KM2.0: Business Knowledge Sharing in the Web 2.0 Age

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Abstract

This paper is intended to discuss the impact of Web 2.0 on knowledge management (KM) and the future orientation of KM. These days, the term KM is used rather less than hitherto. However, as Web 2.0 has made its debut and user participation-type culture has expanded, the new concept of "collective intelligence" has been attracting attention. Opinions are currently being advanced with regard to the concept and process of KM and the system architecture that can be used to implement it. This paper also deals with the issue of knowledge provision, a traditional issue of KM, and introduces a KM model in the context of the Web 2.0 age that can expand collective intelligence in a positive spiral by closely linking it to knowledge extraction from various communication tools and job systems.

1. Introduction

In his paper "What is Web 2.0"[1], which was announced in September 2005 and is currently attracting wide attention, Tim O'Reilly proposed the concept of Web 2.0. This concept is also exerting an important impact on the field of knowledge management (KM). The concept of KM became popular in early 1990's, and many experts in business management made a large number of proposals in the domain of corporate education and knowledge creation and many managers and employees who were in sympathy with the concept conducted attempts in the field. Subsequently, the term KM became rather less popular as the 21st century began but the expansion of a user-participation type culture stimulated by Web 2.0 has brought the new concept of "Collective intelligence" to the forefront of public attention. Currently, evaluation of the concept and process of KM and the system architecture for its implementation is advancing from the viewpoint of Collective intelligence. This paper discusses the impact of Web 2.0 from the viewpoint of KM and the likely future orientation of KM.

2. The Impact of Web 2.0 on Corporate Information Systems

According to O'Reilly[1], the World Wide Web is entering a new stage. He arranged the essential features of the new stage into seven components calling them Web 2.0. One of these factors is "Harnessing collective intelligence," which implies that, when a large number of users participate, the collection of their judgments and knowledge can significantly increase the overall value of knowledge (collective intelligence).

In a more recent paper[2], Musser and O'Reilly pointed out that Web 2.0 has caused innovative changes in software development and service operation techniques and that this has made it important to establish a growth strategy involving customers. McAfee[3] of MIT, who proposed the concept of Enterprise 2.0 and the introduction of Web 2.0 technologies for enterprises, emphasized that the form of communications which has previously been inclined to E-mail should be diversified by using new communication tools in order to improve the quality of the knowledge thus distributed and accumulated.

As seen in the above, the installation of various communication tools and the assurance of job system extendibility are important factors in the introduction of Web 2.0 to corporate information systems. Moreover, from the viewpoint of KM, it should also be recognized that the technologies and case histories discussed in the "Harnessing of collective intelligence" suggest that a new orientation is beginning to affect KM.

3. Traditional KM and Its Issues

A typical example of traditional KM is the SECI model[4]. With this model, the knowledge, experience and know-how

that already exists in the brain but is difficult to turn into language (implicit knowledge) is rewritten into a form that can be shared by third parties (formal knowledge). Such formal intelligence can then be utilized by third parties to create new opportunities by combining its components and thus inherit it as their tacit intelligence. Examples of formal intelligence include user complaint information, system development know-how and order history. The technologies required for these differ from those used in storage or in a database search, which are sets of data with traditional uniform data structures. As a result, the management, classification and accurate searching of contents including actual case histories and acquired know-how have become important key technologies.

This mechanism began smoothly because KM had become a conventional wisdom, but it has gradually become clear that one of the issues for continuing KM activities is to maintain the corporate culture, corporate climate and the motivation of the employees to provide their knowledge. For example, the motivation among employees is difficult to retain if their contributions to knowledge provision are not reflected in their assessments or if the knowledge provision work is considered to be excessive and quite different from their usual tasks. Also, if the adding and updating of high-quality knowledge is not well-timed, the number of employees using the KM system will reduce, thus exerting a negative impact on their support for knowledge provision and thus producing a negative spiral.

4. Solutions for Knowledge Provision Issues

A potential solution for solving the issues related to knowledge provision for KM is to place the knowledge extraction from the systems used in routine jobs, such as job systems and communication tools, as the core.

4.1 Knowledge Extraction from Job Systems

The number of cases has increased in which knowledge is extracted from the information produced by jobs using job applications such as personnel affairs systems and schedule management systems as well as the formal knowledge that is created intentionally by the employees. For example, the log information of information leak-prevention software can become one of the sources of knowledge extraction. InfoCase[5] is software that tracks the in-house distribution and duplication of important files such as customer information files. It records the entire life time data of document files from its generation to intermediate editing, generation of files duplicating part or

whole of it, distribution using the file attaching function of E-mail and deletion as log data. The log can be utilized as data for identifying the present status of in-house information sharing in real time. For example, the log data can show at a glance to whom and in which department a part or the whole of a Web 2.0-related survey report created by an employee in a department was distributed by means of E-mail or file sharing. This can also be regarded as knowledge indicating any adverse distribution situation of knowledge in-house.

