

Research on the management pattern for fragmentation knowledge in organizations under the Web 2.0 environment

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Abstract

Fragmentation of knowledge in organizations has become more evident in the Web 2.0 environment. At the same time, key Web 2.0 applications such as microblogs, Really Simple Syndication feeds (RSS) and wikis provide effective technical support for management of knowledge fragmentation through efficiently helping communication and interaction between organizations' employees. Management of knowledge fragmentation in organizations in the Web 2.0 environment aims to convert fragmented knowledge into effective knowledge within the organization. This is achieved through identification, collection, mining, extraction, dissemination and sharing knowledge, taking advantage of Web 2.0 technologies.

Keywords: Web 2.0, fragmentation knowledge, knowledge management, knowledge systematics, knowledge migration

1 Introduction

Web 2.0 put great emphasis on user participation and interaction: this result in an outstanding richness and diversity of content, but also in massive amounts of fragmented knowledge. Fragmentary and unmethodical knowledge acquisition has then become increasingly important and knowledge management within organizations is consequently expected to change. However, Web 2.0 tools have also showed potential for knowledge management, introducing ideas for resolving management problems dealing with organization of fragmented knowledge in organizations, creating brand-new network platform and environments for managing, sharing, applying and innovating knowledge

2 Influence of Web 2.0 over knowledge management

2.1 KNOWLEDGE IN THE WEB 2.0 ENVIRONMENT PRESENTS FRAGMENTED CHARACTERISTICS

The communication in the Web 2.0 is based on micro content, which refers to any information unit produced by any Internet user at any time. Examples of micro contents are Weibo posts, blog posts or article comments. Organizations therefore need to convert massive amount of micro contents into useful fragmented knowledge by its recognition, collection, excavation and extraction.

Generally, knowledge within the organization is mainly achieved by a fixed framework, including planned and organized internal accumulation and creation, as well as external absorption and transfer. According to the *Long Tail Theory*, this part of systematic knowledge can be considered 20% of key and core content. In the

environment of Web 2.0, the Internet has become an indispensable source, and microblogs, wikis and social network apps have also become important tools for knowledge acquisition. As result, the knowledge itself is intermittent and fragmented when acquired by organizations. This part of knowledge accounts for the 80% of the long tail part that is easily neglected. However, if organizations could systematically sort and arrange fragmented knowledge under a framework of knowledge management, it would certainly result in a better use of these resources

2.2 CHARACTERISTICS OF FRAGMENTED KNOWLEDGE MANAGEMENT IN THE WEB 2.0 ENVIRONMENT

Compared to traditional systematic knowledge management, fragmented knowledge management in the Web 2.0 environment is distinctive in:

1) Making use of the specific Web 2.0 technology and tools. Fragmented knowledge itself derived from the Internet and increased considerably under the Web 2.0 environment. Compared to the complete, collective and well-organized systematic knowledge, management of fragmented knowledge appears more difficult because of its dispersion, diversity and casual. Meanwhile, various specific tools on Web 2.0 platform such as blogs, microblogs, RSS feeds, tags, SNSs, wikis make it technically possible for fragmented knowledge to be recognized, collected, extracted, shared, used and innovated.

2) Going through a systematic procedure for the sake of value enhancement. If fragmented knowledge is kept in a fragmented format, ownership of it will merely be

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ownership, whereas high-valued core knowledge needs accumulation, classification and integration. This will create knowledge that is organic, systematic and easy to internalize starting from fragmented knowledge.

3) Emphasizing the effort of subjective initiative. Fragmented knowledge comes from very different channels, the selection of which guarantees the knowledge quality; massive amounts of fragmented knowledge are accessed as related to employees needs in regards of the organization. In other words, “discoverability” and “availability” depend on personal judgment. Moreover, further integration, systematization and creation of fragmented knowledge via mutual following, communication and sharing cannot simply rely on technical means. Employees’ professional and social experience, as well as their subjective initiative, can add value to this information

2.3 TOOLS OF FRAGMENTED KNOWLEDGE MANAGEMENT IN THE WEB 2.0 ENVIRONMENT

The shaped core applications of Web 2.0 mainly cover blogs, microblogs, really simple syndication (RSS) feeds, Tags, social network services (SNSs), wikis and instant messaging (IM), all of which take advantage form user participation and provide a technical platform for management of fragmented knowledge. A brief introduction to each of them follows below:

1) Blogs.

