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IDEA: A Framework for a Knowledge-based Enterprise 2.0

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Abstract: This paper looks at the convergence of knowledge management and Enterprise 2.0 and describes the possibilities for an over-arching exchange and transfer of knowledge in Enterprise 2.0. This will be underlined by the presentation of the concrete example of T-System Multimedia Solutions (MMS), which describes the establishment of a new enterprise division "IG eHealth". This is typified by the decentralised development of common ideas, collaboration and the assistance available to performing responsibilities as provided by Enterprise 2.0 tools. Taking this archetypal example and the derived abstraction of the problem regarding the collaboration of knowledge workers as the basis, a regulatory framework will be developed for knowledge management to serve as a template for the systemisation and definition of specific Enterprise 2.0 activities. The paper will conclude by stating factors of success and supporting Enterprise 2.0 activities, which will facilitate the establishment of a practical knowledge management system for the optimisation of knowledge transfer.

Keywords: knowledge management, Enterprise 2.0, regulatory framework, social software, expert knowledge, enabling factors, IDEA
Categories: M.1, M.2, M.4

1 A practical example

The economy today is characterised by the internationalisation of competition, increasing dynamism of innovation and market uncertainty. The coordination of the value creation chain in hierarchical organisational structures based on the Taylor paradigm is no longer able to match these developments. Instead there is a growing frequency of a clear dissolution of the traditional department and corporate boundaries. Hierarchical organisational structures are being increasingly replaced by organisational networks [Picot, 03].

As a medium-sized company providing internet-based solutions, T-Systems Multimedia Solutions GmbH is operating in an environment prone to rapidly changing market conditions. The health care sector for example is benefiting from increasing support from applications based on the infrastructure of the Internet. T-Systems MMS is seeking to become an important provider of integrated IT solutions for the health care industry by 2011. To this end the "Interest Group eHealth" was formed to prepare the bases for the establishment of the new eHealth division. The specific ambit of IG eHealth is:

- to establish the **exchange of experiences** in order to consolidate the ongoing activities in relation to eHealth as an issue and to exchange available information as well as
- to coordinate the **co-operation** arrangements within which the operational activities are agreed, the portfolio definition is prepared and cross-sector core skills are bundled.

There is an important role to be played in this by the "TeamWeb", a collaboration platform which is providing technical assistance to IG eHealth. Based on Atlassian Confluence[1] this intranet platform will be deployed for the joint preparation, organisation and publication of content as well as for the exchange of practical knowledge. The content can be discussed by means of the comment function as well as continually improved and made more complete through ongoing revision. In this way visibility is given to the participation of all the members of the interest groups and the experts. Employees append key words to various contents thereby achieving a categorisation of the content into subjects. These will improve access to relevant content and are integrated into the company-wide search systems. To avoid receiving an “information overload” there is the option to use the subscription to an information push by which the user will receive selected information about changes via email or RSS feed.

It is the technological support of the *collaboration* and *participation* that has created an environment conducive to creativity and knowledge transfer, within which the creation and editing of content, the interlinking of authors and collective tagging and commenting enables the actual content (information) to be edited and for expert knowledge to be exchanged.

2 Derivation of initial situation and research issue

Taking T-Systems MMS as our example, it will become clear how the targeted handling of expert knowledge is a task that has taken a central position within organisational practice. For some 20 years now the issue of knowledge has been attracting ever greater attention within organisational theory and practice. Alongside the intensified focus on more skill and resource-orientated organisational theories, knowledge is being reassessed as the basis of all organisational functional processes. Due to the ever decreasing half-lives of specific specialist and methodical knowledge [Probst, 97], more than ever any organisation must be able to depart from traditional

[1] cp. www.atlassian.com/software/confluence

perspectives, be willing to learn and to respond in new ways as well as to question rules and self-evident "truths".

These phenomena characterise the landscape of today's knowledge society [Heidenreich, 02], which is discernable through a shifting from *routine-based to knowledge-intensive working processes.* Knowledge-intensive processes are identifiable not least by way of their high complexity and the requirement for experts. Given these features inherent to knowledge-intensive processes, it can be deduced that it is imperative to manage collaboration better in a more knowledge-orientated manner.