4.2 Knowledge Extraction from Communication Tools

The majority of in-house communications using electronic media are carried by E-mail. Like the telephone the E-mail features advantages in its flexibility and convenience, but its disadvantages have also been pointed out; such as the harmful effects of excessive use, inefficiency in certain jobs and security problems[3]. One of the representative new communication tools that are expected to replace part of the applications of E-mail is the blog, which is a kind of diary made public by an individual. The SNS (Social Networking Site) is a community type website established in order to enable the participants to expand their group of friends by introducing them to each other or inviting new friends. These tools are expected as mechanisms to support simple creation/sharing of contents and communications information or mechanisms for visualizing the group identities.

Fig. 1 shows the model of knowledge extraction from systems used in routine jobs as discussed above. The information produced in the operations of routine job applications is accumulated as log data or as a corporate database. When a mechanism for analyzing the data is installed in order to extract information and knowledge from the data, it is possible to create new applications utilizing the extracted information/knowl-
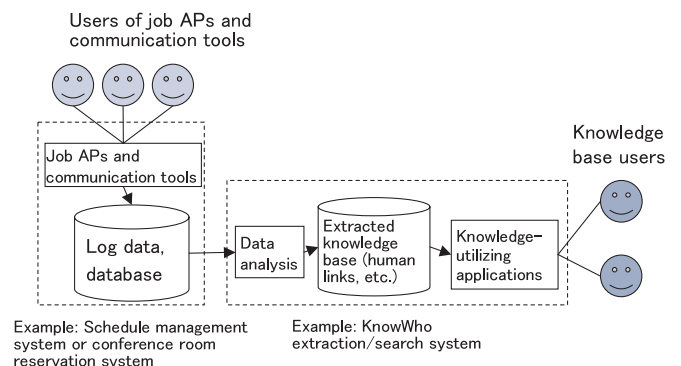

Fig. 1　Model of knowledge extraction from systems used in routine jobs.

edge. Such a KM system features a low burden with regard to knowledge provision for the employees because they can unconsciously provide knowledge and its sources by using job applications and communications tools for jobs that were originally their own.

5. Model of KM 2.0

In this paper, we called the KM introducing the concept of Web 2.0 as KM 2.0 in distinction from the traditional KM. KM 2.0 can be defined as "a model that places collective intelligence at its core and promotes its use by accelerating the distribution of information." Here, the collective intelligence refers to the set of all digital information that is stored in an organization and disclosed by it, including the communication information accumulated in the in-house blogs and SNSs, the logs and data of the web contents, knowledge databases and job applications, the knowledge extracted from the above, and the multimedia information disclosed inside the organization (e.g. lectures in seminars and records of skilled techniques).

Fig. 2 shows the model of KM 2.0. The right half of the figure includes the section for knowledge extraction from the job systems, and the left half shows the newly added communication information sources. The target of KM 2.0 lies in the mutual reference and utilization of these two kinds of knowledge sources to provide a collective intelligence effect that is rather more than a simple aggregation of their content. The process of construction of collective intelligence can be divided into the four steps of "disclosure," "linking," "selection" and "evaluation." (See **Fig. 3**)

"Disclosure" means opening the information sources obtained from individual communications and the knowledge source obtained from job systems to users within the organization. An example of the information sources obtained from
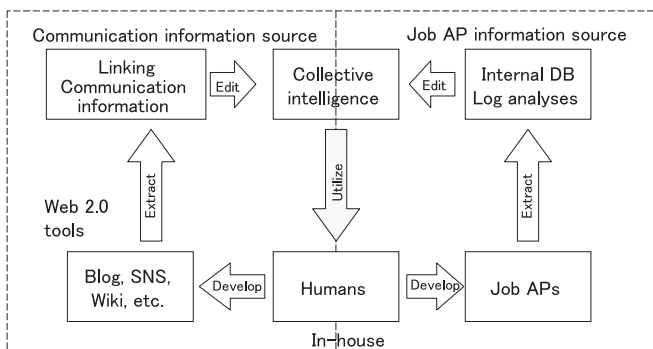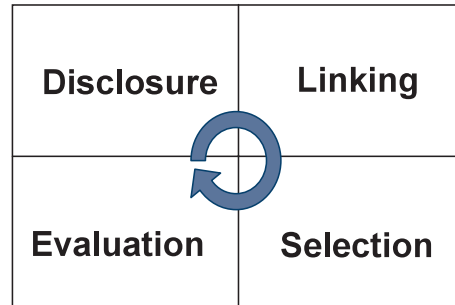

Fig. 3 Steps of collective intelligence building.

communications is the blogs that are created by individual employees who disclose the information they obtained through daily activities such as job reports, job results, what they noticed and their opinions. An example of the knowledge sources obtained from job systems is the disclosure of collective intelligence type information extracted from the log data and databases for job systems so that it can be accessed from inside the organization.

"Linking" can enhance the linkage between disclosed information and knowledge sources based on various actions including quoting by participants, linkage of reference information and addition of comments. "Selection" refers to the determination of the importance of each item of information by quantizing the linked information added to the information and knowledge sources using certain indices to compute the value of each information or knowledge source indirectly. It also enhances the contents of information and knowledge sources that reflect the feelings of participants as required. Finally, "evaluation" means assessment of the values of the selected information and knowledge sources by ranking/grouping them according to necessity and purposes and presenting the results to general participants. It also consists of systematic arrangement of the information and knowledge sources by reflecting the feelings of participants. When the systematized information and knowledge resources operate as pointers for the addition of new information and knowledge by participants, the next "disclosure" step will be triggered.

