Organisational Memory Systems

Application of Advanced Database & Network Technologies in Organisations

Franz Lehner, Ronald Maier, Oliver Klosa

Department of Business Informatics
University of Regensburg
Universitätsstraße 31, D-93053 Regensburg, Germany
E-Mail: franz.lehner@wiwi.uni-regensburg.de,
ronald.maier@wiwi.uni-regensburg.de,
oliver.klosa@wiwi.uni-regensburg.de

Abstract.

This paper deals with Organisational Memory Systems (OMS) which are seen as a new kind of information systems. OMS result from the application of advanced database and network technologies to support Organisational Memory concepts and approaches. First, the notion of OMS, the origin of these systems, their theoretical background and the evolution of data base use are described. Then Intranet technologies in a broad sense are classified and taken as examples to show how Organisational Memory approaches could be supported by information and communication technologies already available. A model of organisational information processing (OIP model) is presented. The OIP model integrates Organisational Learning and Organisational Memory approaches and contains a set of processes. With the help of this model Intranet technologies are evaluated according to their possible contribution to these processes. It is suggested to take Organisational Memory concepts as a vision for the future development of corporate Intranets.

1 Introduction

1.1 Motivation

Organisational Memory (OM) is a concept well known from organisation science and learning theory. Many approaches have been developed which claim to guide organisations to use their common or shared memory in a more efficient way. Existing approaches focus on organisational issues and consider the OM as a resource which has to be managed like capital or labour. With the advent of advanced database technologies (e.g. data warehousing, OLAP, data mining, knowledge discovery and bases, distributed data base systems, multimedia and hypermedia data bases and management support systems, like executive information systems or management information systems) and net technologies, especially the so-called “Intranet”- or “Web”-technologies, sound information technologies exist to support organisational processes of generating, institutionalising, retrieving and disseminating information. However, so far the OM approaches lack the integration of these technologies as means to support the respective processes.

In other words, the authors believe that there are so far no “real” OMS-tools (Organisational Memory Systems) available and there possibly never will be an OMS-tool which covers the respective organisational processes on its own. “OMS-tool” stands for development tools or tool-sets, applications or application frameworks respectively. There are, however, technologies and even systems around which support certain aspects of the OM. The authors hypothesise that the integration of the tools and systems can play a crucial and beneficial role in improving a company’s position in the competition with a clear focus on organisational learning projects.

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Thus in our understanding an OM system is a system which realises parts of the OM (also called organisational knowledge base) with the help of information systems and/or supports tasks, functions and processes closely related to the use of the OM.

1.2 Innovative use of information systems

For some time now under the rubric "Organizational Memory," both innovative and familiar concepts as well as highly promising systems have been proposed and tested (cf. [Lehn1998], [Bann1996], [Shum1997]). The topic has taken on an intense sense of immediacy given the worldwide processes of restructuring in both economy and society. Relevant projects are already being carried out, especially in large corporations. Environmental dynamics and the pressure of competition that necessitate the development or the activation of new capabilities are paving the way for change. These adaptations occur automatically only in the rarest of cases, but presuppose (learning) processes. Important goals include elevating organizational efficiency and flexibility and overcoming growth limits. In times in which quantitative growth (e.g. through an increase in turnover, elevation of market shares, or the development of new markets) is only limitedly possible and the retention of the status quo is already viewed as successful, concentrating on qualitative dimensions gains increasing importance. One could look at this as an expansion inwards, wherein new or previously unused potential and strengths should be developed.

