

ANALYZING THE APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY FOR CONSTRUCTION KMS

Tai Sik Lee

Professor, Hanyang University, Ansan, Korea

Hee Chul Lee

M.S., Hanyang University, Ansan, Korea

Young Hyun Kim

Candidate of Ph.D., Hanyang University, Ansan, Korea

ABSTRACT

The advance of Information and Communication Technologies is giving impetus to the knowledge and information society that knowledge and information is more important than the typical elements of product such as capital and labor. That makes much valuable knowledge spread or apply efficiently in organization. This is being realized by KMS (Knowledge Management System). However, we don't hold the studies that evaluate and analyze the application of Information and Communication Technologies used for constructing KMS. Therefore, this study wants to understand the applied Information & Communication Technologies and then know what are technologies that the application is high or low, when large enterprises of construction construct KMS. In addition, this study discusses what technologies need to be improved to materialize KMS efficiently.

KEYWORDS

Information and Communication Technology, Application, KMS, Knowledge, Benchmarking

1. INTRODUCTION

1.1 The Purpose of Study

KM makes much valuable knowledge spread or apply efficiently in organization. This is being realized by KMS(Knowledge Management System) that uses technologies in information and communication. In case of domestic construction, such actions of KM that make use of KMS are being progressed actively in the center of large enterprise, but there is no studies where and how Information & Communication Technology is being used and what technologies are short. Accordingly, this study intends to grasp technologies in information and communication that use when large enterprises of construction construct KMS for general construction company that want to introduce KMS and then know what are short or useful technologies. In addition, with such analysis, this study knows improvements.

1.2 The Method of Study

The order of this study is as follows.

First, this study understands concepts and kinds of Information and Communication Technologies by the research of related documents, web searching and interview of related research institutes.

Second, this study will understand Information and Communication Technologies used in KMS by interviews of related specialists and benchmarking of large enterprise constructed KMS.

Third, in the basis of those, this study will understand Information and Communication Technologies made use of Virtual Edu-Research Network, that e-Construction Lab., the Environmental and Civil graduate school, Hanyang University, Korea constructs for general construction companies.

According to the above processes, this study will analyze finally what necessary technologies are in constructing KMS and how technologies is used, and then intend to make general construction company construct KMS easily.

2. THE CONCEPTS AND KINDS OF INFORMATION AND COMMUNICATION TECHNOLOGIES

2.1 The Concept of Technologies in Information and Communication

The word that is Information and Communication Technologies, the basic constructing technologies of ERP(Enterprise Resource Planning), EDMS(Electronic Database Management System), DBMS(Database Management System), Group Ware, Work-Flow etc., is a compound word of information technology and communication technology. And it means communication added in a general idea of IT(Information Technology), that is, emphasizes a share of information and communicative process. In addition it means a hardware and software simply to search, collect, communicate the information in a narrow sense, but in a broad sense, all ways to collect, produce, process, preserve, communicate, utilize the information after using a hardware and software.

2.2 The Kinds of Technologies in Information and Communication

IT Information center, Electronics and Telecommunications Research Institute in Korea divides technologies in information and communication into ten classes (See Figure 1.). Table 1 is the concepts of each technology.