Blogs are a platform where user can create personal presentation and communication to record daily life, post feeling and experiences, express personal ideas, get feedback and communicate with others. The content is mainly text-oriented and usually combined with images and videos that displays in chronological order. In addition to personal dairies, many bloggers provide news or comments on specific topics according to their focusing areas. These blogs are often theme-connected, but relatively dispersed, and the contents are not always strictly related to the theme. Therefore, blogs are not tightly connected to each other but stay integrated by label classification, displaying average fragmentation. Blog has realized free personal expression, and advocated the mutual sharing and innovation of information and knowledge, making it possible for readers to communicate by comments, capture and collect dispersed knowledge by reproduction and mutual following.

2) Microblogs.

Microblogs are broadcasting social networking platforms for sharing brief real-time messages. They offer short and fragmented contents; fast information releasing and communicating speed, and work on multiple platforms such as MT browsers and desktops. Microblogs are followed according to the users' field of interest. Their brief and real-time updates make microblogs a high fragmentation knowledge tool. The interaction of reproduction, sharing and commenting emphasize more on

timely content delivery and microblogs information releasing features are more prominent than their content management capability.

3) RSS feeds.

RSS feeds; based on Extensive Markup Language - (XML), aim to share news and other network data. IRSS feeds are a format that describe and synchronize website content. With the help of aggregation tools and software that support RSS, users are able to acquire website information by client terminal without logging in the respective websites. RSS possess particular “aggregation” features that collect and integrate information from multiple sources, assuring that the information is timely delivered and availability. According to users’ personalized requirements, RSS can automatically and in real time browse the content of specific websites, selecting and filtering information and directly pushing the latest data to the users. This completely blocks popup ads and undesired contents, increasing the efficiency for users in acquiring fragmented knowledge coming from dispersed resources. In addition, standard and simple applications make it easier for everyone to learn how deliver own knowledge resources to others via RSS and to share resources.

4) Tags.

Tags are keyword markers. They share features with both “keywords” and “categories”, but they are different from both. One information resources are labeled to belong to certain “categories” before releasing it and “keywords” reflects the covered in the content. Tags are users' markers representing subjective understanding and there is no restriction to the number of tags per resource; tags can categorize content and help to quickly and precisely find it across different sources that share common tags. Tags are a typical representation of fragmented contents generated by individuals that can be semantically aggregated. Its significance not only lies in personal understanding, but also in their sharing and unique “aggregating” characteristics. By integrating fragmented knowledge from similarly tagged content, tags increase correlation, systematization and influencing power of fragmented knowledge.

5) SNSs.

SNS refers to Internet application services theoretically based upon the *Six Degree of Separation* principle and aim at helping people in establish a social network. Thanks to SNSs applications, users can extend relations easily and conveniently excavate potential interpersonal relationship networks and manage networking resources in a more scientific fashion. Besides, through such distributed networking applications, users with similar interests and experiences can easily get together. SNSs have great potential in spreading, sharing and creating fragmented knowledge as well as in systematizing it.

6) Wikis.

Wikis are a social writing tools that are based on multiple participates and their collaboration. In an open wiki website, users can create contents, maintain and

update content created by other and discuss improvements on common topics. Wikis are a typical expression of creativity and interactivity of Web 2.0, where a collective effort results in wide and fast knowledge integration. Wiki topics are generally definite. Contents regarding similar topics are highly correlated, representing strict and authoritative knowledge integration. Users focusing on the same topic form a self-organized community, which use communications tools provided by the wiki to share knowledge and shape an effective knowledge-sharing system. The accumulations collective knowledge continuously enriches the knowledge base: through such classification and reorganization process, fragmented knowledge can gradually be developed into an integrated knowledge system.

7) IM.

IM is a real-time instant messaging communication services. Users can contact and carry out real-time communication by means of text, voice, and video and file sharing. IM can be regarded as an effective communication platform that save time and costs for both parties involved. The main purpose of IM is to serve as a high-efficient communicating tool for strengthening knowledge interactivity.

After analysing blogs, microblogs, RSS feeds, tags, SNSs, wikis and IM, the 7 main application tools of Web 2.0, the influences of these technologies on management of fragmented knowledge is summarized in Table 1.

TABLE 1 Support of Web 2.0 technology to the management of fragmented knowledge

Web 2.0 Technology Process of Knowledge Management	B log	Microblogs	RSS feeds	Tags	SNSs	Wikis	IM
Recognition and Collection	○	○	●		○	○	○
Excavation and Extraction	○		●	●		●	
Spreading and Sharing	●	●	○	○	●	●	●
Utility and Innovation	○	○			●	○	

3 Management frameworks and system for fragmented knowledge in Web 2.0 environment

3.1 EXTERNALIZATION PROCESS OF IMPLICIT FRAGMENTED KNOWLEDGE IN WEB 2.0 ENVIRONMENT

According to a survey of the consultant firm Delphi Group, 42% of the public knowledge accounts for implicit common knowledge in employee’s minds. Fragmented knowledge is also divided into explicit fragmented knowledge and implicit fragmented knowledge. In the network environment of Web 2.0, fragmentation of external sources and users’ fragmented reading and thinking habits contribute to users' implicit knowledge. While explicit fragmented knowledge comes from the users' interaction with the information source, implicit fragmented knowledge mostly derives from users only.

