

Knowledge Management and Process Innovation: The Knowledge Transformation Path in the Information Space

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Abstract

This paper explores the possible connection between knowledge management (KM) and process innovation (that is, BPR). Although these two seem to be popular themes in management innovation literatures, there is not so much endeavor to discuss these together. On the one hand, knowledge management has been treated as a trendy management fad that is mainly focused on knowledge creation, dissemination, and use. Moreover, the advocates of knowledge management seem to be concerned with building the KMS (knowledge management systems). On the other hand, process innovation is regarded as an efficiency-oriented process redesign and re-engineering, which seems to be nothing to do with knowledge management.

However, the case study of *Samsung SDI* (formerly *Samsung Display Device*) can illuminate the significance that in real world knowledge management is deeply linked with process innovation. In *Samsung SDI*, knowledge management is not unusual and not even novel concept to some extent. And it is practiced along with process innovation. Especially, knowledge has been closely connected with process innovation in the sense that practitioners regard process knowledge as the byproduct of process innovation as well as the intangible asset. Thus, for describing *Samsung SDI*'s knowledge management strategy, the term 'PI-based KM' is coined.

The paper sheds light on the two points. First, the features of process knowledge should be studied. Knowledge associated with process is called 'process knowledge'. Second, socio-cultural features of knowledge management should be illustrated in terms of 'knowledge transformation path' in the I-Space (information space).

1. Introduction

It is argued that the aims of knowledge management (KM) are not to build knowledge management system (KMS) but to enhance competitiveness of organization through capitalizing the potential value of knowledge [1, 2]. But there are many studies that are concerned with just building KMS rather than enhancing competitiveness itself. Thus, the authors try to explore the KM strategy ways in which we can review the literatures on KM research critically. And we have also undertaken our own case study.

For this purpose, we need to search for KM strategy with regard to gain the sustained competitive advantage for companies. According to resource-based view of the firm, the sustained competitive advantage is inimitable and historical so that the nature of KM should fit to these constraints [3]. In this

study, we contend that the Process Innovation-based (PI-based) KM strategy is providing the sustained competitive advantage. And we can highlight Knowledge Transformation Path (KT-Path) leading the chain reactions of innovation. Our study is based on the authors' own case study of *Samsung SDI* and other Korean researchers' case studies.

2. PI-based Knowledge Management Strategy

Since 1990s, many Korean companies have tried various types of management innovation practices, notably process innovation (PI). Nevertheless, these endeavors are more or less fruitless efforts in the end. The reason why this has been failed is that these innovative trails are not properly and carefully practiced, but these are hastily implemented like fads.

Thus, it is necessary to search for connection and relationship between KM and management innovation practices. In this sense, we try to make connection and to find out solutions of implementation of KM, simultaneously. We call this strategy as the PI-based KM in the sense that this connects PI and KM.

So far, there are not many studies relating the two together at least in Korea. For instance, recently one study criticizes the current trend on KM researches in the sense that the themes of KM and PI could not be linked properly [4]. But, they also cannot give us the connection of the two in concrete and explicit manner. On the other hand, other researchers suggest that BPR (Business Process Reengineering) can provide us with good resources for KM [5]. Probably BPR can be a methodology for enhancing the process efficiency. But our study is rather different in that both PI and KM should be linked and we are stressing on the significance of the complementary nature of the two.

This study highlights the value of PI concerning the viewpoint of KM. Unlike other researches, we try to connect PI to KM in which the two should be implemented in parallel. The main theme of this paper is that KMS should be implemented with connection to PI in parallel, in order to realize the real value of knowledge in companies.

There are the two points that we want to make. Firstly, KM strategy should be considered with connection to the characteristics of process knowledge, which are produced through PI and process implementation. Secondly, KM strategy should be considered socio-cultural features of process knowledge.

2.1 Knowledge Management Implementation Strategy based on the characteristics of Process Knowledge

Process knowledge is the knowledge and information that are produced as the outcome of process innovation process and innovative process practiced. These values of process knowledge are represented to be the reduction of lead-time, enhancement of management efficiency, reduction of information search cost so as to enhance the competitiveness of the company.

As a global company *Samsung SDI* (formerly *Samsung Display Device*) has practiced PI for building core competency and competitiveness. From the initial stage, the company has kept introducing and adopting advanced processes using *SAP R3* (ERP package) rather than innovating their own established systems and processes. There are so many documents and manuals of PI practices so that they need to have effective way of handling knowledge and information of these kinds. Afterward, they have realized their needs of introducing KM and implementing PI-based KMS. The whole picture of *Samsung SDI*'s KM process is presented in Fig. 1.

