지식경영 기업의 지식전환을 위한 정보기술 활용

IT Usage for Knowledge Conversion in KM Companies

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목 차

Keywords: *knowledge management, knowledge conversion, knowledge management system, information technology*

Ⅰ. Introduction

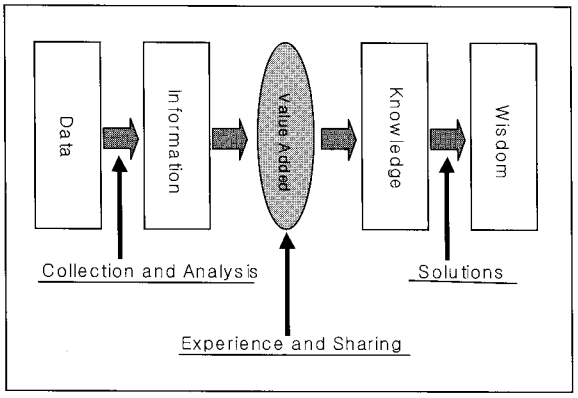
Since the concept of knowledge management was introduced in Korea, many companies have been making an effort to implement knowledge management. Especially, knowledge management keeping up with the rapid development of information technology is spreading around the world faster than any other management techniques. Academia has already completed the definition of knowledge management and companies are scrambling to come up with good business improvement measures through knowledge management. The biggest contributor to this brilliant growth of knowledge management system has been information technology. Information technology not only provided business managers with different perspectives of corporate management but also enabled them to create and implement a new set of management strategies using IT. That is why Nonaka, the so-called pioneer of knowledge management, places much emphasis on the role of information technology in knowledge management (Nonaka, 1998). However, there are also negative perspectives about information technology. Sveiby (1997) points out that the amount of information rapidly increases with the development of information technology but users do not know how to effectively utilize the vast pool of information. He takes one example to show how serious this problem is. According to him, it has not been proved that the use of information technology in the financial market brought about any better results than ten years ago. Rather, he says, the use of information technology caused confusion to financial dealers and brokers, and its impact still remains in the market. It is true that excessive amounts of information caused some confusion to users, but that does not necessarily mean information technology itself should be denied. Current information technology has contributed much to productivity growth and cost reduction. Users are

able to get necessary information through information technology. Information technology converts certain information into knowledge that is essential to management. Also, companies are able to set up a proper business strategy for competitive advantage through a knowledge-based system, using best practice information that contains necessary information about competitors (O'Leary & Selfridge, 2000). This strategy became an indispensable element in today's globalized world. This research is aimed at exploring information technology that Korean KM companies utilize for knowledge management and knowledge conversion and providing some suggestions for the best use of information technology by figuring out how Korean KM companies' efforts for knowledge conversion are related to the use of information technology. For this purpose, this paper researched a number of Korean KM companies that implement knowledge-based management and presents information technology that companies can utilize based on Nonaka's four processes of knowledge conversion.

Ⅱ. What is knowledge?

In today's information-based society, the importance of information has been continuously discussed and, as a result, "information" has become a household word that is spotted in every sector. But it is not easy to define the genuine meaning of "information". Information is data tailored to the needs of its recipient and has real or perceived value in the behavior or decision-making of the past, present, and the future. This definition only shows the difference between data and information and is far from "Knowledge", the main concern of this paper. Then, what is knowledge? This question has been typically asked throughout the history of philosophy since the ancient Greek period. Nonaka (1998) made a clear distinction between information and knowledge by defining knowledge as follows. First, knowledge is different from simple information: knowledge is about trust and promise. That is, knowledge functions as a specific attitude, outlook and intention. Second, knowledge is different from information in that it is about certain behaviors. Third, knowledge deals with meanings: knowledge is contents-oriented and has a correlation with contents. Knowledge is more than just knowing something. Knowledge is an invisible asset that provides certain standards for decision-making and has various individual elements in it such as personal insights, judgments and improvement skills based on his or her learning and experience. Knowledge lies above information in its concept. Facts, data and information go below knowledge. Facts exist objectively and data is the lowest form of certain known facts that essentially have no meaning by themselves (Myburgh, 2000). Information is more than a simple integration or combination of data: it contains a certain relationship, understanding or context between data. Knowledge is certain information activated based on individual experience (Leonard & Sensiper, 1998). As you can see from <Figure 1>, this refers to a case where information is acquired by an individual or organization and, then, processed to create new added value. In other words, knowledge means an ability to create new added value by acquiring and processing information at an individual or organizational level. That is, knowledge refers to something useful that satisfies users' needs and creates new added value out of plenty of information. Knowledge is rendered universal through accumulation and systemization processes. New knowledge created through these processes is an integrated understanding that provides certain criterion for the future decision-making. On the next step from knowledge is wisdom. Wisdom covers vast range of intelligence that can

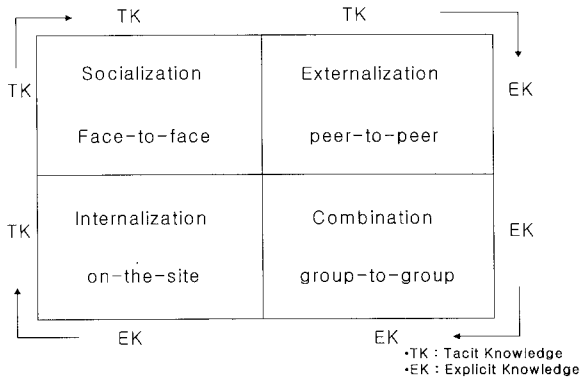
provide solutions based on knowledge. When we refer to knowledge, it is usually used as a broad term that includes wisdom in it.