Implicit fragmented information comes from accumulated experience and transferred information, as well as from various dispersed channels on the Internet. Through self-excavation and the use of specific Web 2.0 tools, implicit fragmented knowledge is represented by transferring and sharing with the purpose of interpersonal communication and interaction, and it is successively converted into explicit fragmented knowledge. As is shown in Figure 1: as possible and include the country. If the authors are at different addresses, numbered superscripts should be used after each surname to reference an author to his/her address. The numbered superscripts should *not* be inserted using Word’s footnote command. Ensure that any numbered superscripts used to link author names and addresses start at 1 and continue on to the number of affiliations. Do not add any footnotes until all the author names are linked to the addresses. For example, to format

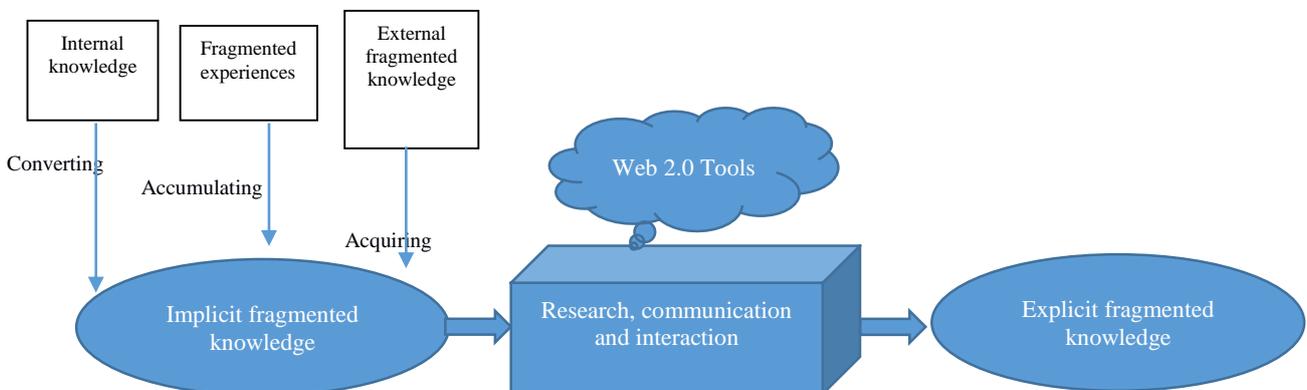


FIGURE 1 Externalization Process of Implicit Fragmented Knowledge in the Web 2.0 Environment

The research, communication and interaction in the externalization process perfectly express the advantages of Web 2.0, which is open, convenient and social-focused. Blogs, microblogs, RSS feeds, tags, SNSs, wikis and IM, all have a positive effect on the knowledge externalization in different degrees, make Web 2.0 not only a framework for implicit fragmented knowledge, but also an efficient platform for the externalization.

3.2 MANAGEMENT MODEL OF FRAGMENTED KNOWLEDGE IN THE WEB 2.0 ENVIRONMENT

Based on the Web 2.0 applications mentioned above, the proposed fragmented knowledge management model for in the Web 2.0 environment needs to carry out recognition, collection, excavation and extraction, spreading, sharing, use and innovation on the fragmented knowledge. As knowledge management is continuously improving, systematization of fragmented knowledge will gradually be accomplished and will become an efficient knowledge composition for the organization (Figure 2):