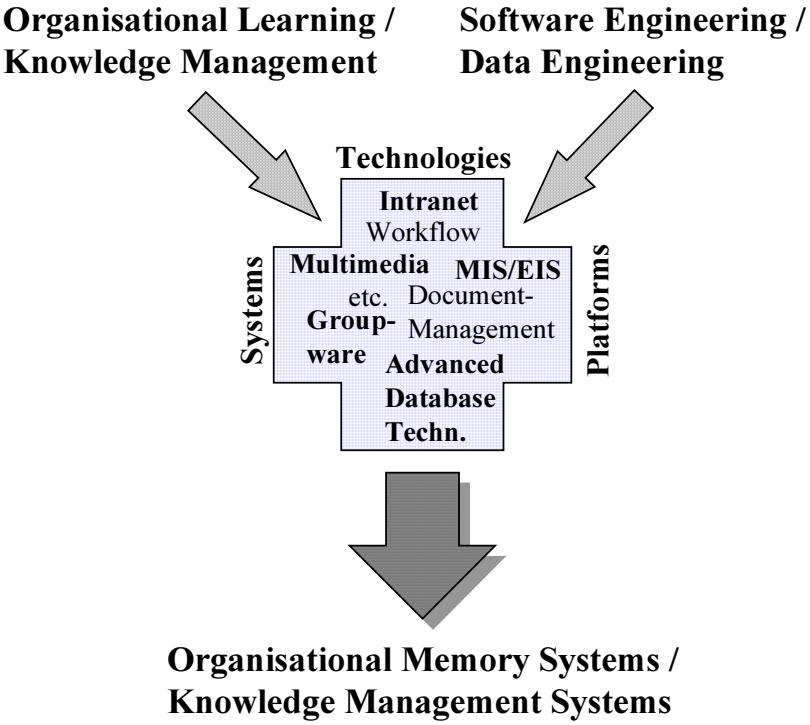

Figure 1: Framework and conditions for Organizational Memory Systems

In order to achieve the aforementioned goals it is necessary to develop an understanding of the effected frameworks and management concepts that are already available. In addition, a more comprehensive understanding of the use of conventional databank technology has to be developed and integrated within the broader concept of "organizational knowledge." This book is meant to take into consideration the framework and content of these goals.

The development of Organizational Memory Systems (OMS) is substantially more complex than the development of current information systems because existing models and planning methods must be developed further, and a relationship to management applications (e.g. BPR, process organization, corporate models) must also be developed. Figure 1 shows how this can be acheived via the convergence of various structural approaches, whereby especially organizational development should be

stressed. It should also be emphasized that important developments arise at the juncture where systems and available technologies meet.

2 Organisational Memory Systems - Theoretical Background

2.1 Basic Ideas and Evolution of Data Base Use

The quick and easy availability of data, information and knowledge (frequently in a multimedial form) is becoming increasingly important for companies. For a long time, data bases were the most important means for supporting this task. However, due to the developments of the past years, completely new possibilities have evolved leading, on the one hand, from isolated data base concepts to enterprise wide information models and, on the other hand, to a revised interpretation of the concepts available in business today.

Recently, there has been an intense discussion of the term “Organisational Memory” relating it to new but also to existing concepts and systems. The environmental dynamics and the pressure of competition form the background which enforces the development or activation of new talents within the companies. Usually, these adaptations do not happen automatically. Rather than that, they require (learning) processes which aim, among other things, at organisational efficiency and flexibility. These are precisely the tasks, problems and questions etc. for which OM Systems are relevant. They constitute the (technical) realisation or support of that part of an organisation which is termed ”Organisational Memory” (and which can generally always be found in an organisation). Several partial disciplines contributed to the development of the main ideas:

- Organisational learning (OL) and Learning Organisations (LO)
- knowledge management
- organisational and personnel development
- organisational change, management of change, innovation management
- organisational culture
- Organisational Intelligence (OI)
- theory of self organisation
- knowledge based systems (artificial intelligence, cognitive science)

The OM is not the only component playing an important role within the above mentioned disciplines and approaches. Due to its importance with respect to all these concepts, especially for Organisational Learning and knowledge management, OM should be emphasised and explained in more detail (see chapter 2.2). More detailed information concerning the individual concepts is provided by the respective basic literature (see especially [Lehn1998], where numerous sources for further studies are quoted). Put in a nut shell, OM Systems should contribute to the learning ability, the flexibility and the mastering of the organisational change.

Some of the theoretical concepts and preparatory work regarding such systems date back to the 1950s or even further back. It is certainly not a coincidence, that since the beginning of the 1990s there has been intensive contemplation of such systems and even actual implementations have taken place. On the one hand developed technologies are available making such implementations possible at all (e.g. Intranet, client-server-architectures, multimedial data bases). On the other hand, the competitive pressure and the general restructuring process require the company to take new measures, as the potential for rationalisation is often already exhausted. By going back to concepts of knowledge management, organisational learning, organisational development and other approaches one tries to find or develop a solution. With the help of information and communications technology these solutions are put into practice. However, this is certainly not a new concept for boosting success, comparable to lean management or business process re-engineering. It is also not a new form of information systems which one will be able to buy off the rack in the near future. Instead, it is more like a new dimension of the development of information systems and organisations in the sense of a synthesis of both approaches and a consistent further development of data processing.

level/name	type of system/focus
4 - knowledge management	Organisational Memory Systems
3 - information as a resource	advanced database technologies
2 - data management	data (base) architecture of the company
1 - file and data organisation	data systems

Figure 2: Developmental levels regarding the (electronic) handling of data, information and knowledge in companies

During practically all phases of development, implementation and use OM systems require interdisciplinary knowledge or at least a coherent understanding of organisation and management, group and behavioural psychology as well as computer science (or, respectively, the co-operation of the respective experts in a team). In addition, the knowledge of the special area that is to be supported is necessary. It should thus be emphasised again, that such projects are not simple systems development projects but projects for organisation development (OD). OM Systems thus work on a higher level than conventional data base systems. This requires the mastery of the lower levels of development as a prerequisite for success (compare Figure 2).

