e.g. [26], 3-5, [22], 169, [47], 91, [1], 10ff). Thus, it is not surprising that the systems on the market are more or less sets of functions thought to be useful for knowledge management.

Therefore we decided to focus on the functions provided by systems as different as Intranet platforms, group support systems, communication systems or systems explicitly described as knowledge management systems. A list of 66 functions was derived a) from an extensive survey of existing knowledge management systems, b) from a set of empirical studies on knowledge management and c) from approaches to classify this kind of systems in the literature. The following groups of

functions were identified (for a comprehensive list of the functions see [24]):

- 1) support of knowledge search and presentation (low-high)
- 2) support of knowledge publication, structuring and feedback (low-high)
- 3) support of communication and co-operation (low-high)
- 4) support of computer based teaching and learning (low-high)
- 5) support of the administration of knowledge management systems (low-high):
Two more dimensions are used to describe KMS:
- 6) application of knowledge management systems (no particular KMS- one- many)
- 7) degree of integration (low-high)

F. Organizational Memory Content

OM content can be located in peoples' minds, in paper-based documents and in electronic form as part of KMS. Generally, both, normative suggestions for KMS and actual implementations of KMS vary considerably in terms of the content to be managed. Many companies seem to be driven by a pragmatic approach which puts those parts of the organizational knowledge at the center of consideration the management of which would promise the most direct positive effects. Examples are patents, skills data bases (yellow pages), lessons learned, best practices, descriptions of products, processes or the structural organization and the like. In many cases, explicit knowledge is predominant. The dimensions measured in the empirical study concentrate on that part of the OM content which is available in KMS. The construct "complexity of contents" consists of three subconstructs in analogy to an instrument for the measurement of the complexity of data models developed by Heilandt and Kruck ([19]):

- 1) size of contents (small-large):
- 2) structuring of contents (unstructured-structured):
- 3) heterogeneity of contents, storage and size of knowledge elements (homogenous-heterogenous):

G. Organizational Culture

Generally, there is considerable discussion about the notion of organizational culture. For starters, there is no general agreement on what the term organizational culture describes (see [12], 164). Moreover, the measurement of organizational culture is a serious problem. In principle, the actual values and assumptions of people about other people, time, space and goals are a lot less observable than official statements about values and indicators such as stories, symbols, language, clans (see [12], 166). Thus, it is unavoidable to investigate the notion of organizational culture indirectly.

In our empirical study the single dimension measured reflecting organizational culture is "willingness to share knowledge" (low-high). The items used to measure this construct were taken from other studies which dealt with constructs similar to the one used here (see [32], 416, [16], 435):

- mutual understanding of work groups: employees know about the work of other teams/work groups (e.g. about problems, tasks, roles), employees value the achievements of other teams/work groups,
- mutual trust of work groups,

- mutual influence of work groups: influence of teams/work groups on important decisions of other teams/work groups,
- mutual support of work groups: employees help each other between teams/work groups,
- employees help each other within teams/work groups,
- willingness to learn,
- communication within work groups,
- communication between work groups,
- existence of incentive systems for knowledge sharing: material incentives (money), career opportunities dependent on knowledge sharing,
- approval/acknowledgement of co-operative behavior,
- informal exchange of ideas (e.g. in breaks, at company events, private),

H. Budget

Knowledge management efforts vary not only in terms of goals and organizational design, but also in terms of size and funding. Three concepts of funding KM activities can be differentiated. (1) Most organizations supposedly finance knowledge management efforts in terms of a budget allocated to a group or a project. This is due to various reasons. First of all, knowledge management is a rather new approach which is propagated to increase its acceptance throughout the organization. In this first phase, the knowledge management efforts are funded centrally and the usage of the corresponding services is free to all departments, processes or individuals. (2) As the concept matures most organizations will try to at least allocate costs where they are generated which means that services are charged for. (3) The final step might be a move to a market scheme where demand and supply of knowledge management products and services are brought together, both internally within the organization and externally with business partners. The following dimensions are investigated:

- 1) method of financing knowledge management activities (budget-cost allocation- market):
- 2) resources for knowledge management (money/human resources):
- 3) senior management support (low-high): According to Davenport ([7]) senior management support is one of the key success factors for knowledge management efforts.

I. Organizational Results

One of the most prevalent questions in the knowledge management area widely discussed in literature and practice is how do we determine the value created and the benefits gained by the application of such efforts (see e.g. [45], 2). Considering the fact that there is still considerable disagreement about what exactly knowledge is or knowledge resources are which have to be managed (for an extensive critic see [39]) it is hard to assess what the results of the application of such a concept would be and especially what the differences to not applying this concept would be. Several approaches to this problem can be distinguished, e.g. the Intellectual Capital (IC) approach (see [50], [44]).

In wide parts of the MIS literature the system-use construct has been considered as a dependent variable: a success measure (see [10], 173). More usage has always been considered desirable. In an extension of DeLone and McLean's information system success model ([8]) use leads to individual and

community impact and this in turn leads to organizational impact (see Figure 4). One could argue that this holds true for the use of KMS, especially more active involvement of participants.

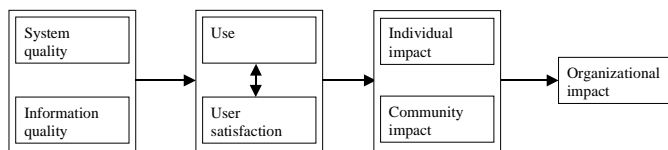


Figure 4: Information system success model (after: [9], 87)

The following dimensions are investigated:

- a) success/advantages of the application of knowledge management systems (low-high):
- b) use (limited-extensive):

IV. CONCLUSION

In this paper a perspective-based approach to study the application of organizational memory approaches and knowledge management systems was motivated. The term knowledge management system was defined. The perspectives were used to define the theoretical frame of an in-depth research project studying the state-of-the-art of the use of knowledge management systems (KMS '99). This frame was used to analyze concepts for the use of knowledge management systems. Such concepts are ideally divided in organizational design, culture and systems. The eight constructs used in the frame were detailed by dimensions and variables.

There are a lot of unresolved research questions in this area, especially concerning strategies of knowledge management, organizational design of knowledge management, usefulness of the content of knowledge management systems, architectures and classification of knowledge management systems, differences in design and management between knowledge management systems and more traditional information and communication systems and, last but not least the economics of the application of knowledge management systems.

These questions show that much has to be done in this research field. As we tried to point out, there is a strong need for an interdisciplinary approach, which combines research findings from (at least) organizational psychology and sociology, organization science and business informatics. Our perspective-based approach and the framework are seen as instruments to support an integration of the various approaches developed in these disciplines.

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