Routine processes	**Knowledge-intensive processes**
Low complexity	High complexity
Frequent repetition	Little repetition
Contextual knowledge on hand	Little contextual knowledge on hand
Low novelty value	High novelty value
Little expert knowledge from experts required	Expert knowledge from experts required
Requisite knowledge is eminently codifiable	Requisite knowledge is difficult or nearly impossible to codify

Table 1: Comparison of routine and knowledge-intensive processes [cf. Hartlieb, 00, p 136]

Alongside the shift towards knowledge-intensive processes, today's knowledge society also features the emergence of new information and communication technologies. As a result of the success of Web 2.0 within the private use, the term *Enterprise 2.0* has evolved for the use of social software within businesses [Koch, 08]. From the perspective of business informatics, social software can be understood as an “application systems that, on the basis of new developments relating to internet technologies and which utilise networking effects and economies of scale, directly and indirectly enable inter-personal interaction (coexistence, communication, coordination, cooperation) on a wide basis and which map and underpin the relationships of their users in the World Wide Web” [Koch, 07]. One feature of social software is that it makes contributions and interactions permanently and universally visible [McAfee, 08]. Project, knowledge and innovation management in particular are important application areas for social software. The enhancement of the support available to group work within enterprises is also the guiding principle of the research in Computer-Supported-Collaborative-Work established in the 1980s and which has intensified its focus on research into social software in recent years.

But the focus of the Enterprise 2.0 concept is not merely on the technology (social software) aspect. Taking a lead from the Web 2.0 trend on the Internet, "Enterprise 2.0" is taken to mean the conscious dismantling of hierarchies and the decentralising of responsibilities. The people in the individual teams organise and

manage themselves while the administration acts more in the role of a chairman while also assuming responsibility for the management of networks. Enterprise 2.0 therefore takes on the role of an organisational paradigm, which encompasses the dimensions of people, organisation and technology [Bullinger, 98] of a company and which therefore may be deemed to be integral.

Numerous authors designate the improvement of knowledge management as a significant reason for the introduction of technological and organisational aspects of the Enterprise 2.0 concept [Back, 08; Schönefeld, 09]. From a technological perspective social software can help to underpin and map knowledge-intensive working processes, while organisational and cultural changes strengthen the willingness to share knowledge. The task presented to knowledge management lies in the targeted introduction and harmonisation of these measures. In the general discussion of the Enterprise 2.0 concept the authors noticed a lack of knowledge-oriented systematisation for Enterprise 2.0 activities. In order to close this research gap 'IDEA' was developed as a knowledge-focused management model, which acts as a *regulatory framework for knowledge management* in relation to Enterprise 2.0. This regulatory framework targets to serve as a basis for planning, deployment and review of Enterprise 2.0 activities and for the derivation of concrete enabling factors.

3 Development of a regulatory framework for knowledge management in Enterprise 2.0

The objective of business informatics is the development of models and methods for the organisation of socio-technical information systems. Researchers from TU Dresden[2] developed in collaboration with industry the *IDEA regulatory framework* for the analysis and organisation of knowledge management in Enterprise 2.0, with the framework being evaluated taking T-Systems MMS as an example. The guiding philosophy within this is the idea of participation, which Gruber et al. [Gruber, 04] regard as the central challenge for modern knowledge management and as the solution for the exchange of complex knowledge (e.g. expert knowledge). This regulatory framework consequently provides for a person-centric approach and the self-directed participation of employees [Koch, 08, p. 52].

A variety of knowledge management models can be found in the literature. Because of its simplicity and usefulness, the pragmatic knowledge management concept of Probst et al. is widely found in practice. However a rigorously one-dimensional objective-orientated definition of knowledge is not suitable for the treatment of complex knowledge, but this is what marks out many knowledge management models [Kumbruck, 03]. The SECI model [Nonaka, 97] appears apt for the transfer of expert knowledge, because it avoids perceiving knowledge as a timeless, placeless, objective, observer-neutral and stabile entity, but instead regards knowledge as the result of a social construction process. The practical usefulness of the SECI model is the subject of increased criticism, because the transformation

[2] Faculty of Business Management and Economics, Chair of Business Informatics, esp. Information Management.

notions of the tacit and explicit types of knowledge appear are questionable at best or even impossible [Schreyögg, 03, p 19].