〈Figure 1〉 Transforming process of knowledge

Ⅲ. IT for knowledge conversion

Knowledge is not something that we simply share and collect. In order to utilize knowledge, it is important to properly convert knowledge into something necessary to the business environment a certain company is situated in. This is because each business should consider what kind of knowledge assets would be essential to them among four knowledge processes (Socialization, Externalization, Combination and Internalization) when they set up a business process or business model (Konno, 1999). Knowledge conversion (KC) refers to a set of actions related with the transformation of knowledge from one form to another. It consists of two types of knowledge: Tacit Knowledge and Explicit Knowledge. Knowledge conversion involves a transformation process of these two types of knowledge into the same or different kind of knowledge. Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or share with others (Nonaka & Konno, 1998). Therefore, tacit knowledge can be usually shared through highly interactive conversation (Zack, 1999). Tacit knowledge has its roots in individual experience, thinking and values. Explicit knowledge is expressed through letters or numbers and can be shared in the form of a manual, specification, formulation and data: it is formally and systematically transferable among individuals (Nonaka, 1998). Explicit knowledge is easy to standardize and deliver; therefore, it increasingly plays a bigger role in a company or organization. Except those types mentioned above, knowledge can be divided into many more kinds according to its types and ranges. But this paper is mainly focused on tacit knowledge and explicit knowledge. <Figure 2> is Nonaka's four processes of knowledge conversion based on tacit knowledge and explicit knowledge, and shows source knowledge and how source knowledge is converted into a different form. This research will focus on explaining how to utilize information technology suitable to Nonaka's four processes of knowledge conversion through the case study of Korean KM companies.



〈Figure 2〉 Nonaka's the SECI model

3.1 Information technology for Socialization

Socialization refers to a process where certain individuals or groups share their own experience to create

and deliver their tacit knowledge such as spiritual models and skills. It is a process of transforming one tacit knowledge into another tacit knowledge (Nonaka, 1998; Nonaka & Takeuchi, 1995). A good example of Socialization can be found in a craftsman's passing down of his skill on to others or a relationship between the skilled and non-skilled in apprenticeship system of the past. Today, socialization or passing down of knowledge occurs in the form of On-the-Job Training (OJT) that is implemented in the modern military or companies. However, time and cost problems can arise when companies deliver tacit knowledge to their employees because the delivery of tacit knowledge is realized through a face-to-face instruction or personal experience. The reason is because tacit knowledge is a personalized knowledge based on individual's experience, attitudes, values and behavior patterns, and therefore, is not easy to see or express, it is highly personal and hard to formalize (Gore & Gore, 1999). But, despite time and cost problems, many companies place a great deal of emphasis on tacit knowledge since they know it is an essential key to creating new knowledge.

In an effort to effectively exchange tacit knowledge through its groupware "Arisam", Samsung SDS Co. opened a new cyber space called "Forum" where an individual or group can exchange their views and knowledge. This groupware includes "Cyber Consulting" through which a person can acquire professional knowledge to create new knowledge. At present, "Forum" is open only to employees but is expected to be open to the outside from the year 2001 so that outside competitors and business partners can participate. LG-EDS thinks that the effective exchange of tacit knowledge is very important and set up knowledge management system based on a Web-based Intranet. The company has a different system for tacit knowledge and explicit knowledge. For tacit knowledge, they opened up an integrated Q&A session in Smart Community where a person or organization can ask a question and advise each other on various matters. To further promote the exchange of tacit knowledge, they also set up "K-Village" for experts and community groups, and "Knowledge Mall" to help exchange knowledge acquired at work, various ideas and know-how.

As we can see from the above examples, the usage of information technology made it easy for Korea KM companies to pass down and share knowledge among employees and, thus, transform personal knowledge into knowledge that becomes a part of corporate assets. As a result, companies are able to effectively create and convert knowledge by removing time and space restrictions that existed in the past practices such as a group meeting, brainstorming and management by walking around.

Acquiring knowledge from customers is also important, but direct knowledge acquisition from customers is not feasible in reality. Therefore, information technology such as the Internet homepage and e-mail is very effective in gathering and utilizing customers' needs. In a comparison between the usage of information technology of Microsoft and that of Netscape, the former wasted time and money by delivering a beta-test program through physical media such as CD-ROMS and other media while the latter could save a lot of time and money by delivering their beta-test program through free means. Currently, the two corporations are using the Internet to get knowledge from customers and other IT and software companies are also using the Internet to get knowledge from customers. In other words, since customers want and choose a new and easy method, old and outdated methods are highly likely to be abandoned. In this sense, today's companies should work hard to develop a user-oriented and customer-

oriented medium using multimedia and graphic technology.