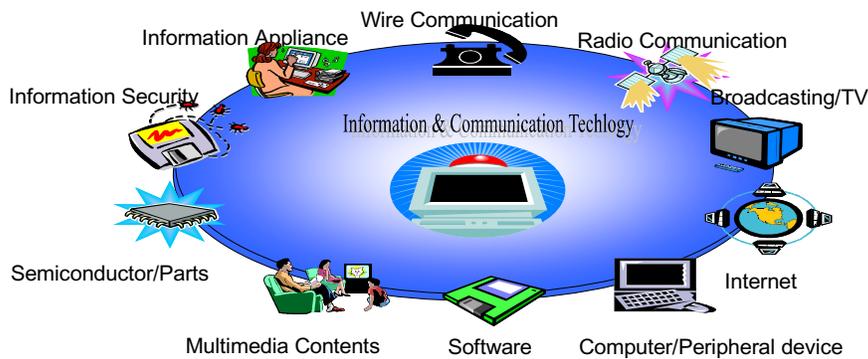


Figure 1: The kinds of Information & Communication Technology

Table 1: The Concept of Technologies in Information and Communication

| Classification | Concepts | Application of KMS |
|------------------------------|---|----------------------------------|
| Wire communication | Electronic communication to use a leading wire | Infra Technology |
| Radio communication | Electronic communication to use an electromagnetism wave | |
| Internet | The set of net connected with communications networks | |
| Computer / Peripheral device | The Electronic device that programming is possible | |
| Semiconductor / Parts | The material an electrical conductor is worked by an electron and hole | |
| Software | A general term for the computer programs and its related documents | Important application technology |
| Multimedia content | Content uses various media for communications | |
| Information security | Protecting much information kept or transmitted in information system from threats of every kind | Unexploited filed |
| Information appliance | The digital appliance of new kind designed to offer internet service such as web browsing or e-mail interactively | |
| Broadcasting / TV | The radio communication by a electronic wave | |

3. AN ANALYSIS OF APPLICATION OF TECHNOLOGIES IN INFORMATION AND COMMUNICATION FOR CONSTRUCTION KMS

The next will analyze the application on the subject of Information & Communication technologies the degree of application is important in Table 1 in detail (See Table 2), benchmark KMS of S•D•H company for such analysis, and giving marks of each 1, 2, 3 with the degree of application through interviews of related specialist, evaluate each detail technologies.

Table 2: Detail Technologies of Important Application Technology

| Classification | | |
|----------------------|---|--|
| First | Second | Third |
| Software | Packaged software | System software, Applied development tool, Application software |
| | Computer service | System integration, Program development service, System management/Maintenance, Data processing |
| | Knowledge information processing software | Automatic translation, Speech recognition, Classification /Summary, Information search, Knowledge processing |
| Multimedia Content | Work of digital content | Work of content, Work environment |
| | Content for education | Work of content, Learning management, Education platform |
| | Content for entertainment /game | On-line pc game, Video game, Arcade game |
| Information Security | The common infra technology | Cryptograph, Authentication |
| | System /Network Security | System security, Hacking/Virus confrontation, Network security |
| | Security of application service | Information security for <i>electronic commerce(EC)</i> |

Alphabet in Table is used as a substitute for names of each technology.

3.1 The Analysis of Application of Information & Communication Technologies through Benchmarking KMS of S•D•H Company

In case of domestic construction, KM by development of KMS is being progressing in the center of large enterprise. Accordingly, This study analyzed application of Information & Communication Technologies through interviews of related specialists and analyzing KMS of S•D•H company. Figure 2 shows the degree of application by detail technologies.

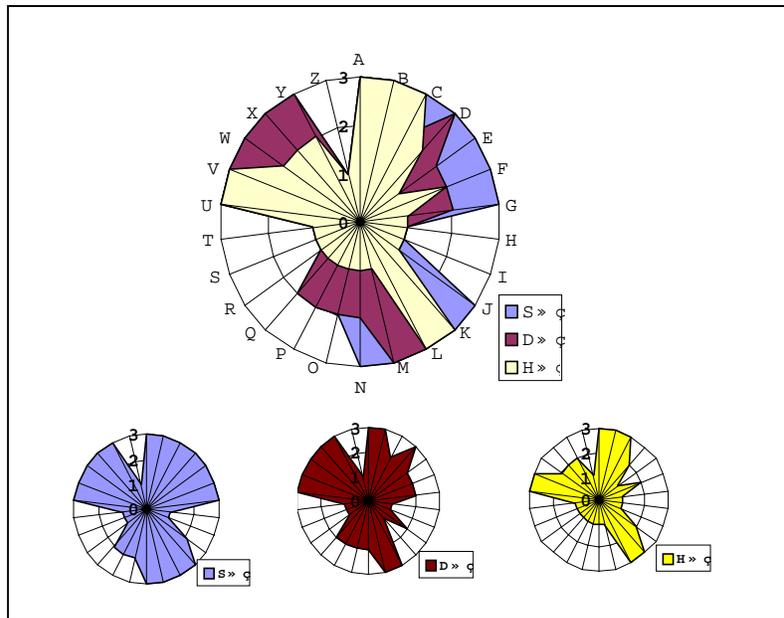


Figure 2: The Degree of Application of Information & Communication Technologies through Benchmarking KMS of S • H • D Company, in detail