The IDEA regulatory framework as developed is aligned towards working processes, which may have four characteristic moments (lat. momentum: movement, basis, influence): interaction, documentation, evolution and adoption. In this context these IDEA moments are not to be understood as sequentially performed part processes (e.g. as in the SECI model).

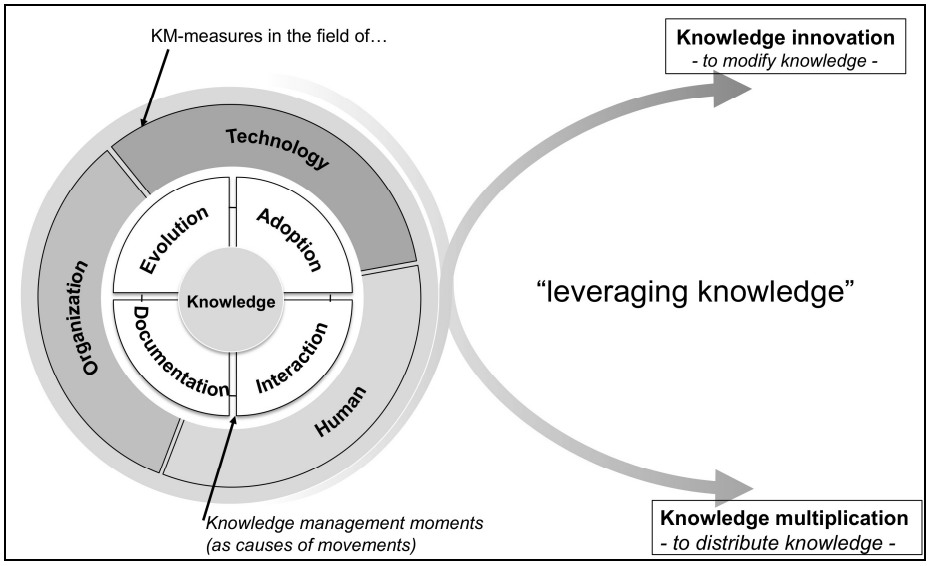

Figure 1: The IDEA knowledge management moments

3.1 Interaction

The interaction moment describes the degree of reciprocal referencing found in communicative processes. One thing of interest in this respect is the degree to which communicated messages are tailored to the specific context (situation) of the recipient. The range here extends from undirected communications (such as an entry in an anonymous database) right across to deliberate, regular communications within the terms of an intensive collaboration (e.g. work using interactive whiteboards and wiki systems). Interaction in this context enables contingency problems to be surmounted. Through a gradual approximation within the dialogue, it is possible to establish a link to the specific prior knowledge of the counterparty. Interactivity furthermore concerns motivational aspects of the knowledge process. Intensive interactions lead to the formation of a social relationship within the terms of which delight/fun will be experienced in relation to the interaction (enjoyment-based intrinsic motivation) and the feeling of reciprocal commitment arises (obligation-based intrinsic motivation) [Lindenberg, 01].

3.2 Documentation

The documentation moment encompasses the mapping and recording of results and sequences of working processes for subsequent processing. This can occur in an active or passive manner: *passive documentation* denotes the recording of working processes without additional knowledge work (e.g. video recording a meeting), whereas *active documentation* sees the (post) processing of the content (e.g. preparation of project documentation). Within this the act of formalisation and coding of the individual required for active documentation promote a better cognizance of knowledge. Cognitive content that previously had little structure has to be reflective upon and systemised in order for it to be documented. It should be noted that documentation only produces data that must first be perceived and correctly interpreted before actual knowledge can be constructed (cf. adoption).

3.3 Evolution

The evolution moment describes the extent to which the further development of existing content is permitted, encouraged and implemented organisationally. It is through exchange, interpretation and application that qualitative further development of knowledge can be performed within working processes. But the question of whether these changes are actually imported into the organisational knowledge base [Argyris, 99, p 28] largely depends on the ability to learn and willingness to change that exists within the organisation. Conceptually approximate to evolution is the Kaizen philosophy or the employee suggestion system. Within the evolution moment it must be determined what content is invariant for the organisation and what should be expressly developed further.