3.2 Information technology for externalization

Externalization refers to a process where tacit knowledge that has gone through a socialization process is transformed into a specific concept (Explicit Knowledge). Through the externalization process, tacit knowledge becomes specified, and metaphors, analogies, concepts, hypotheses and models take shape. Externalization includes creating concepts during a product development process, crystallizing CEOs' thoughts and experts' know-how into a language, and expressing and materializing covert needs of customers. It always involves the creation of easy-to-share and easy-to-deliver explicit knowledge within an organization by using a set of languages and visual messages (Nonaka, 1998).

Korean KM companies regard the conversion of tacit knowledge into explicit knowledge as their first priority in knowledge management to make tacit knowledge a part of organizational knowledge through transformation and share it among employees. Many companies are constructing a knowledge management system with this purpose in mind and are trying to attract more participation from their employees by drawing up more detailed methods and setting up a new compensation system like a knowledge mileage system. They are making an utmost effort to attract as much support as possible from employees throughout the whole organization. Anderson Consulting is one of the companies that show the most active knowledge sharing. Its corporate culture is based on the principle of knowledge sharing. In principle, Anderson Consulting exchanges knowledge on a face-to-face basis but it has another system called "K-X change" to enable experts around the world to exchange their knowledge more effectively. The firm allows an individual or group to have access, through "ANET"(a network for Lotus Notes users), to its knowledge database where explicit knowledge (transformed from tacit knowledge) is stored. Its employees or teams register their tacit knowledge acquired through work on knowledge database, making it possible for all organization members to share and use the database.

Daelim Information & Telecommunications Co. is working on knowledge conversion through "Logos", a groupware that the corporation created on their own. Daelim's groupware "Logos" was created with three major principles in mind: "From explicit knowledge to another explicit knowledge", "tacit knowledge Sharing", "transforming tacit knowledge into explicit knowledge". Especially, for the principle of transforming tacit knowledge into explicit knowledge, Daelim divided knowledge into two kinds: "On-line" and "Batch". They are also promoting systematic development of knowledge into explicit knowledge through HELP and Q&A sessions on online bulletin boards. The knowledge management system that Daelim put into place is EDMS and Logos. EDMS mainly controls explicit knowledge while Logos manages the conversion of tacit knowledge into explicit knowledge.

Meanwhile, Korea Telecom is setting up a portal Internet site to help all employees retrieve and use necessary information or knowledge quickly using a Web-based single platform. The corporation is also setting up a new knowledge management system with the intention of connecting it with the legacy system. Core issues involving Korea Telecom's construction of knowledge management system is that, firstly, it is difficult to maximize the usage of information and knowledge with the legacy system and its conventional way of processing information. Hence, Korea Telecom

is focused on establishing a new system that can manage a life cycle of knowledge from its creation to extinction through an externalization process. Secondly, the corporation is focused on constructing a new system where different systems can be connected and operated together. The legacy information system was developed unit by unit and, therefore, had different structures where it was hard to retrieve or use information in an integrated way. Thirdly, the new system should include a process where knowledge is shared and controlled by each department. Such a process has not been put into practice due to the absence of a proper system where information and knowledge can be systematically accumulated and utilized. The focus of Korea Telecom's knowledge conversion plan lies on establishing a knowledge management system based on externalization. Unlike other companies, Korea Telecom is trying to establish a knowledge management system on a step-by-step basis. The first step is establishing a pilot system for the core part of marketing. The second step is expanding the marketing area and developing a management system (e.g. personnel and finance management systems). The third step is developing a system for technology and management support. Both Korea Telecom and Daelim Co. adopted a knowledge mileage system as most companies did in order to encourage employees' participation in knowledge management. On the other hand, Anderson Consulting has no such compensation provided in exchange for employees' knowledge sharing and registering. This difference stems from different corporate cultures. Anderson Consulting considers it natural to create and share knowledge among personnel.

3.3 Information technology for combination

Combination involves the conversion of explicit knowledge into more complex a set of explicit knowledge (Nonaka & Konno, 1998) through the systemization of concepts and conversion of knowledge. It is a process where an individual or group can create new knowledge by combining its explicit knowledge with other explicit knowledge. Individuals exchange and combine information through such media as documents, meetings, telephone and computer networks. They create new knowledge by reconstructing the existing information through classifying, adding and combining tacit knowledge. Traditional management information systems often result in the creation of combination knowledge (Riggins & Rhee, 1999). The combination process includes various works such as crystallizing related strategies and concepts and making management data and product specifications. Especially, Western enterprises are ahead of others in this field. When comparing them with Japanese companies, Western companies tend to create concepts by synthesizing all the explicit knowledge they have gathered while Japanese companies create concepts from tacit knowledge by externalizing on-site information. This comparison shows different business characteristics in terms of information usage between Western and Japanese companies: the latter tend to think highly of on-site information while the former do not.