As shown in Fig. 1, the huge amount of information and knowledge has been produced as the result of implementation of PI. The output of PI includes various kinds of knowledge, namely, knowledge on process itself, knowledge on business contents and methods, relationship of business and people concerning process, know-where, know-what, know-how, and so on. These types of knowledge are automatically updated.

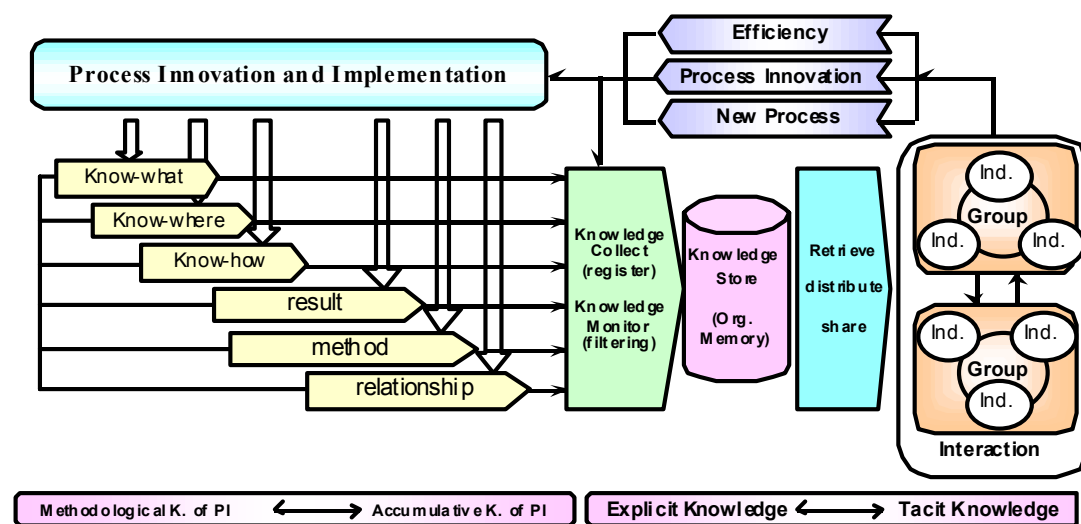


Fig. 1 Process Innovation-Based Knowledge Management in Samsung SDI

In *Samsung SDI* the knowledge is not been stored in paper-forms, but is automatically stored in the electronic knowledge store system. But the knowledge that cannot be stored in the system such as PI related knowledge, is lead to be registered selectively by means of the knowledge monitor system. The knowledge registered in the knowledge store is available for those who want to use them at anytime and anywhere through the Internet and the intranet. It is also organized with many forums such as the forum for knowledge sharing and the forum of the 'best practice' that is introducing the cases of management innovation.

Meanwhile, the knowledge related to management innovation is shared with other members of the company who are working in the dispersed areas across the country and across the world. They are working in the same field and the similar tasks in the company. Moreover, they are improving their productivity by means of the interactive practices actively. And it is continued toward new innovative management practices. Likewise, *Samsung SDI* has implemented KMS toward the value of knowledge using the characteristics of knowledge as we have argued in this paper.

(1) Methodological Knowledge of PI

We coin the term the 'methodological knowledge of PI' for representing the knowledge that is produced through PI. Specifically, this type of knowledge derives from analytical knowledge about process and improved process based on internal consensus. This process knowledge includes the contents

of specific tasks and their relationship, departments concerning the tasks, process-related information system, and output knowledge in this stage.

The three main characteristics of this type of knowledge as follows. Firstly, this type of knowledge is produced through externalization that is transformed from tacit knowledge to explicit knowledge [6]. Secondly, the value of this knowledge is capitalized when the knowledge is distributed, shared and internalized by the members who are in charge of the tasks. Thirdly, this type knowledge is bound to the given context due to the characteristics of knowledge. When the context has been changed instantly, the process knowledge has been restructured and adjusted to the changed context. Therefore, the KMS should be implemented and infrastructure is constructed toward the direction of capitalized the value of the process knowledge. Moreover, it is essential for the KM implementation to distribute process knowledge and to secure the places for sharing.