3.4 Adoption

The adoption moment relates to the individual-based (re-)construction of knowledge from data. The neglect of this moment in purely technologically-aligned approaches to knowledge management has led, inter alia, to the development of "dead knowledge databases" [Schütt, 03]. In such cases knowledge may well have been documented in the form of documentation, but is only infrequently called up or used due to the failure to take account of human cognition processes. For this reason the moment of adoption is of central importance for the optimisation of knowledge processes. The first step in adoption is the perception of relevant information. Only that information actually perceived by the individual will also be taken into consideration in relation to the (re-)construction of knowledge. It is particularly important that, in times of increasing abundance of data and information as a result of electronic processing and storage technologies, efficient methods of information selection are developed. The interpretation of the perceived information must subsequently be examined. Depending on the observer information is perceived and comprehended differently from an autopoietic perspective. Following the perception and interpretation the information incorporated into the mental structure of the individual can start to have an influence on his or her behaviour. It is only through the application and re-contextualisation that interlinking and solidification of the learner can take place.

This systemisation aligned to the structure of the SECI conversions forms a regulatory framework for the interventions of knowledge management. An analysis of

the knowledge-intensive working processes that takes account of the four IDEA moments can aid in:

- identifying possible knowledge problems,
- identifying potential optimization in order to initiate measures in the areas of technology, organisation and people and
- providing an inter-linked/integrated view of Enterprise 2.0 activities for knowledge transfer.

4 The transfer of knowledge in Enterprise 2.0

As outlined in the initial example, knowledge work concerns the effect of various "moments" and is underpinned by Enterprise 2.0 activities. General factors for success will now be posited; these enable specific knowledge management moments to be reinforced and balanced. Further social software applications are defined by the IDEA regulatory framework to serve as concrete support functions in Enterprise 2.0 (cf. Figure 2).

The success factor motivation of knowledge workers impacts all of the knowledge management moments. Social software concerns all four determinants of human behaviour [von Rosenstiel, 03, p 1 ff.] and can be deployed in a targeted fashion, in order, for example, to increase the motivation for the documentation of working processes and results in Enterprise 2.0. Knowledge and explicit information are extremely context-based, which makes them barely comprehensible to outsiders. It is therefore crucial that there be an understanding of which factors motivate knowledge workers to ensure conscientious documentation or intensive communication using social software. The behaviour of an individual is determined both by him or herself and his or her environment. The conditions for human behaviour can be structured within four determinants and can be influenced by social software:

- *Situative enablement:* The presence of (open) social software platforms creates the technical framework conditions for documenting content and to make it broadly available (e.g. an open Wiki or employee blog). Aside from this there must also be sufficient time for the preparation, documentation and exchange during the normal working day.
- *Social permissions and duties:* An official introduction of social software technologies can be interpreted by employees as an organisational "authorisation" ‘or "invitation" to publish content autonomously. But they could be obstructed by hidden social restrictions, for example if a shifting of information sovereignty is prevented due to micro-political interests. Alongside the mere fact of installing social software it is therefore also necessary to establish a consciousness that bridges hierarchical structures to the effect that the use and interaction with the social software platform is expressly desired.
- *Individual desire:* This describes everything that appears important and worthwhile to an individual (e.g. value orientations, motivation). Since documentation and communication with social software takes place in an open (virtual) space, other social software users function as an Auditorium‘

who communicate recognition, praise or criticism via their own contributions or comments. The social embedding of documentation processes therefore gives rise to "social feedback" [Hippner, 06, p 7], which has a decisive influence on motivation.

- *Personal ability:* It is an essential pre-condition that the individual possesses a certain personal knowledge advantage or lead (e.g. expert knowledge, experience) which is worthwhile to exchange or document. Furthermore the technical abilities in being able to handle the social software platform are also important. Social software should therefore be made user-friendly (software usability) through a focus on the fundamentally important communication and text processing functions.

4.1.1 Relationship and cooperation management

To this can be added social software platforms to support the relationship management of employees [Schmidt, 06, p 2]. By relationship management we mean the active linking and maintenance of contacts. The autonomous search for experts is simplified, because these can be identified and directly contacted by means of their contributions. With the assistance of social networking services employees can add other users to their own contact lists with the permanent possibility of establishing contact easily. Social software platforms also offer functions relating to co-operation management. For example joint content can be prepared in wikis by using the editing function and discussions conducted in that regard. Social software thereby socialises the content creation process and encourages the active participation of employees [Schönefeld, 09, p 83].