Hyundai Department Store co. replaced paper and documents with digital files in processing and recording information. By doing so, the organization and its employees have their work experience stored on digital files for the corporate knowledge assets. The corporation classified knowledge into four types: product knowledge, customer knowledge, service knowledge and task knowledge. In order to control these four types of knowledge, they set up a new knowledge management system, a groupware called "Office-Ware" that handles the conversion of existing knowledge into

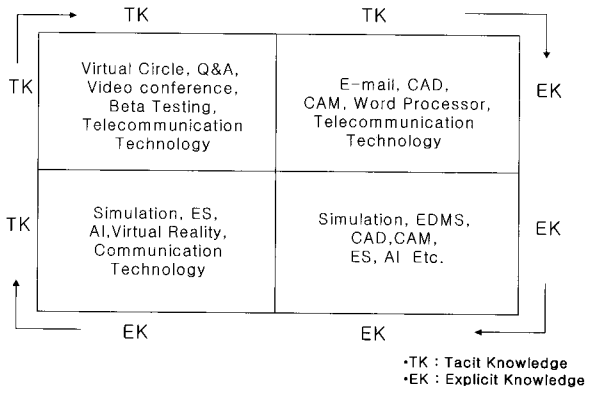
explicit knowledge. Knowledge can be registered, retrieved and acquired through "Office-Ware". It also includes a special session for experts to answer questions from employees.

Korea United Pharm. Inc., as one of small and medium-sized companies, is making an effort to have knowledge management in place by setting up "Cyber knowledge management center" through consultation with Anderson Consulting. The company collects and shares knowledge through a web-based intranet. As one of the small and medium-sized companies, it is difficult for the company to acquire and accumulate high-quality knowledge due to many in stabilizing factors such as difficulty with securing high-quality human resource and high employee turnover. To overcome these weaknesses, the company is implementing knowledge management focusing on the combination of explicit knowledge. Its "Cyber knowledge management center" consists of "Intell-Base", "Knowledge-Base", "Management-Insight", and "Discussion". "Intell-Base" provides all kind of information about competition such as related circumstances, market, and competitors. Knowledge-Base is a storehouse for corporate knowledge assets where achievement assets, finance assets, intellectual assets, human resource assets and infrastructure assets are classified into appropriate categories to systematically store and utilize corporate knowledge. "Management-Insight" stores secret documents within the organization that is open only to its CEO. "Discussion" is a place for exchanging tacit knowledge. But the company highly depends on "Melting Pot Meetings"(where employees can freely discuss certain issues in an environment isolated from regular work) for the exchange of tacit knowledge. Therefore, the rate of using Cyber Space to exchange tacit knowledge is low. SK C&C puts more emphasis on information technology in implementing knowledge management because it considers IT plays the role of an enabler for knowledge management. The company's knowledge management system is a combined form of its database and groupware intended for sharing, accumulating and diffusing knowledge. The company utilizes its knowledge management system focusing on the management of explicit knowledge (Combination) and conversion of tacit knowledge into explicit knowledge (Externalization). In addition, the company set up a communication plaza that mainly deals with the exchange of tacit knowledge.

3.4 Information technology for internalization

Internalization refers to a process where new knowledge is created through the conversion of explicit knowledge into tacit knowledge within an organization. It is closely connected with "learning through practice" (Nonaka & Takeuchi, 1995). Internalization takes place when explicit knowledge is exposed to a new concept or method that is better than the existing ones. Internalization involves a process where different kind of explicit knowledge such as know-how, manuals and documents that went through socialization, Externalization and combination is understood and experienced by each individual through role-playing or simulation. The way through which successful business examples are diffused within a company is relevant to this process. Experimental and reflective trial or experience is significant in this process. The examples of this process are business games, Cyber university and cyber learning course run by some companies. Not only domestic but also foreign companies are showing much interest in employee training. Among Korean companies, Samsung Multi-campus, Daewoo Information System e-Learning and LG Academy facilitate employees' Internalization process through the Internet and

on-site education. Companies that lack their own education facilities entrust employee training to their rival companies' educational institutions (e.g. Daelim Information & Telecommunications Co. entrusts its employee training to Samsung and Daewoo, its rival companies educational link-up is possible not only between companies but also between a company and a regular educational institution. For example, Korea Telecom is providing its employees with video-based education through satellites through the link-up with Korea Advanced Institute of Science and Technology (KAIST). This shows that IT-based cooperation within a company, between companies and between a company and an educational institution is possible in training and educating employees. This also shows that the idea of e-commerce is being incorporated into the education sector. <Figure 3> re-constituted the usage of information technology in Nonaka's four types of knowledge conversion, which companies can utilize when they implement knowledge conversion.