(2) Accumulative Knowledge of PI

As a coined term, the 'accumulative knowledge of PI' refers to the knowledge that is an outcome of innovation process. It is automatically registered in the knowledge store. For instance, after practicing the improved bidding process we can get the list of company names participated in bidding, the documents submitted for bidding, evaluation papers for bidding process, the final evaluation paper, the information about the personnel in charge of bidding, and so on. In *Samsung SDI*, this knowledge is called to be 'utilized knowledge'. It is reused by other members of the company and by someone who are in charge of these tasks outside the company in order to facilitate more effective and efficient task performance.

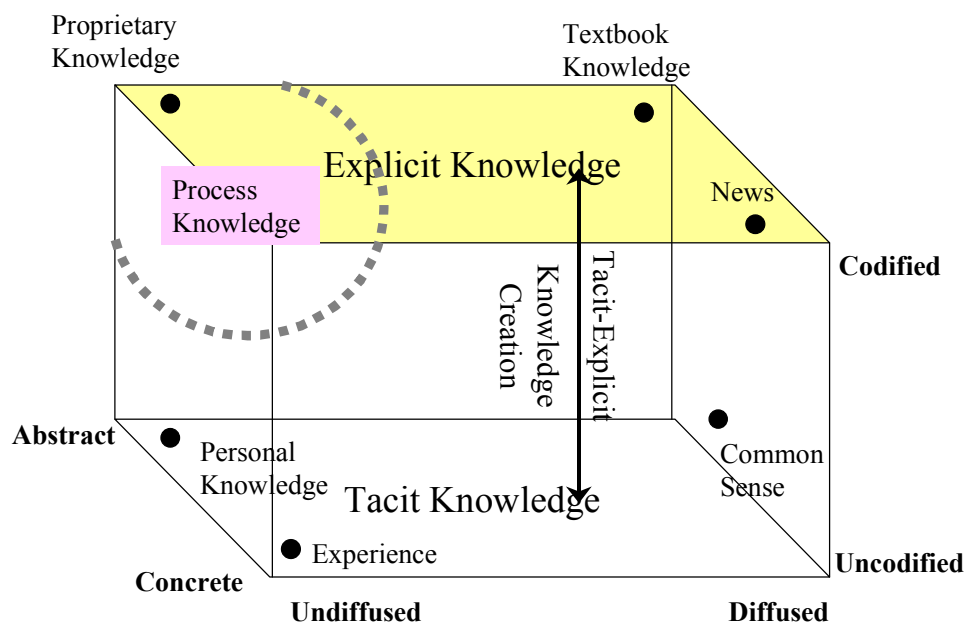


Fig. 2 Knowledge Types and process knowledge in the I-Space

The characteristics of this sort of knowledge can be summarized in the two points. Firstly, this is not the process itself, but the tasks related performance. Secondly, unlike the capitalizing the values of the

explicit and tacit knowledge, this type of knowledge should be combined with tacit knowledge that is embodied to someone working for the task, and explicit knowledge that is collected in the knowledge store. Therefore, the implementation of KMS should be constructed with considering the features of process knowledge.

Nevertheless, what we have argued is not only the significance of the features of process knowledge, but also the interactions of individuals and groups. As shown in Fig. 1, the significance of process knowledge is tightly related to the human and organizational interactions. Otherwise, we may not get to the point of lesson from the case of *Samsung SDI*. This is why we want to move on to the next theme of socio-cultural factors concerning the KM strategy. The human aspects of KM are nothing but the socio-cultural factors of KM.

2.2 Knowledge Management Implementation Strategy based on Socio-Cultural Factors

(1) The Process Knowledge in the I-Space

When implementing the KMS, we should consider the socio-cultural factors of process knowledge in cognition and utilization process. Boisot [7, 8] has long been working for the theme about socio-cultural factors of knowledge and the KMS implementation method. He mints his own theoretical framework as the I-Space, which is using three dimensions, i.e., concrete-abstract, diffused-undiffused, and codified-uncodified. Based on the framework, he suggests the I-Space by which can extend to various themes. In this paper, when we explain the features of process knowledge, we use the notion of the I-Space as shown in Fig. 2.

The I-Space is a theoretical framework for explaining and analyzing the dynamic knowledge flow. The I-Space is basically a three dimensional cube with regard to the culture and organization.

Firstly, the dimension of codification is dealing with the categorization. It sheds light on the theme whether it can categorize the subject of phenomena and experiences. And the categorization means the 'coding'. Through this, it is codified and formalized. Therefore, when we can codify more, we can get exceptions less. In contrast, the more exceptions, the less codification. Therefore the dimension is paralleled with the dimension of tacit and explicit knowledge [6].