4.1.2 Cultivation of communities

New forms of working partnership are becoming increasingly established through changes in organisational structure and the understanding of employee roles in the Enterprise 2.0. The expansion of communities is one aspect that is particularly encouraged. Communities are denoted by a group of persons who share similar problems or passions in a particular area, and who want to enhance their knowledge and expertise in this area [Wenger, 02, p 4]. Special characteristics include dynamically changing (working) roles, the informal character of the communication as well as the distinctive "us-feeling" within the community. The emotional attachments formed on this basis can strengthen the willingness to exchange knowledge [Schön, 00, p 190]. In these context social software platforms of the communities can be used as a common depository for common material as well as for the opportunity to interact and communicate (e.g. subject wiki or subject groups in social networking sites). Affective aspects of communication are underpinned through the use of emoticons and avatar forms. Social software platforms thus establish a "virtual space", which facilitates the cultivation of geographically dispersed communities.

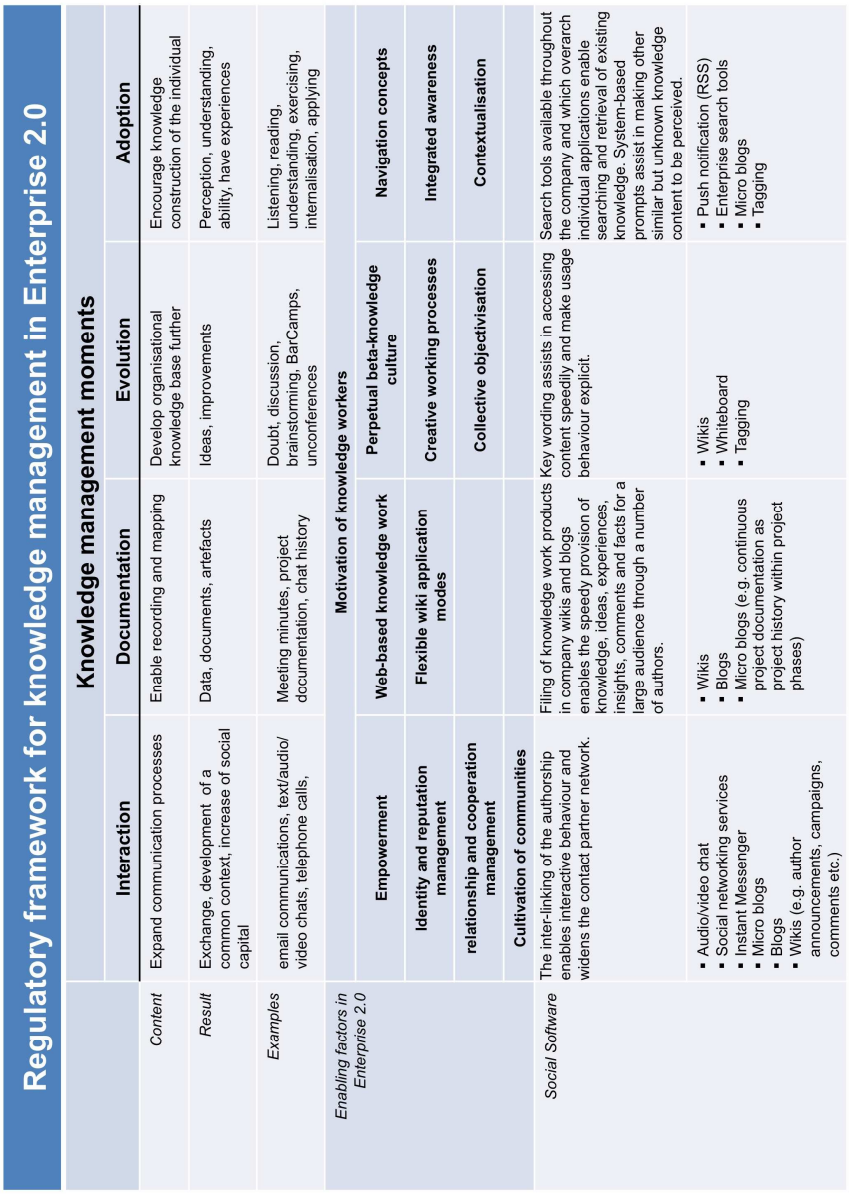

Figure 2: IDEA regulatory framework for knowledge management in Enterprise 2.0

4.2 Success factors - Documentation

An Enterprise 2.0 is denoted by the intensive use of social software. This can continuously support working processes, through which the form of the cooperation will be modified. The success factors web-based knowledge work and flexible wiki application modes can reinforce the documentation moment.