〈Figure 3〉 Information technology for knowledge conversion

Ⅳ. The utilization of KMS by Korean KM companies

Ernst & Young's 1997 research shows that 431 American and European organizations think that the order of carrying out related projects for the introduction of knowledge management system should be as follows: creating an intranet (47%), data warehousing and creating knowledge repositories (33%), implementing decision-support tools (33%), implementing groupware to support collaboration (33%), creating network of a knowledgeable workers (24%) and mapping sources of internal expertise experts (18%). In the same research, barriers to knowledge management were as follows: changing people's behaviors (54%), measuring the value and performance of knowledge assets (43%), determining what knowledge should be managed (40%) and justifying the use of scarce resources for knowledge initiatives (34%). Barriers to knowledge conveyance were as follows: culture (54%), top managements self -assurance (32%), lack of shared understanding of strategy of business model (30%), organizational structure (28%), lack of ownership of the problems (28%), non-standardized process (27%) and information/communication technology restraints (22%). These results show that human resource and organization culture are a precondition for successive knowledge management. Ruggles (1998) determined the degree of importance among human resource, process and technology as 50/25/25 respectively, stressing the importance of human resource-related factors. His point is not about ignoring information technology altogether. He points out that excessive focus on information technology-based knowledge management can be a burden to a company.

A research team for this paper visited and interviewed several companies that adopted knowledge management system to create new knowledge through knowledge conversion. They tried to discover what were their motivations for adopting the system and how they run and use the system. The research team selected 13 organizations that adopted knowledge a management

system and contacted them through an e-mail to ask for an interview. Among 13 enterprises, only 9 allowed an interview and the interviews were carried out from the 25 July to 28 August in 2000. Interviewees were the heads of the teams within the companies who participated in implementing the knowledge management system or who had been in charge of the system. The description of the 9 participating companies is as follows:

Company A was established in 1985 and is an SI company. Their main business is EC, internet service, information technology education, consulting and business integration. This company has been trying to upgrade its management and introduce a permanent improvement, leading to international level performance. Their focus is to create 'an information infrastructure' from 1994. The result is that they have adopted a KM-system over the last 6 years.

Company B was established in 1987 and is also SI company. They offer solutions and e-service in the fields of e-innovator and e-biz to the satisfaction of their clients. They attempt to create systematic synergy and maintain confidentiality. This is designed to implement a KM master plan project capacity, on demand, to large companies, dating from1996.

Company C is one of the largest Korean food companies and was founded in 1965. They have participated in conferences and seminars over a long period of time. From this basis, they have constructed a basic framework and set objectives as of March 1999. This company built a Web based system. So they can use their system on the web, which could not be done before.

Company D is a technical communication services company for basic industries in Korea. As a previously nationalized industry, they had a monopoly and as such their competitors had difficulty entering their market. As a compromise to comply with the WTO, a reorganization of international communication, participation of new Internet communication companies and the relaxation of restriction in the Korean market, there is keen competition in the industry. So the company decided that KM should be introduced to overcome internal difficulties and get an advantage over competition. They devised an information oriented plan for the construction of a KMS to be introduced in phases.

Company E is a pharmaceutical company that was founded in 1987. Their CEO attended a symposium organized by the Korean management association and he strongly advocated the introduction of a KM structure, which was done with the help of Anderson Consulting from 1999. They built a groupware "KMS", of course, which are few and far between small and medium enterprises.

Company F was previously a subsidiary of a computer communications company but in 1988 they were reorganized to form an outsourcing company in the general business area of IT. By 1997.They had already established a business vision and corporate structure to cultivate e-Management and e-Business at the heart of their capabilities. They introduced a KMS to be competitive in their respective markets

Company G is a global consulting company and was founded in 1989. It is a company specializing in the sharing and transfer of their general professional knowledge. They also match together their value levels with their customers. As such their knowledge is an important commodity in its own right. Their business therefore has many similar characteristics to KM itself. They need to accumulate personal know how and general experience to maintain their business. They work with and compete against international companies and it is necessary to overcome the difficulties of understanding and working together. As such the failure

rate of their joint ventures is high. Consequently, they have chosen to introduce a KMS which extend KM to their employment, education and change of career in 1993.

Company H is an SI company that separated from the computer department of Group D in 1985. The CEO wanted to use KM as a way of reorganizing and managing senior staff. They chose KM to implement their business vision in 1996 and they built a KMS in 1998 with an enlarged groupware capacity.

Company I was a part of group K that became independent in 1999. They differentiated themselves from the management company by specializing in their field. They introduced KM into their business system to change their working environment and with the goal of better satisfying the needs of their clients and improving client management. They linked their homepage with groupware and managed to increase their productivity. They also introduced a reward program to encourage their staff to participate in the new system.

This research asked the responding companies about the background, process and purpose of choosing to implement KM. It also questioned the type, user and focus of the KM system as well as the 'enablers' and 'barriers' that were encountered. In the '<Table 1>', the numerical value of SECI is divided into 4 types according to the importance within each company. It was given values according to the process and is based on the data provided by the relevant companies.