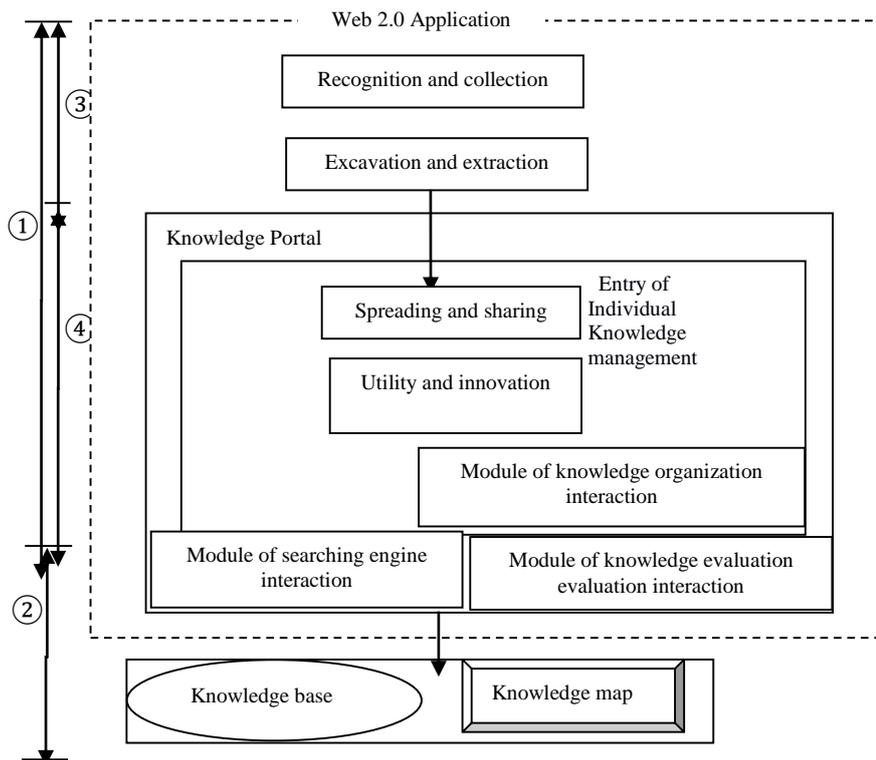


FIGURE 2 Management Model of Fragmented Knowledge in Web 2.0 Environment

(Note: ①Systematization process of fragmented knowledge; ②Knowledge Transference; ③Individual systematization; ④Organization systematization)

3.2.1 Systematization Process of Fragmented Knowledge

To achieve effective management, fragmented knowledge needs to be sorted into systematic knowledge first. Fragmentation is relative under the framework of knowledge goal and system.

Fragmented knowledge can also be efficiently classified and integrated, and, by interpersonal communication, it can finally be systematized. The process of systematization is never separated from improving knowledge management and it is eventually realized with the help of Web 2.0 technologies.

1) Recognition and Collection.

Knowledge acquisition is the first stage of fragmented knowledge management. In the Web 2.0 environment, sources of fragmented knowledge are wide and dispersed,

so it is necessary to set a clear goal before-hand: recognize knowledge discover ability and availability for the organization; and, in order to collect appropriate fragmented information, look for proper channels according to personal judgment. Because of the goal-oriented knowledge acquisition and recognition of knowledge channels, collected fragmented knowledge has been initially filtered and it is relatively highly cohesive compared to blind acquisition. The approaches of knowledge collection and tool selection are a matter of user preference and Internet habits. Web 2.0 tools for collecting fragmented knowledge are mainly blogs, microblogs, RSS feeds, tags, SNSs, wikis.

2) Excavation and Extraction.

After being recognized and collected, fragmented knowledge needs to be excavated and extracted, which

refer to further selection, classification, organizing and systematical arrangement for the sake of future management and creation of individual sets. Web 2.0 excavation tools excavation and extraction are generally RSS feeds, tags, wikis and Blogs. Compared to traditional extraction methods for fragmented knowledge, Web 2.0 tools better represents employees' active and conscious personal understandings. In addition to that, these methods are easy to operate and able to achieve fast organization and storage of personal fragmented knowledge. Fragmented knowledge formed at this stage is actually a deep systematization of employees' individual fragmented knowledge, which lays the foundation for the organization systematization in the next stage.

3) Spreading and Sharing.

For employees themselves, the excavated and extracted fragmented knowledge has formed a systematized structure, but from the point of view of the organization, the systematization still needs further improvement. Improvement and integration are carried out by open spreading, sharing, utility and innovation. However, the openness is relative and emphasizes on the knowledge management platform, taking relevant topics as links and finally integrating the individual employees' fragmented knowledge into an organization system that relates to all knowledge topics. Blogs, microblogs, RSS feeds, tags, SNSs, wikis are all social-interaction enabled. The internal knowledge management platform can integrate these elements by weakening their entertainment nature and strengthening classification, communication and sharing features.

4) Utility and Innovation.

The organization systematization of fragmented knowledge is basically finished, but utility and innovation pay more attention to application of knowledge. By comparing ideas with other staff members and through practice, the employee should generate new knowledge and constantly deepen the value of knowledge under the original knowledge system and organization structure. On wiki-base management platform, whose features of joint writing and mutual collaboration have provided new ways and ideas for the innovation of knowledge; blogs and microblogs have enhanced the social aspect of personal knowledge innovation; through relationship aggregation, SNSs has innovated and added value to knowledge with continuous enhancement and expansion of internal relationships.