4.2.1 Web-based knowledge work

By shifting traditional working partnerships to web-based knowledge work content is no longer created and stored on a local workstation but can instead be deposited centrally and publically in the form of a wiki page. Discussions on particular issues are no longer conducted solely on a personal level or concealed in email communications, but can instead be carried on openly and directly on the wiki page by using the comment function (cf. Table 2).

Traditional forms of co-operation	**Web-based knowledge work in Enterprise 2.0**
Document-based creation and storage of content on local hard drives	Web-based creation and storage of content (in wiki or blog)
Provision of documents/content upon specific request; Dispatch of documents via email attachment	Content is generally publicly available; Content can be retrieved by any employee as required
Private discussions about contents of email	Publicly documented discussions directly about content by means of comment function

Table 2: Change in use of technology

For this purpose a large amount of Metadata such as author, time, version and key words is documented along with the actual content. It is not just the final results that are documented. The associated process of creation and change is also stored.

The increasing penetration of working processes by social software applications and the passage of time means that a comprehensive, operational knowledge archive is established in this way and which contains all the working results produced using social software including the associated communications. Even those employees who have left the company leave their own digital traces behind them. Social software thereby represents a solution method for documentation within companies, in which artefacts of operational processes are stored permanently and openly.

4.2.2 Flexible wiki application modes

Enterprise 2.0 facilitates flexible wiki application modes for the purpose of documentation (cf. Table 3). First and foremost it is the method and manner by which social software is deployed that has significant influence on the results of the

documentation. Given the stringent sub-specification it is possible to distinguish between two different application modes of wikis. The first possibility is to construct an operational-internal wiki-based article database along the lines of the Wikipedia internet-based encyclopaedia. Repeatedly required information (Frequently Asked Questions), established standard methods or summarised experiences from projects can be compiled in wiki and condensed. This wiki application mode, hereafter termed "encyclopaedic", is primarily directed towards the multiplication of knowledge by making existing answers and solutions available to a wide audience. This is conditional upon the content being generalised and abstracted as much as possible, in order to guarantee applicability in other situative contexts. To this end it is advantageous to have a repetitive formal structure in order to speedily acquire the content.

	Wiki application modes	
	"encyclopedic"	**"whiteboard"**
Use of the wiki as …	Encyclopedia / "knowledge" database	Virtual whiteboard / universal cooperation platform
Supported knowledge process (tendency)	Knowledge multiplication	Knowledge innovation
Type of documentation	Active preparation of the content, detached and downstreamed from working process	Passive "archiving‘ of the working processes (drafts, discussions) parallel to content creation
Purpose	Content with high rate of repeated use, e.g. FAQs, Lessons Learned, training materials	Support of collaborative, conceptual work, e.g. product development, project planning

Table 3: Comparison of the wiki application modes

But wikis can also be utilised in the form of a virtual “whiteboard”. The simple manner of operation combined with the possibility of commenting on and arbitrarily structuring content makes wikis ideal for documenting various conceptual working processes (e.g. brainstorming sessions, joint drafting of a meeting agenda). Unlike the encyclopaedic application mode, the creation and coding of knowledge is unified with documentation and is understood as a continuous process [Schönefeld, 09, p 136]. The whiteboard application mode for wikis presents the opportunity to minimise the effort required for the documentation of working processes by writing the content directly in the wiki. This approach does not treat documentation as a separate working process, but instead as a procedure to be conducted passively in parallel with the content creation.

4.3 Success factors - Evolution

The ability of a company to survive is not merely dependent on securing what it already has, but also on its ability to critically reflect on whether or not new solutions need to be initiated in order to accommodate changed situations. The success factors of perpetual beta-knowledge culture, creative working processes and collective objectivisation enable the organisational knowledge base to develop further and to underpin the evolution moment.