Each individual level supports certain functions of the enterprise and uses the corresponding basic technologies and methods for the development of the actual systems. The problems regarding the higher levels not only consist in the difficulty in coming to terms with the technical complexity (heterogeneous systems, distributed systems, different norms and standards, different languages and user interfaces, varied purposes of the system and the user groups). Instead, completely new perspectives are added, so that a conflict of goals regarding the lower levels is certainly possible. On level 4 (knowledge management) an additional fact has to be considered, namely that the applied technology by no means has to be restricted to files or data bases. In fact this aspect can even be completely moved into the background. Apart from the classical structuring tasks (e.g. design of the ”static” data model), modelling and supporting dynamic processes (e.g. the process of acquiring information or of changing knowledge) and supporting organisational learning processes are gaining an importance as yet unknown to computer science. As there is hardly any experience in this area, extra efforts are necessary. However, in practice it has become obvious, that it is in this area, where there are chances and potentials. Innovative companies face this challenge by initiating relevant projects.

However, there is no direct hierarchical relation between the individual levels that are depicted in Figure 2. Instead it is an idealised presentation deducted from the chronological order of development. As a consequence, most concepts are based on the preceding one. Of course a closer view reveals that there are also other relationships, also with regard to the partial tasks. An example is data management which deals with the data and data base technology on the level of the whole company and thus also plays a part on the level of knowledge management.

2.2 The Concept of Organisational Memory

In general the term ”memory” describes a system of abilities which makes it possible to store what was perceived or experienced for longer than the actual period of time of the perception or experience and which allows to retrieve these perceptions and experiences at a later time. Learning is not possible without memory. Accordingly, the OM is always mentioned as the most important prerequisite for organisational learning. However, the use of the term ”Organisational Memory” should certainly not imply an analogy according to which organisations have a ”brain”. The term should only convey the fact, that members of the organisation as well as for example documents or files contain knowledge, which can be kept ready for recall (cf. [Ober1996], 53).

Intensive scientific research in this area began at the end of the 1970s and the beginning of the 1980s and took place mainly in the USA. Duncan/Weiss ([DuWe1979]) suggest in this context the following definition, which is still valid:

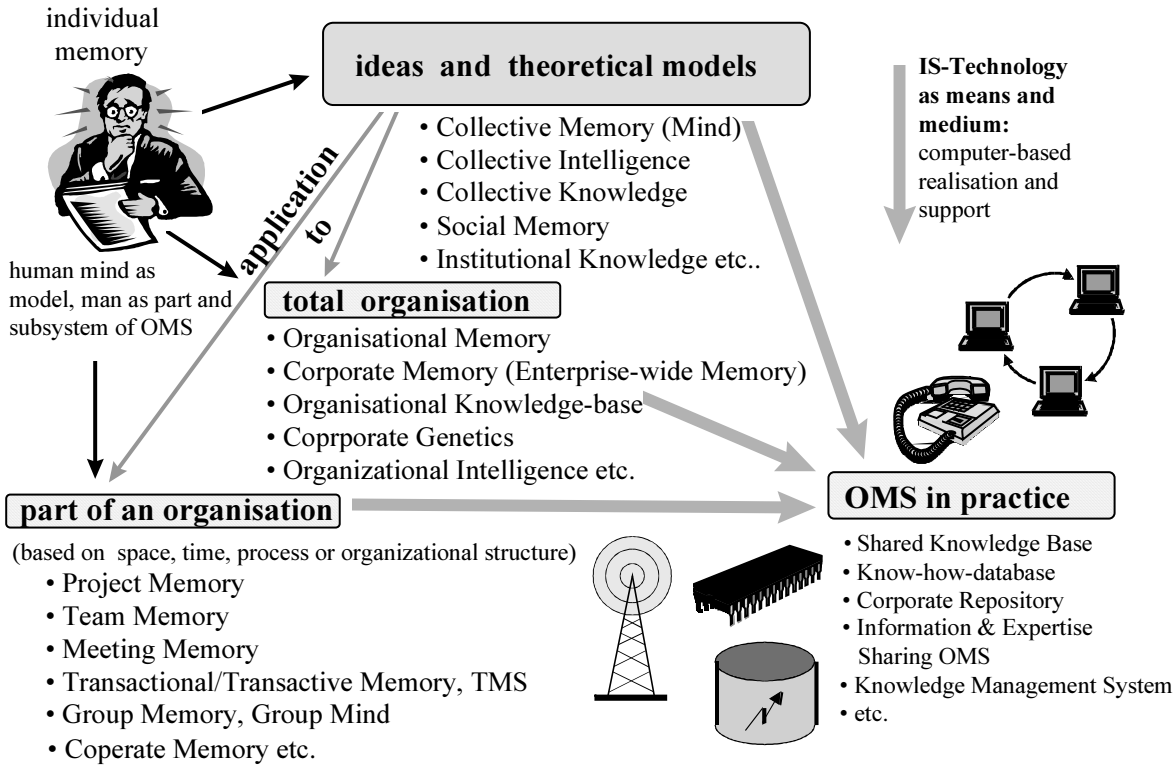

Figure 3: Relationship of the terms to each other

Organisational knowledge base = the whole of the co-operatively imparted knowledge and skill within an organisation

As a consequence, the concept of ”Organisational Memory” was widely discussed in the relevant literature, but no uniform and clear use of the term could be developed. Meanwhile, there are numerous similar or synonymous terms revolving around the common object of research and the connected phenomena. Examples are:

- organisational or corporate memory
- enterprise-wide knowledge base
- Group Memory, Group Mind
- collective memory
- collective intelligence, corporate intelligence

Further terms that can be found in practice are:

- Shared knowledge base (SKB)
- Corporate Repository
- Know How Data Base (KhDB)

For many it is difficult to even imagine the concept of organisational knowledge, as this is knowledge which is mainly not stored in the brains of human beings but in the forms of the organisation and operation of a socio-technical system. Organisational or institutional knowledge can be found e.g. in control systems that are independent of human beings and which define the ways in which a social system operates. Examples are standard procedures, rules, codifications, descriptions of work processes, established routines for certain situations, traditions as well as the specific culture of an organisation. Further examples are the information on trends, actual and potential competitors, customers, suppliers, new technologies etc. Especially in companies with many traditions or in historically grown institution this ”super-individual”, organisational knowledge becomes evident, as new employees do not only enter the organisation, but slowly take on and internalise the ”stile of the house”, the values, certain ideas regarding status, routine behaviour etc. (see [Will1996]).

In order to identify the knowledge basis of an organisation, one has to ask for its retrievable knowledge. Central questions are for example (cf. [Will1996], 282):

- Where and how is this knowledge stored?
- How, by whom and in which situations is it recalled?
- How does the organisation acquire, store, manage and change this knowledge?

Some authors (e.g. [Wats1996]) understand the term OM in a very restricted technical sense of a comprehensive enterprise-wide data (base) concept, which is generally also supported by multimedia and network technologies (e.g. imaging, archiving and document management systems). In most publications on learning organisations, corporate knowledge management etc., knowledge is understood in a very universal way. Traditional data bases or data are either completely left out of this discussion or only make up a part of this knowledge. Organisational learning is defined, among other things, as the transformation of this organisational knowledge base. The actual problems here are measuring, operationalising or understanding this transformation. It has to be clear, that the knowledge base of the organisation can be regarded separately from the persons involved, but it is not independent of the members of the organisation and cannot be developed independently from them. This is based on the idea of a collective knowledge as well as the perception that the content of this knowledge is to a large extent not shaped by the knowledge components in the brains of individual persons, but by the relations and the patterns of the connections between these components. The connections themselves constitute the independent collective or systemic knowledge of an organisation (see [Will1996], 284).

2.3 Organisational Memory Systems (OMS)

OMS are closely connected to the above presented concept of OM. They are most easiest understood, if one starts with the functions which are to be fulfilled by these systems as well as from the tasks and procedures which they support. Both are closely connected with the above mentioned approaches which attribute a particularly central role to organisational learning and knowledge management. However, the discussion on the different areas of application has not progressed much in the relevant literature, though there does seem to be a large degree of consent at least regarding organisational learning. The following central functions are stated (cf. e.g. [Hube1991]):

- general support of learning processes within the company (individual and collective) - and as a specification of this general function
- the support knowledge acquisition
- the distribution of information and knowledge (general and homogenous access to the knowledge base, information service center, active but also foresighted service point)
- help with the interpretation of information
- (technical) realisation of the OM.