3.2.2 Knowledge transfer

Individual systematization and organization system of fragmented knowledge are actually need to be converted and transferred from the external fragmented status to an internal one, for both clarifying the transferred knowledge and for knowledge sharing. Apart from that, knowledge transfer also contains a knowledge absorption stage, which focuses on converting the knowledge into understandable and valuable knowledge for the organization and

integrates it into the knowledge base, improving the level of knowledge management.

As the foundation of the whole knowledge management platform, the knowledge base must ensure the effective store of fragmented knowledge after integration, so a poly type knowledge base is adopted for distributed. A knowledge map helps users not only leading them to the needed information points quickly, but also reveals the distribution of related resources and the dynamic connections between different knowledge units. The knowledge map can also establish relationships between knowledge and users, emphasizing users' subjective initiative in the processes of systematization and transference; it can return to the related knowledge sources and provide communication means of the knowledge providers while finding the searching knowledge. In this way, the implicit value of knowledge can be further excavated and knowledge innovation realized.

3.2.3 Knowledge portal

The Knowledge portal is set up on the basis of Web 2.0 technologies. It provides an effective technological support for employees' fragmented knowledge systematization and for knowledge transfer. It also serves as a platform for knowledge communication and sharing, and it plays the knowledge value of the organization to the full; it has also dynamically combines organization knowledge management and individual knowledge management and offers employees the entry of individual knowledge management. During the process of individual systematization, all Web 2.0 tools described above have been applied; in contrast, systematization of the organization, including knowledge transfer, depended mainly on technological functions provided by the modules of social interaction knowledge organization, search engines and information evaluation.

1) Social Interaction module.

This module introduces social interaction technologies of Web 2.0 to the knowledge management platform, establishing and organizing social interaction and weakening its entertainment nature, while strengthening the functions of communicating and sharing. Taking blogs and microblogs as examples, the social interaction module sets up an internal function platform similar to light blogs to take advantage of classification and expression of blogs and the tendency to social-interaction of microblogs. Employees can release their fragmented knowledge collected and extracted from all channels by one-key forward and turn it into knowledge beneficial to the organization and combined with their own understandings; other employees acquire information by quotation, tracing, RSS feeds subscription and tags, and via communication with each other by comments. An internal wiki platform is also open to users to generate content and share knowledge. The knowledge portal works therefore as a platform for the

employees to interact and exchange ideas and information while acting as a main driving force.

2) Knowledge Organization module.

Employees tend to organize their fragmented knowledge using personal comprehension and knowledge collected from other employees. Information can be therefore duplicated. The entire content must be centrally organized and put under related tags and topics to be more distinct and specific. The knowledge organization module aims to solidify the knowledge structure of the organization, and can adopt tags for filtering redundancy and to raising the information quality. It can also connect the contents of internal wiki and light blog platforms by self-organization, and it gathers content repeated or related to the same topic, in order to revise and optimize inter-connection of keywords.

3) Search Engine Module.

The search engine module aims at providing a convenient tool for employee to classify and search the knowledge on the management platform. It also serves as navigation and a unified entry. This optimized search engine should be optimized so that it relates topics to its parameters and classifies knowledge and information of various characteristics by vectoring data analysis. Besides, measurement can also be used for quantitative statistics of knowledge searching, following and using, to provide references for different weights of different topics and determining the relevance order of returning results.

4) Knowledge Evaluation module.

The main functions of this module are to supervise and evaluate the knowledge and contents contributed by employees. This is achieved by statistical analysis on knowledge and adding tags, categorizing and organizing

confirm the relevance of contents. This aims to guarantee knowledge quality and provide evidences for the returning relevance order and knowledge recommendation. Moreover, the knowledge evaluation module can offer support for evaluation of employees' individual contributions. It provides an organization measuring standard for encouraging users to take part in the knowledge management.

4 Conclusions

Fragmentation of information, very present in the Web 2.0 environment and affecting organizations, requires a breakthrough in information management. After analyzing the relationship between fragmented knowledge management and the seven main Web 2.0 applications, namely blogs, microblogs, RSS feeds, tags, SNSs, wikis, we propose a model for externalization and management of implicit fragmented knowledge in the Web 2.0 environment: specific Web 2.0 tools can promote the externalization of implicit fragmented knowledge by improving interpersonal communications and interactions. The management model of fragmented knowledge in the Web 2.0 environment is a gradual systematization process, converting fragmented knowledge into structured information useful to the organization. This result in a significant improvement of knowledge management through recognition and collection, excavation and extraction, spreading and sharing and utility and innovation of fragmented knowledge using basic Web 2.0 technologies.

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