Now let us examine an example of KM 2.0 architecture. As shown in **Fig. 4**, the information obtained through the communications of participants can be developed and disclosed through ordinary blogs and SNSs; procedures that are currently available. On the other hand, for the knowledge sources to be extracted from existing job applications, it is required to develop a new mechanism for disclosing them within the organization. In this mechanism, each information source should be registered in a disclosure registration directory together
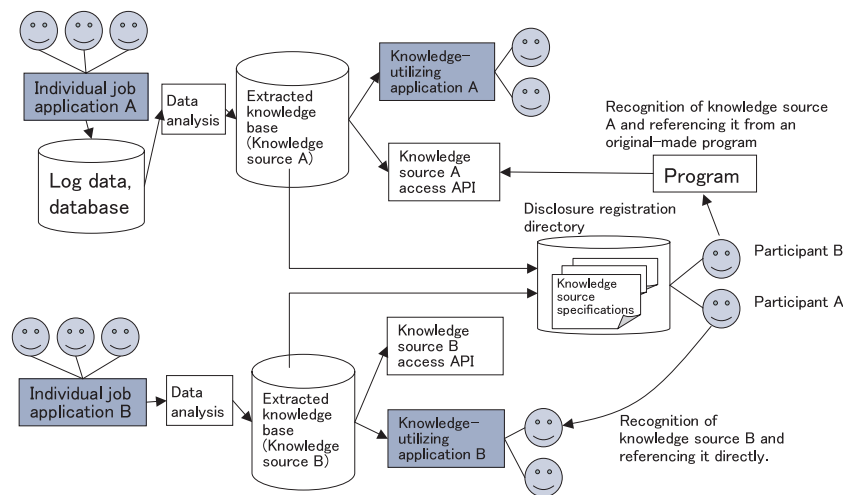

Fig. 2 Model of KM 2.0.

Fig. 4 Knowledge source disclosure architecture.

with the definitions of its syntax and semantics, the names and specifications of the API for accessing it, the frequency of its revisions and the range in which it can be used. The participants can browse this directory, can know what kinds of information sources have been extracted from job applications that the organization owns, and can reference them directly (e.g. Participant A) or load them into the programs created by participants for data processing (e.g. Participant B).

With the knowledge sources obtained from the communication information, the inter-content referencing function and the collaborated editing mechanism incorporated in the communication tools such as the blogs and SNSs can be used as they are.

On the other hand, the knowledge sources extracted from job applications are required to be equivalent to the knowledge resources obtained from the communication information. In order to achieve this, it is necessary to provide functions such as the linkage, track-back and push-type auto distribution RSS functions that the blog incorporates to the knowledge sources extracted from the job applications. For example, assuming that the log data of the schedule management system is automatically analyzed every week and the know-who knowledge source obtained from it is automatically disclosed inside the corporation and if an employee writes comments about the results of the use of the know-who knowledge source in a blog; the link to the know-who knowledge source is then inserted in the blog. This link is automatically turned into a mutual reference by the track-back function, and the employee is notified of new information every week when the knowledge source is updated. This notification may sometimes trigger further com-ments from the employee.

Whether or not the linkages that are built between information and knowledge sources are valuable is dependent on the quality of the contents of the information and knowledge sources. Usually, communication information sources such as blogs often fall into the "merely idle talk" or "abuse and blame," categories but a continual supply of knowledge sources is expected to maintain high quality in the communications between participants. In addition, with regard to the linking, various mechanisms are proposed to let value-added links grow automatically by using text mining tools, including a tool for clustering according to the similarities between contents, as well as linkages by human behavior patterns.

The corporate development model based on KM 2.0 is that the collective intelligence builds and grows by taking the steps of disclosure, linking, selection and evaluation in the various hierarchical levels and departments of an enterprise. However, it should be noted that the tools and mechanisms used in these steps are in this paper merely examples. In the future, it is expected that new tools and mechanisms will be provided one after another for each step.

6. Conclusion

In the above, we have discussed the impact of Web 2.0 on KM and on the future orientation of KM. Among the features of Web 2.0, the concept of collective intelligence is exerting the biggest impact on KM. In this paper, we assert that the optimum model for KM in the Web 2.0 age consists of close

linkages of a variety of communication tools and job systems, extraction of knowledge from them and the expansion of collective intelligence in a positive spiral. One of the proposed future study topics for this purpose is the methodology for fostering corporate cultures for backing up such procedures. One of the keys to a successful resolution of this issue is the hacker ethic. The hacker ethic is a theory describing the reasons for the development of open source software (OSS) advancing well and claims that hackers (engineers who are dedicated to the advancement of programming) have the commitment and openness to support the success of OSS. This idea is expanding as a new cultural attitude in Web 2.0, and how to apply it to support KM 2.0 is an issue of fundamental importance.

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