Due to the situation described above and the dynamic development of the application areas, it is not surprising, that there are hardly any definitions for this new type of information system yet. One of the few attempts at an explanation was made by Stein/Zwass ([StZw1995], 95), who define an OM Information System as ”a system that functions to provide a means by which knowledge from the past is brought to bear on present activities, thus resulting in increased levels of effectiveness for the organisation”. This definition clearly aims at the contribution of such systems to the increase in organisational efficiency. In order to be compatible with the considerably widened spectrum of use, the following new definition is suggested (cf. [Lehn1998]):

Definition: An *Organisational Memory System (OMS)* is a system, (a) which realises parts of the organisational knowledge base with the help of information and communications technologies and/or (b) realises and supports tasks, functions and procedures that are connected to the use of the organisational knowledge base.

Apart from the synonymous term which was already used above, OMIS (Organisational Memory Information System), the term CSOM (Computer-Supported Organisational Memory) can be found in

the relevant literature. The terminology concerning the organisational knowledge base can be understood with the help of the terminological interpretation of chapter 2.2.

Organisational Memory Systems (OMS) are generally characterised by the fact, that a whole bundle of technologies is used and not an isolated single technology. A particular obstacle regarding the categorisation and order occurs due to the close connection to the concepts of information and knowledge. These terms are usually understood in a very inhomogenous and wide way, and a homogenisation is neither to be expected in the near future nor realistic. That is why it is not surprising, if a very wide scope of realisation forms is seen. This reaches from a very restricted understanding in the context of specialised systems for the support of specific, relatively clearly defined tasks (e.g. the admission procedure of new medicines), via the company-wide use (e.g. knowledgeLINK, see [Lehn1998]) to very general information systems which at first have no specific connection to the corporate performance (e.g. Answer Garden, see [Acke1990]). Thus, OMS could certainly be treated in the same way as conventional information systems. The justification for a specific approach which is emphasised here is based, on the one hand, on the insufficient support provided by traditional methods of systems development and, on the other hand, on the particular requirements which are expected from such systems, due to the contribution to the development of the organisation and to learning organisations.

3 Intranet Technologies

3.1 Definition and Classification

Backed by the exceptionally rapid development of the Internet, especially of the World Wide Web, the relevant Internet- or Web-technologies were used more and more within organisations: in company or enterprise networks. Internet-technologies denote in short interconnected client-server systems which use highly standardised protocols (documented in the RFC - “Request for Comment” see e.g. [LAN1995]). The most popular Internet client-server systems are electronic mail, ftp (file transfer protocol), telnet, IRC (Internet Relay Chat), newsgroups and the World Wide Web (WWW) with its recent additions such as Java, video-conferencing, the handling of multi-media content (e.g. VRML, video, audio) and the like.

The term “Intranet” or “Corporate Intranet” was created to distinguish the use within organisations from the use outside, in the world-wide web or “Internet”. It denotes the provision of all internal applications by the means of powerful WWW-browsers using a standardised user interface (see e.g. [Kyas1997], 22, [Hill1997], 4). “Provision” is understood in a broad sense. The Intranet integrates the traditionally separated office systems, telecommunication and (interactive) multimedia into an enterprise-wide media, communication and information system (see [KoWi1997], 29). Thus many authors state that the Intranet consists of more than the Internet-technologies:

- **access technologies**: which means modern or advanced database technologies, which support the access of certain user groups (e.g. management, marketing) to (operational) databases: data warehousing, OLAP, data mining, knowledge discovery and bases, multimedia and hypermedia databases and management support systems, like executive information systems or management information systems (for management support systems see [GlGC1997]); apart from these more advanced technologies, there is a simple need for accessing existing applications, where database interfaces and standardised gateways providing access to so-called legacy systems are needed; additionally, the abound unstructured information has to be accessed: Intranet search tools;
- **communication technologies**: e.g. messaging systems, chat systems, network news systems, fax software, voice conferencing systems, video conferencing systems; electronic (or on-line) publishing (and broad- or multicasting!) systems;
- **co-ordination and co-operation technologies**: workflow management systems, groupware systems (workgroup computing, for a product overview see e.g. [Hill1997], 95ff) such as electronic meeting systems, whiteboards and data conferencing, knowledge repositories, group writing and shared editing, calendaring and scheduling systems, document management systems;

- **security technology**: network security systems, such as firewalls, proxies, virus protection;
- **electronic commerce technology**: electronic payment systems, EDI-applications (see [RoMa1996]);
- **support systems**: which denotes a whole category of products the goal of which is to assist people using information systems or, in a more general understanding, performing some set of tasks (e.g. EPSS - electronic performance support systems, which either can be embedded in a computer application or, in a broader sense, relate to computerised help desks, see e.g. [DeLF1997], for a case study see also [CoFS1997]), on-line education and training (see [KoWi1997], 33).