As Figure 2 is shown in, technologies three companies apply importantly are system software, applied development tool and applied software among packaged software in software, knowledge processing in multimedia content, and cryptograph, authentication in Information security. On the other hand, the application of information security for electronic commerce in information security and speech recognition, automatic translation in knowledge information processing software was analyzed lowly. A noteworthy matter is that application is low generally in the whole field of multimedia content. As this study analyzes the above explanations, in case of software, application was different according to construction budget and method of enterprises that want to introduce KMS. In case of S company among three companies, it invested most some 6 billion in constructing KMS and key system connected with KMS, and worked contents through business map in comparison with other companies, so system of S company isn't unable to be high. As is shown in Figure 2, S company have the high application in the whole field of software. However, Automatic translation and speech recognition in software show they were not almost applied because they are insufficient in use and performance, whereas they cost a great deal in developing. Looking into multimedia content, it was analyzed that application of content for education is low, whereas one of work of digital content is high. Work of digital content is an easiest, efficient technology for three companies to construct KMS. Accordingly, such technologies show high applications generally. Three companies (including a lowest H company) show the application of content for education isn't high about it, because in case of domestic construction, a time starts KM through constructing KMS is short and they focus in registration of knowledge than application of one. And Content for entertainment/game isn't almost applied. Information Security showed the high application, which is being treating importantly as a means to protect a system from every threat. Because standardization, every security for network protection of LAN etc., system connected with Internet and information used in every EC, electronic document, e-mail are taken serious view of as time goes on in surroundings that is opened and decentralized, Internet's characteristics. However, information security for EC is a technology that is applied in KMS, which is applied to electronic supply system such as CALS (Continuous Acquisition & Life-cycle Support). According to a result of analysis, Figure 3 divides into detail technologies of Information & Communication Technologies the degree of application is very important (V.I), important (Im) or unimportant (UI).

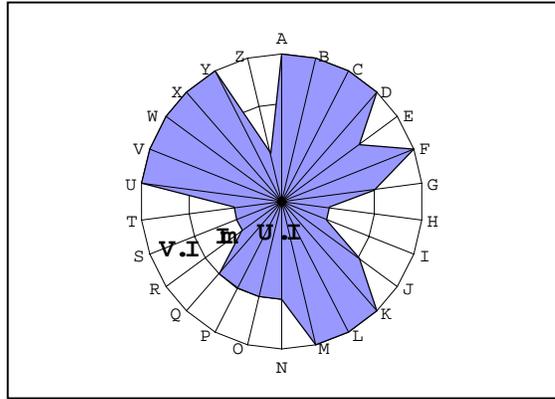


Figure 3. Classification technologies in information and communication by application

As a result of analysis, application of content for education and entertainment/game in multimedia content are analyzed lowly, because such technologies don't need to be applied in KMS as infra of enterprise. However, such contents are necessary technologies to transmit the knowledge efficiently. Accordingly, decrease of software application for decrease of investment cost, application of content for education and entertainment/game need to be studied in the aspect of construction industry. Here, this study will look into how such technologies are applied and how the degree of application is improved through Virtual Edu-research Network (hereinafter referred to VERN), KMS in a broad sense, e-Construction Lab. Hanyang University, Korea is constructing.