Secondly, the dimension of abstraction (concrete-abstract) is related to people who are dealing with understanding the phenomena required cognitive and conceptual categorization. What we categorize some phenomena can make it higher level of abstraction. And the abstraction is related to understanding the basic structure of phenomena, whereas the concrete leads us to understand more or less practical and individual things.

Thirdly, there is the dimension of diffusion (diffused-undiffused). This is often called the dimension of information sharing. If we share more knowledge, the knowledge is more diffused. And it can be applied to differences among the national cultures, such as Korean and Japanese culture.

Let's move on the issues of institutions and knowledge in the I-Space [7, 8]. We refer to the diagram of Boisot's framework as shown in Fig. 3. The bureaucracy is in the realm of abstract-codified-undiffused, in which diffusion process can be performed by the central control mechanism, notably, monthly financial report. The market is in the realm of abstract-codified-diffused. The typical example of diffusion mechanism is based on the price. The fief is in the realm of concrete-uncodified-undiffused. The example is personal memory and experience. The clan is in the realm of concrete-uncodified-(partially)diffused. That is, diffusion is not in the whole but in partial subset. The example is myth and tradition.

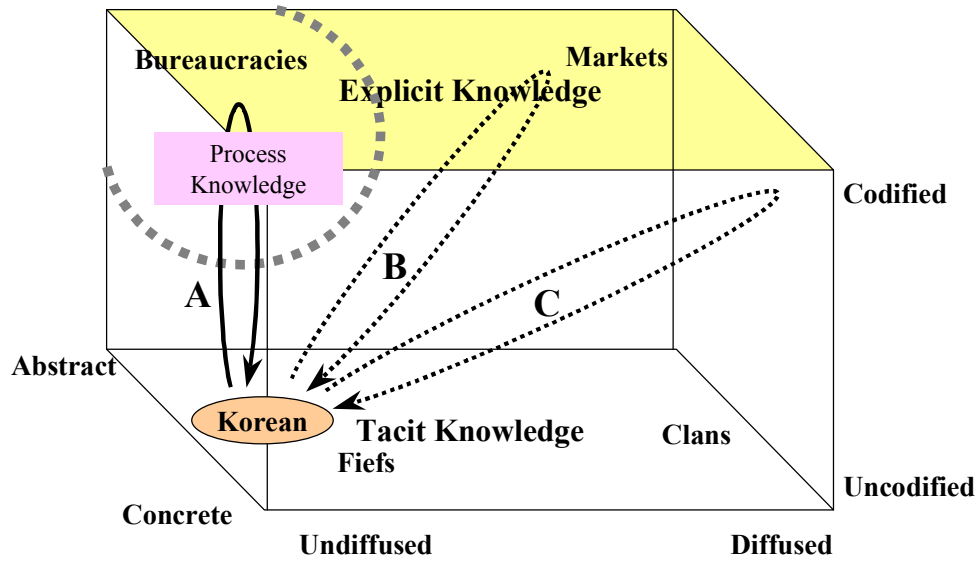


Fig. 3 Cultural patterns and the KT-Path in the I-Space

According to the I-Space framework, the process knowledge is in the codified and undiffused area in which is rather similar to the proprietary knowledge as shown in Fig. 2 and Fig. 3. This knowledge is the codified knowledge and the firm-specific knowledge as well. Thus, it is closely related to the societal and organizational context.

(2) Knowledge Transformation Path (KT-Path) in the I-Space

The KT-Path means the transformation path of different types of knowledge in the I-Space. Especially, the significant the KT-Path is the knowledge transformation between tacit and explicit knowledge, which is necessary for knowledge creation in organizational level. For Korean companies, there are some possible ways of the KT-Path such as A, B, C as shown in Fig. 2. It is necessary to consider the characteristics of knowledge and cultural dimension in the I-Space in order to identify the most effective and efficient ways for Korean companies. We may identify cultural differences between the European countries and the East Asian countries, furthermore the differences among Korea, Japan and China.

For instance, Boisot and Child [9] compare the differences between the Western organizations and Chinese organizations in terms of the KT-Path. According to them, the Western organizations deploy the strategy of complexity reduction based on cognitive aspects. In the Western organizations, while the cognitive complexity is lower than others, the market-centered relational complexity is higher. Because of this feature, the market order is deployed for reducing the relational complexity based on codification and abstraction, which can be called ‘cognitive strategy’. As an example, the transaction information in markets has been changed into number and price specifically. Through this transformation, relational complexity can be reduced, that is the Western organizations’ strategy.