Most of the applications and tools that vendors market as "Intranet"-based are applications and tools, that are extended by hyperlinks (HTML-format) and a standardised interface to applications (common gateway interface - CGI). There are, however, some applications that are developed for the use in an Intranet, e.g. Digitals Workgroup Web Forum. The most important quality of these applications is the integration of most of the technologies mentioned above (see [Koss1996], 299).

Additionally, it is not clear what is meant by "internal" applications. Electronic Commerce (EC) and Intranet are often seen as "the perfect couple" which can benefit from each other (see e.g. [TiSt1997], 603f). The borders are blurry. There is good reason to extend the Intranet to provide access for authorised members of the organisation (e.g. sales personnel) or market partners (e.g. customers, suppliers) via the Internet (sometimes called the "Extranet") and/or to provide public access via the Internet and vice versa organisation-wide access to the Internet via the Intranet (see [KoWi1997], 30).

4 Intranet-tools Supporting Organisational Memory Approaches

4.1 Model of Organisational Information Processing

Figure 4 shows a model of the organisational information processing which is derived from organisational learning and OM approaches (for a detailed description and analysis of the model see [MaKu1998]). The numbers in the figure refer to the information processes within an organisation. The organisational information processing starts with the establishment of data in the organisation which is perceived by organisational agents (human or computer agents) from the environment (1). Two kinds of information sources can be distinguished: the information itself or "information about information" which can be accessed, if required, in the environment: meta-information. Via individual learning (2) the information sources become part of the OM (which consists of the shared knowledge, the individual knowledge which is accessible by the organisation and the institutionalised knowledge, see also [Pautz1989], 79). The individual knowledge can be shared, verified and linked to other individual knowledge by communicating with other members of the organisation: intersubjective knowledge is created (3). To be fully accessible and independent of individuals, knowledge has to be institutionalised (4).

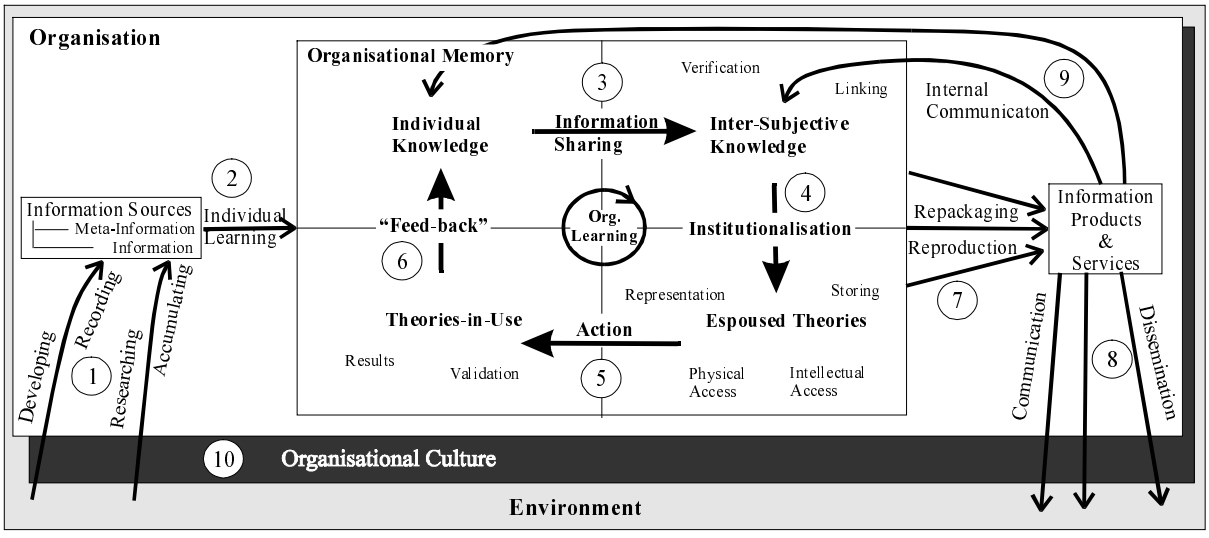

Figure 4: Model of the Organisational Information Processing (OIP model)