4.3.1 Perpetual beta-knowledge culture

The term "perpetual beta" has established itself in relation to the Web 2.0 movement. It describes the way that websites and software on the WWW undergo continuous improvement and are therefore in a constant state of development.

"Perpetual beta" is a term that originally had purely technological connotations, but it can now also be unleashed from its narrow interpretation and be allowed to be generally applied to the content of organizational knowledge bases. An organisational culture that chooses to regard content as being "perpetually beta", can assist in dismantling the possibly dysfunctional employee mental structures that underlie the content [Schneider, 96]. Beliefs and supposed "truths'" must be continually challenged and be exposed to revision. In this way knowledge does not take the form of a never-changing "object'" with an automatic claim to veracity, but instead is subjected to an ongoing process of reflection and continual development. This perpetual beta-knowledge culture at the same time finds itself accommodated by the technological functionalities of social software. Content published on social software platforms is not purported to be complete and conclusive, but is instead exposed to increment quantitative and qualitative development. The editing function in wiki pages generally enables all content to be modified and updated and the comment function means that all content can be discussed or put into question. The functional mechanisms of social software create a technical framework for ceaseless ongoing development - the evolution - of content.

4.3.2 Creative working processes

Understanding the peculiarities of creative processes is especially important in Enterprise 2.0 in order to establish the framework conditions for evolution.
Creative working processes are a fundamental component of problem solving processes. By "creativity" we mean the process of generating new ideas [Majaro, 93, p 6]. From the perspective of system theory, creativity is also regarded as system's own combination ability for building stable "structures" from random situations.

One feature of Enterprise 2.0 is that problems are not merely processed by individual people, but instead are increasingly being tackled by dynamic, interdisciplinary constellations. Co-operation processes are therefore not restricted to departments but take place in overarching networks. The confrontation of numerous opinions and perspectives with one another that this brings about - i.e. the deliberate manufacturing of opposing disturbances - is an important prerequisite for creativity. It is precisely the instability of these group thought patterns that is to encourage the development of new thought structures in the form of ideas.

In this context social software platforms can be strategically deployed to support the idea identification process as an element in problem solving. Wikis could be used, for example, to organise a virtual brainstorming with an indefinite time period and a non-restricted group of participants. The generated ideas can be directly evaluated, discussed and further developed in the wiki (ranking).

4.3.3 Collective objectivisation

Alongside the deliberate manufacturing of "disturbances", in order to generate conditions conducive to creativity, social software platforms can conversely be used to activate objectivising, harmonising mechanisms. “Objectivisation" for the purposes of this paper is not to be understood in the normative sense of identifying the truth, but rather as the establishment of consensus as an intersubjective process of convergence.

By using social bookmarking applications it is possible to achieve an objectivisation of relevance of content, for example. The bookmarking system takes all the individual bookmarks of all users to generate an aggregated overview of the content objects. The frequency with which content objects are mentioned reflects their relevance assessment and, in the form of a company-based social bookmarking system, can be used to filter out from the intranet all that content no longer used. A direct scoring function for content (rating system) can also be used for the objectivisation of individual appraisals through averaging.

Apart from the objectivisation of relevance, social software also supports the objectivisation of the semantics of content. Through the arrangement of the content creation into a participatory process a condensed representation is iteratively created on the wiki pages, and it amalgamates the various perspectives of the editors. The reasoning behind objectivisation is that the corresponding content can only remain in the wiki provided no other user has deemed it to be in need of revision.

4.4 Success factors - Adoption

The optimisation of documentation processes in knowledge management must not be understood as an end in itself, however. It is only through the perception and interpretation of documented content that data can be construed into the knowledge of an individual. In Enterprise 2.0 the social software can be deployed to improve both the perception through the success factors of navigation concepts and integrated awareness as well as interpretation through the success factor of the contextualisation of content. Together these underpin the knowledge management adoption moment.

4.4.1 Navigation concepts

It is characteristic for social software platforms to have a large number of available navigation paths by which to access stored content. A large number of supported navigation concepts enable content on social software platforms to be perceived in an individualised non-linear manner. The levels of navigational support are:

- *Browsing:* At this level the network structured content (hypertext/media) is discovered by following the hyperlinks. This approach is particularly suited to random "browsing about" [Kuhlen, 91] in the database (associative browsing).