<Table 1> shows which type of knowledge conversion Korean KM companies consider important when establishing knowledge management system: seven out of nine companies placed greatest importance on combination (2.78 points on average). The next important process was externalization (2.56 points on average), the third one was socialization (1.56 points on average) and the last one was internalization (1.33 points on average). This is because internalization process mostly occurs within the boundaries of an individual's experience and thinking rather than within an organization. Some companies placed the equal amount of importance on four types of knowledge conversion, but mostly companies placed different stress on different types. This is because each company has a different corporate size and situation. For example, exchanging tacit knowledge through a face-to-face meeting might be much more effective for small and medium-sized companies. And, it is natural that combination process would be more important for a company that already retains a great deal of explicit knowledge. The most important thing in knowledge conversion is that companies should place different importance on different knowledge depending on their corporate characteristics to properly introduce and utilize knowledge management system.

There is a summary of answers to the questions in '<Table 2>' from the viewpoints of type and size of industry, the purpose and level of introducing the KMS,

〈Table 1〉 Knowledge conversion in terms of information technology

Company	A	B	C	D	E	F	G	H	I	Average
Socialization	◎	◎	△	△	△	×	○	△	○	1.56
Externalization	◎	○	◎	◎	○	◎	◎	○	○	2.56
Combination	○	◎	○	◎	◎	◎	◎	◎	◎	2.78
Internalization	○	◎	△	△	×	△	△	○	△	1.33

* Relative Importance within a company: ◎: Very important (3 points), ○: a little important (2 points)
△: less important (1 point), ×: not important (0 point)

〈Table 2〉 Comparing 9 companies in the establishment of KMS

	A	B	C	D	E	F	G	H	I
Industry	SI	SI	Manufac-turing	Communi-cations	Manufac-turing	SI	Consulting	SI	Distribution
Size/Type	Large	Large	Large	Public	S/M-sized	Large	Multina-tional	Large	Large
Purpose	CS	CS	CA	CS	CA	KA	KA	CVA	CS
Intro-level	CEO	CEO	CEO	Gov.	CEO	CEO	CEO	CEO	Middle -Manager
Implemen-tation	DC	DC	Phased	Phased	DC	DC	DC	DC	DC
System	Legacy	New	New	New	New	Legacy	Legacy	Legacy	Legacy
Focus	S/E	S/C	C	E	C	C	C	E	C
Target	All	All	All	All	All	All	All	All	Full-time
Communi-cations	GW	Intranet	Intranet	Intranet	Intranet	GW	GW	GW	GW
Character-istics	Technology -based	Culture -based	Culture -based	Technology -based	Technology -based	Technology -based	Culture -based	Technology -based	Culture -based
Source	Internal/ External	Internal/ External	Internal	Internal	Internal	Internal	Internal/ External	Internal	Internal/ External

* CS: Customer Satisfaction, CA: Competitive Advantage, KA: Knowledge Assets, CVA: Creating Value Added, C: Combination E: Externalization, S: Socialization DC: Direct Cutover, GW: Groupware

method of construct the system, the use or not of the existing system, focus on the modeling SECI, the user target in system, type of system, characteristics for practicing KM and making a plan to deal with outside knowledge in general.

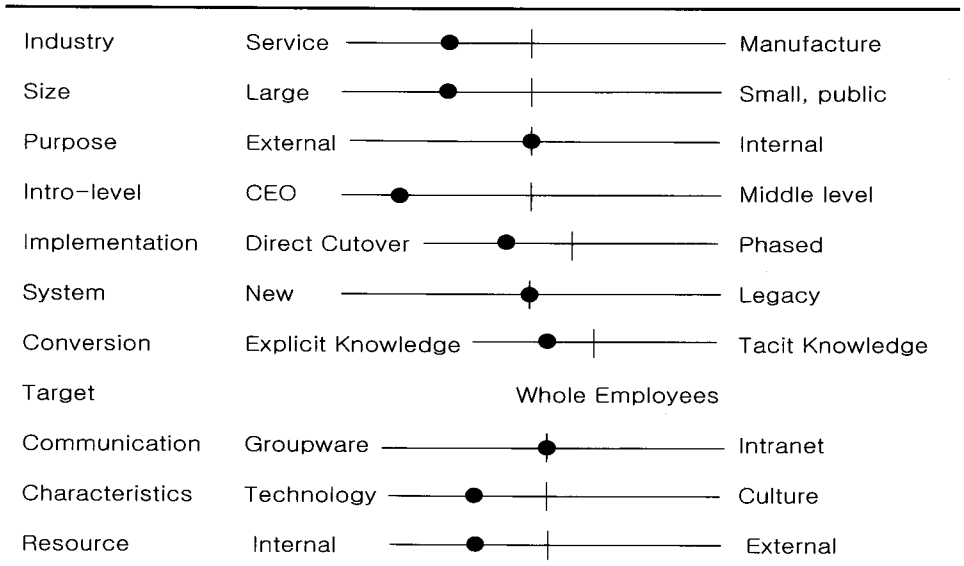
Each item in '<Table 2>' is similar in view to a management information system because the current KMS, which manages additional nonstandard data, was based on the legacy systems.