The so-called "espoused theories" are explicated, officially accredited or agreed ways of reacting to certain situations as opposed to "theories-in-use" which denote the rules and hypothesis which are actually applied (5) (see [ArSc1978], 11). The theories-in-use may or may not be compatible with espoused theories; furthermore, the individual using these theories may or may not be aware of the incompatibility of the two theories (see [ArSc1978], 11). The results of actions give finally feed-back, new individual knowledge is created (6). The OM as a whole can be used to create information products and services (7). On the one hand these products and services can be communicated and disseminated to the environment (especially sold to customers!) (8). On the other hand, they can be communicated internally, as some kind of "official statement" (9) (e.g. in a big company, a subset of the OM of the headquarters may be communicated to branches).

The whole process of organisational information processing is embedded in the organisational culture (10). Most of the OM approaches claim that organisational culture has to support OM. An open and trustful culture is intended so that individual knowledge can be shared without regret.

In the following this model is used as a basis for our investigation of the possible support which Intranet-tools could provide for implementing OM approaches in organisations.

4.2 Analysis of Intranet Technologies Based on the OIP model

The matrix below shows the possible support of Intranet technologies for organisational information processes which were described above. The result was derived from a qualitative analysis which was done by the authors. It is planned to verify the results by empirical studies.

	Establishing info-sources (1)	Individual Learning (2)	Information Sharing (3)	Institution-alisation (4)	Action (5)	Feed-back (6)	Repack-aging (7)	External Comm. (8)	Internal Comm. (9)	Culture (10)
access and analysis technologies										
DSS/EIS/OLAP	0	++	0	0	+	+	+	0	0	0
data mining	0	++	0	0	0	0	+	0	0	0
data base interfaces and gateways	+	+	0	+	0	0	+	+	0	0
Intranet search tools	0	++	0	0	0	0	++	+	0	0
communication technologies										
messaging systems	+	0	++	+	0	0	0	++	++	+
chat systems	0	0	+	0	0	0	0	0	0	+
network news	++	+	++	+	0	+	0	++	++	+
electronic publishing	+	+	++	+	0	0	0	++	++	0
video conferencing	0	0	+	0	0	0	0	+	0	+
co-ordination and co-operation technologies										
workflow	+	0	0	+	++	+	0	0	+	-
groupware	0	0	++	0	0	+	0	0	+	+
security technologie										
firewalls	+	0	0	0	0	0	0	0	0	++
virus protection	+	0	+	0	0	0	0	0	+	++
electronic commerce technologies										
electronic payment systems	0	0	0	0	0	0	0	++	+	0
EDI	+	0	0	0	0	0	0	++	0	0
support systems										
on-line education and training	0	++	0	+	+	0	0	0	0	0
EPSS	0	++	0	+	++	0	0	0	0	0

Figure 5 : The support of Intranet-technologies for organisational information processes (Legend: ++ strong influence, + weak influence, 0 undecided or no influence, - weak negative influence, -- strong negative influence)

The columns contain the ten processes of the OIP model. The rows contain the different Intranet technologies mentioned in chapter three. The matrix fields reflect the expected support of each technology for each process. As an example we expect that individual learning can be strongly supported by decision support systems (DSS), executive information systems (EIS) and on-line analytical proc-

essing (OLAP) (++).In the following the results of figure 5 are described in detail process by process, especially the fields which indicate a weak (+) or a strong (++) support.

Note that every process is supported by at least one Intranet technology.

The process of *establishing information sources (1)* is supported by several Intranet-technologies. On the one hand, communication technologies ease the recording of information and meta-information from the environment. Additionally, co-ordination and co-operation technologies such as workflow systems and also EDI systems form an automatic interface to for instance customers or suppliers (e.g. via the Internet). With an Intranet it is more easier to use the Internet as one big "data source" from which information is extracted (for the definitions of the terms information and data see [LeMa1997]).

The main support for the process of *individual learning (2)* comes from access and analysis technologies and support systems. Imagine for instance a data mining-tool which helps business managers learning more about their business by finding correlations between different data or certain data patterns. The support systems, like an on-line-education-tool are used for training on the job by enabling the user to get new knowledge about e.g. new information systems by him- or herself. Communication technologies, e.g. newsgroups, can help employees to find information on several subjects.