3.2 The Analysis of Application of Information & Communication Technologies through VERN

This study benchmarked KMS in the center of large enterprises in the above. Looking into a result of analysis, it is more efficient for special technologies to access in the aspect of construction industry than accessing in the company's aspect. To know such technologies, in this chapter, this study intends to draw the best-fitted technologies in information and communication applied in KMS on the subject of VERN e-Construction Lab. is constructing for general construction companies (including subcontractors) through benchmarking KMS of large enterprises and interviews of related specialist. Figure 4 shows the degree of application of information and communication technologies applied in VERN (including Figure 3 for comparison). VERN provides general users (including students, children etc.) and related specialists with information with regard to construction and supports KMS of the aspect of construction industry for efficient KM. E-Construction Lab. constructed a virtual education site up to now and will construct KMS of a broad sense with its own KMS and KMS for subcontractors hereafter. In this chapter, this study intends to know differences between VERN and KMS of three enterprises and what application of technologies is improved. Most characteristic of VERN can look at the aspect of packaged software in software, content for education and entertainment/game in multimedia content. First, looking into the packaged software, these technologies occupy most rate of construction cost for system, so three companies showed the high application of these technologies. However, VERN showed the low application of these technologies, which mean e-construction Lab. lowered the investment cost through its own development and study. Second, looking into the content for education, KMS of three companies didn't realize the doge system of field on KM System, but VERN applies these technologies efficiently because of accessing in the aspect of construction industry. That is a fruit of steady study by development of a long term. Finally, application of content for entertainment/game may be high by indirect use than direct one. That is, VERN adds these technologies to various contents and is constructed for the system for end-users. Presently, e-Construction Lab. constructs KMS for its own and subcontractors and application of these will be high hereafter. The application of cryptograph and authentication in information security isn't high in comparison with large enterprises invest a lot of cost to protect their system from knowledge and information drain because VERN is constructed in the aspect of construction industry.

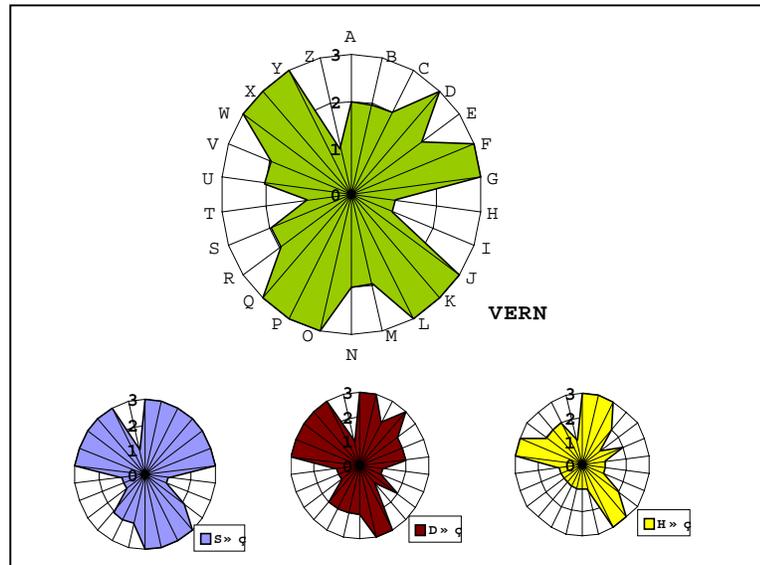


Figure 4: The Degree of Application of Information and Communication Applied to VERN

Looking into the application of Information & Communication Technologies used in VERN, we can know various technologies large enterprises didn't have access to is improved and applied in VERN constructed in the aspect of construction industry. As a result of analysis, we can also know the application of various technologies that isn't high in the aspect of large enterprises is higher and more efficient in the aspect of construction industry as VERN.

4. CONCLUSION

This study understood what technologies that aren't used well in constructing KMS are and its reason is through practices of benchmarking KMS of large enterprises of domestic construction. Also, this study drew the improvement through VERN with regard to such those. As a result of analysis, special technologies such as content for education and entertainment/game and decrease of investment cost of software need to be accessed in the aspect of construction industry, and in addition, the result of this study is judged to maximize the efficiency of KM through KMS if the system such as VERN constructed through access of the aspect of construction industry is used about special technologies that are difficult to construct because of companies own characteristics as infra technologies of ASP (Application Service Provider). Hereafter, this study will be a good example to general construction companies that want to introduce KMS. However, this study need to draw more objective Information & Communication Technologies (applied to KMS) harmonized with through addition of practice because this study is limited to three companies, and application of technologies in information and communication will be higher because e-Construction Lab. is constructing KMS for e-Con and subcontractors in VERN at the present time.

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