This research consists of reviewing each item of an existing CBIS. Analysis showed that the existing KMS was similar to the Internet-homepage and groupware, In addition to these should be added other items such as Focus, Characteristics and Resource of the KMS as they are also relevant.

<Table 2> shows each company' knowledge management system in detail including purpose, who lead the introduction of the system, method used for the construction of the system, communication technology and characteristics. As for the purpose of introducing the system, most companies wanted to secure competitive advantage through customer satisfaction and strengthened competitiveness. Eight companies showed that a CEO led the introduction of the system while only one company showed that a middle-level manager led the introduction. As for the construction methods, companies that already had a groupware system in place renovated it while companies that did not have or like the existing one set up a new Web-based system. <Table 2> can be summarized into <Figure 4>.

<Figure 4> shows the present position of the knowledge management companies and is based on '<Table 2>' showing the number of companies that responded.

Each characteristic is represented by dots around



〈Figure 4〉 Tendency of Korean KM companies toward the implementation of KM

a centerline and shows clearly the nature of proactive companies in the Korean KMS. It is not possible to make a generalization because of the relatively small sample of the subjects of the investigation. However, it should not be overlooked that the character of the 9 companies is grouped to one side of the centerline.

<Figure 4> shows which of the Korean KM companies take up a positive attitude, which is a service type of industry, and which is a large company.

The introduction attached great importance to the role of the CEO. It suggested that there should be an assertive group that is in charge of the strategy for the introduction of KM.

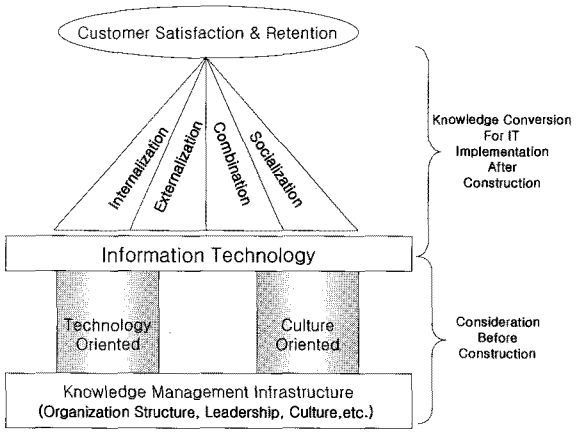
The interview showed what companies considered to be important when establishing KM and that the greatest importance was placed on KM of the technology center. The result of the interview was that the companies thought that it was more important to build a system for knowledge management practice than merely to hold knowledge in general. However, it appeared that there is no difference between the purpose of introducing inside KM (customer satisfaction, competitive advantage) or outside KM (knowledge asset). Neither was there a difference whether they used an older system or a newer one nor the method of utilization.

In some cases, there is a lack of differentiation, This may be attributable to insufficient study subjects and the diverse nature of their characters.

Brief overview of the knowledge management activities of Korean KM companies can be viewed in <Figure 4>. Service companies, large companies are leading these activities more than manufacturing companies and medium sized companies, respectively. It is seen that the knowledge management are adopted company-wide rather than with pilot incremental approach. Also, Korean KM companies have a tendency to implement knowledge management quickly and technically to see a short-term effect rather than to implement it with slow cultural change and evolution. In general, the CEO initiates KM adoption and its usage is intended for all the managers and full-time employees.

V. Discussion

One particular characteristic concerning the introduction of knowledge management is that it is divided into two methods: one is based on information technology while the other is on culture. This is the first among four characteristics that a CEO should take into account when implementing knowledge management. The issue is about what should be the first priority. If companies simply utilize technology and process without considering human factors, they would fail to implement the knowledge management (Lee, 2000). Companies that introduced knowledge management in the introduction stage of knowledge management were focused on information technology. But companies that introduced knowledge management in the growth or maturity stage of knowledge management became more focused on culture. The reason is because the former companies mostly failed to implement knowledge management properly as they were too much concentrated on information technology, relatively ignoring employee education and promotion. Given this fact, it is natural for the latter companies to work hard on establishing an organization culture for about one year before actually implementing the system. The importance of information technology might seem relatively reduced because of cultural importance. However, forming an organization culture is just another precondition for successive business while information technology is always at the center of spreading and sharing a organization culture. Other preconditions for successive business are employee education and promotion. For this, most companies use an internal broadcast or e-mail. But these means are not effective but forceful. Hence, utilizing appropriate information technology would be necessary to form an effective organization culture. As the above cases show, the second issue is that externalization and internalization processes cannot generate a synergy effect in knowledge conversion if the processes are only focused on individuals. Information technology using networks is needed to solve this problem. A groupware would be effective within an organization while an intranet and extranet would be more effective for integration within and outside of an organization. The third issue is that companies should adopt different technologies and apply them to different parts depending on their size and characteristics. Hansen *et al.* (1999) argued that method and scale of investment in information technology should be different depending on organization strategies (e.g. personalization or codification). Excessive investment in information technology would cause a waste of money. On the other hand, companies would not be able to effectively respond to change in competitive environment if they could not input appropriate information technology as a necessary. In summary, IT-utilizing strategies should change according to company sizes, characteristics and financial situation. Lastly, companies should prioritize and introduce the most necessary information technology first. If a company uses a high-level of information technology despite its low-level of knowledge management, or vice versa, information technology would be meaningless/ineffective in both cases and only cause a waste of money. Therefore, it is recommended that companies should assess their own level of knowledge management and check out necessary conditions for the introduction of the most appropriate information technology beforehand. It is desirable that they should figure out what kind of information technology is possible at each stage and predict the results in advance (<Figure 5>).