The strongest support from all Intranet-technologies for the process of *Information Sharing (3)* comes from communication technologies which are classified according to the number of receivers for information sent. On the one hand, there are systems for one-to-many communication like messaging systems (especially with the help of distribution lists) and network news, on the other hand there are systems which pass the information only to one station (e.g. chat systems, video conferencing). Whereas the first group strongly supports information sharing, the second group is thought of as being of only minor help. Apart form the communication technologies there is also a strong support for the process of *information sharing* which results from co-ordination and co-operation technologies. For example groupware systems enable every team member to disseminate his or her knowledge to the other team members very easily and quickly. This is all the more important as the constant need for change forces organisations to adopt virtual structures. In this context one person is member in many teams in which he or she plays different roles.

The *process of institutionalisation (4)* is supported by bi-directional data base interfaces and gateways, by communication and co-ordination technologies like workflow systems and by support systems. These technologies can be used to spread new values, norms, rules, regulations, business procedures and information so that new espoused theories emerge.

Once the rules, regulations, information and the like are institutionalised in workflow systems and electronic performance support systems, they immediately support the *action-process (5)*. Workflow systems more or less force the employees to use the espoused theories, whereas electronic performance support systems are slightly more subtle.

For the *feed-back-process (6)*, however, Intranet technologies are of no great help. A weak support comes from executive information systems and on-line analytical processing which for example show the effects of a new marketing-mix on retail sales in a certain geographical region, from communication, co-ordination and co-operation technologies, especially those that have a multi-cast architecture.

The *process of repackaging (7)* is supported by only one group of Intranet technologies, the access and analysis technologies. Information and knowledge, that is already available in the organisational memory can be reproduced and repackaged using Intranet search-tools, decision support systems, data base interfaces and gateways to all kinds of application systems throughout the enterprise.

Communication technologies are certainly needed for the processes of *external Communication (8)* and *internal Communication (9)*. Today official enterprise communication, whether internal or external, is often still paper-based, but a corporate Intranet with its massive amount of electronic information can ease these processes a lot. The new generated Information product can be disseminated by a messaging system inside and outside the company or stored in a data warehouse accessible for se-

lected people. Another strong support for the *external Communication* comes from electronic commerce technologies. Electronic payment systems play a crucial role because they make it possible to charge customers on-line small amounts of money for information (see e.g. [RoMa1996]). In the case of *internal Communication* one could imagine that each profit center charges other organisational units for information provided. Thus, information sharing could be boosted by returning benefits to those departments that offer their knowledge freely (which could also affect the organisational culture).

Several technologies affect the *culture (10)* in a company. Security systems, e.g. firewalls and virus-protection-systems encourage to communicate freely and can create an open and trustful technological environment. However, workflow systems with their tendency of forcing people into predefined organisation flows exert a negative influence on the openness of the organisational culture.

5 Conclusion

In this paper we tried to bring together OM approaches on the one hand and technologies which could support the related concepts on the other hand. A theoretical model was developed to analyse the potentials and chances which existing technologies have considering their support for the OM. Intranet technologies were taken as an example to show the application of the model. Additionally, the model was used to integrate different OM approaches with respect to their requirements for technological support.

Basic result of this analysis is that there are already considerable potentials when applying Intranet technologies to OM approaches. Current OM approaches as stated in the literature are sufficient to serve as a common framework for the design and development of technical solutions. In other words OM concepts can form a comparably well-founded vision for the future development of corporate Intranets. However, whereas after almost 30 years of software engineering and data base engineering we now have sound methods and tools to support the design and management of (relational) data base systems (DBS), there is still a lack of understanding considering the notion of OM theories and concepts. Nevertheless, we believe that OMS form an emerging market which is very attractive to enterprises and business consultants (conducting business development projects) and software vendors as well (in search of applications for their technologies). Both readiness and willingness to support management activities in the field of organisational learning and knowledge management by modern information technologies is already increasing.

Apart from this practical dimension, the application of advanced database and network technologies in organisations make it possible to gain more insight into what effects OM approaches can exert on the notion of organisational information processing (evaluable e.g. by the means of empirical analysis). Our research work is still in progress. A comprehensive description of the research approach and the results will be published in [Lehner1998]. This paper summarizes first results of a qualitative analysis. There are, however, too many tools around which claim to support organisational processes of generating, institutionalising, retrieving and disseminating information. Therefore this paper concentrated on tools concerning “Intranet”- or “Web”-technologies. As a suitable concept or a sound theory is still missing there is considerable confusion concerning the right way of applying information and communication technologies to OM or OL projects. This paper is intended to contribute to a better understanding of the relevant issues and to indicate research directions.

6 Bibliography

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