- *Searching:* What is meant here is the targeted acquisition of content on a specific subject (cf. McAfee search), during which search algorithms examine the content of the social software platform for key words as a result of which content is identified when the corresponding key words are detected. The search results can usually be narrowed by inputting Metadata into a search filter (e.g. limiting the search to articles by a particular author or a particular publishing period).
- *Tag clouds:* social software platforms feature a high degree of collaborative forms of content retrieval. The aggregated presentation of the tags correlating to content in the form of a tag cloud can function as an additional access and navigation option. Navigation via tag clouds assists in the discovery of targeted knowledge content, in which a keyword can be selected and which is taken from the standard terminology of other users.

4.4.2 Integrated awareness

Social software can create an integrated awareness thereby optimising the coordination of co-operation. In order to avoid misunderstandings and problems of coordination and synchronisation in relation to collaborative work, it is necessary to establish transparency about the activities of the co-operation partner in the collaboration process. Group awareness [Prinz, 01, p 335] is information about other members within a network. There are four basic types of awareness that can be distinguished from one another:

- *Informal awareness:* Information about the actions and intentions of others,
- *Social awareness:* Information about the emotional state of others,
- *Awareness about the group structure*: Information about the roles and responsibilities within the group,
- *Awareness about the work area:* Information about the interaction effects of users who share the same work area.

Micro blogging services are particularly useful in establishing informal and social awareness [cf. also Böhringer, 09], Information that would normally find no input via formal communication channels can be communicated in a low-key manner by means of brief postings in the form of status reports (e.g.: "Am extremely stressed right now".). One special feature of social software is that, alongside the content, the name and profile image of the content author is stored as meta data. This information can be used to encourage awareness of the group structure by providing an overview of what user has contributed to particular issues. Edit overviews in wikis encourage awareness of the work area by displaying an aggregate form of recent activities (edits, comments) within a specific timeframe. By subscribing to selected pages (e.g. via RSS feeds) awareness of the work area can be generated. Employees in this way can observe specific changes made to content over a longer period of time.

4.4.3 Contextualisation

Knowledge acquisition concerns an autopoietic process relating to the construction of knowledge. The interpretation, and consequently the understanding of content by the

individual, cannot be directly controlled. One important contingency factor in relation to interpretation is the individual specific knowledge concerning the context of content. The availability of automatically stored Metadata such as author, time stamp, tags, comments and change history can aid the user in the interpretation of content (cf. Table 4).

Meta data item	Aid to interpretation
Author(s)	Who is working on subject XYZ? (Awareness of group structure)
Time stamp	How current is subject XYZ?
Tags	Under what subject can the content be categorised? What alternative labels are there?
Content	What is being currently discussed? What has already been discussed?
Change history	What conceptual steps have already been taken?

Table 4: Metadata as an aid to interpretation

Social software consequently serves to fill in contextual gaps and can aid the interpretation of content. At the same time, however, a greater degree of personal responsibility is required of the user in relation to the adoption of content.

5 Summary and outlook

This paper shows the convergence of knowledge management and Enterprise 2.0 to discribe the necessarity of collaboration management in a more knowledge-orientated manner and to avoid considering the issues of knowledge management and Enterprise 2.0 independently from one another. One aspect of the focus here is on the person-centric approach while the other is on the self-directed participation of employees. Both approaches are amalgamated under the concept of participation, which is understood as a pre-requisite for the exchange of complex knowledge, such as expert knowledge.

The IDEA regulatory framework was developed to identify and balance out various knowledge management moments (interaction, documentation, evolution, adoption) across the working processes of the knowledge worker. The IDEA additionally provides a list of recommendations for knowledge management interventions. An analysis of the knowledge-intensive working processes that takes account of the four IDEA moments can aid in the identification of the causes of possible knowledge problems, to detect potential optimization in order to initiate measures in the areas of technology, organisation and people. Furthermore the regulatory framework can provide assistance to employees in understanding aspects of knowledge management and social software as being interlinked, so as to deliberately push for the exchange of knowledge even as early as during the creation process of the actual content itself.

The regulatory framework is currently being used as the basis for a survey within MMS designed to evaluate the characteristics and intensity of specific knowledge moments. The object of the empirical study is to derive measures for Enterprise 2.0 and to achieve a balance between specific knowledge moments, i.e. between documentation and interaction and between evolution and adoption.

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