〈Figure 5〉 KC & IT in Korean KM companies

Ⅵ. Conclusion

More and more companies are implementing knowledge management in Korea. As they did with other kinds of new management strategies, companies are about to reorganize their structure and introduce appropriate information technology that is suitable for the new structure. In the business world, upon a CIO's advice and persuasion, a CEO may introduce the best technology and strategy available at that time and experience both success and failure with it. This paper is intended to present the most appropriate information technology based on Nonaka's four types of knowledge conversion, to provide an opportunity for benchmarking through case studies of Korean KM companies and to provide a solution for an effective usage of information technology in creating, accumulating and sharing knowledge. The recent controversy about information technology is whether its usage is truly effective to a company. According to Sveiby (1997), there is no direct connection between corporate profitability and information technology investment, though IT has been thought to be a driving force behind corporate intellectual productivity and competitiveness. He added that IT capital per one white-collar worker is rapidly increasing while their productivity growth is at a standstill. Still, companies are not reaping the fruits of IT investment. It is said that IT capability for the efficiency of productivity per hour would face its limitation and, therefore, more sustaining IT usages are needed to create lasting values. However, knowledge management experts admit that utilizing information technology can be an infrastructure for knowledge management. They suggest companies can effectively share, convert, accumulate and create knowledge by using information technology. In summary, Korean KM companies evaluate the usage of information technology in introducing knowledge management positively. All nine companies studied, regardless of their types and sizes, have already established knowledge management systems through information technology and are implementing knowledge management using the information system. All interviewees stressed the necessity of information technology and considered that using information technology is effective to establish a knowledge management system. But not every business needs information technology for knowledge conversion. Small and medium-sized companies consider face-to-face knowledge conversion more adequate to socialization because of the small number of employees and some chronic problems such as high replacement rates and difficulty with securing high-quality human resources. As discussed earlier, companies can establish a proper knowledge management system only if they take into consideration such factors as corporate cultures and characteristics, individuals and organizations, and technological characteristics (<Figure 5>). In particular, it is self-evident that the role of the stakeholders is getting more important since an organization's knowledge is limited and their knowledge should serve as core knowledge that helps an organization survive in a competitive environment.

An organization should extend its borders to acquire and use this knowledge and become an Extended Knowledge Enterprise that is based on trust and compensation.

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〈Abstract〉

The purpose of this research is to review how Korean KM companies are applying information technology to their operations from the four perspectives of knowledge conversion (KC) and to suggest ideas for introducing appropriate knowledge management implementation methodology through the case studies of Korean KM companies that have adopted knowledge management strategy using information technology.

This research was conducted focusing on the cases of companies that are carrying out knowledge management by applying information technology and the result shows that Korean KM companies place high value on the application of information technology in introducing knowledge management. However, the use of information technology is not common to all kind of companies in four kinds of knowledge conversion.

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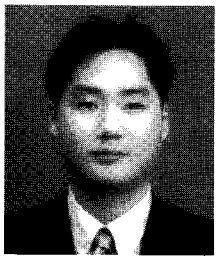

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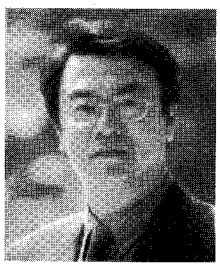
경희대학교 경영학과를 졸업하고 동 대학원에서 석사학위와 박사학위를 취득하였다. 현재 경희대학교와 유한대학 강사, 경희대학교 정보센타 연구원으로 재직중이다. 주요 관심분야는 품질경영, 지식경영, 인터넷 비즈니스, CRM, 전자상거래 등이다.



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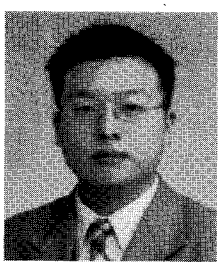

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경희대학교 경영학과를 졸업하고 동 대학원에서 석사학위를 취득하였다. 현재 경희대학교 경영학과 박사과정을 수료하였으며, 경희대학교 강사, 경희대학교 정보센타 연구원으로 재직중이다. 주요 관심분야는 인터넷 비즈니스, 전자상거래, 품질경영 등이다.