On the other hand, Chinese organizations deploy so-called ‘relational strategy’ for absorbing complexity. When Chinese people manage organizations, they use the network-based strategy, especially the traditional extended family system in order to absorb the complexity. In Chinese organizations, the cognitive complexity is high, while the relational complexity like feudal and clan style complexity is moderate level. Thus, they use the relational strategy to deal with cognitive complexity. In other words, relationship like extended family system can be used for absorbing the cognitive complexity.

In this way, we can notice the differences between the Western and Chinese organizations when they deal with organizational complexity. While the Western companies prefer the strategy of reducing the complexity, Chinese organizations prefer the strategy of absorbing the complexity.

It can be argued that the differences among the national culture are connected to the differences of the KT-Path. One of the main arguments by Boisot [7] is to point out the differences between the Western culture like English and French culture and the East Asian culture like Chinese and Japanese culture. That is to say, Anglo-American culture can be located in the diffused-codified-abstract dimension, which is market-centered knowledge; while the East Asian culture place in the diffused-uncodified-concrete realm of the I-Space, which is called as clans-centered and fiefs-centered knowledge.

Regarding this argument to KM, KMS in Anglo-American culture is constructed by market-oriented, numerical and analytical approaches based on competition so as to fit socio-culturally. In other words, complexity of knowledge is decreased by means of codification and abstraction that is called cognitive strategy.

On the other hand, KMS in the East Asian culture is constructed by relational, qualitative and wholistic strategy, which is based on relationship-centered and clan-centered approach. And this system is adopted well socially, because complexity of knowledge is absorbed by the relationship-centered strategy. Therefore the East Asian people prefer using well-documented papers and absorbing complexity of knowledge based on relationship of extended family system to processing and elaborating information in terms of analytical perspective that is mainly practiced in the Western countries.

However, we can also illustrate cultural differences among three countries, namely Korea, Japan, and China. For instance, China may be closer to the fiefs whereas Japan is similar to the clans [9]. Korea is similar to China, but there are also many differences [10]. However, it is obviously a controversial issue to be discussed further.

What, then, is the more effective and efficient way to transform the process knowledge for Korean companies? We suggest tentatively the path A in Fig. 3 because it is one of the shortest way of cultural change concerning the three dimension of knowledge in the I-Space. If Koreans follow the path B and C, it takes much longer time and energy because these paths engage two or three knowledge dimension in the I-Space. There are many possibilities of the KT-Path in the I-Space. Thus, first thing we have to identify in this regard is to map the any organization's institutional position in the I-Space. And then, we have to judge the right (or effective) KT-Path for transforming the knowledge from tacit to explicit, or vice versa. In this regard, EDMS (Electronic Document Management System) as a document-centered KM tool is more valuable tool for Korean companies in that it is able to transform process knowledge easily into explicit knowledge.

The case of *Samsung SDI* shows the fact that EDMS may become the infrastructure of KM and accumulate and utilize process knowledge. The company has regarded the document as an important explicit knowledge source in the organization, not simply as information and data as such. Furthermore, the company has started KM as a way of knowledge accumulation and utilization. At the initial phase, the company has simply changed its documents into the electronic format, and saved into the knowledge store. But later, the company innovates business processes and tasks in terms of KM. Especially after PI there are massively produced process documents, i.e., process knowledge so that it should be stored, transformed, shared and utilized, that is the goals of KM.

3. Conclusion

We conclude that the PI-based KM can provide a Korean company, *Samsung SDI* with sustained competitive advantages, which are inimitable competencies from other companies. The PI-based KM may become the firm-specific competency because process knowledge itself has proprietary feature of knowledge for the company.

Thus, we suggest the implications of this study for implementing KMS effectively as follows:

- To consider the features of process knowledge when implementing KMS
- To consider socio-cultural factors and organizational culture when searching for the KT-Path concerning knowledge cognition and utilization of knowledge.

This study suggests the notions like the I-Space, the KT-Path, and process knowledge as theoretical building blocks for KM. With these notions, we also propose the KMS implementation strategy. Along the line of this perspective, we criticize current researches as well. We also stress the difficulty to find out the universal strategy for any cultural settings and any organizational contexts. If we think more critically, we can point out problems of the universal and normative design perspective for KMS. It is similar to criticize the established theories of management disciplines. These are so-called 'rational' perspectives that premise the best way for managerial practices. Unfortunately, many of us try to find out and look for it.

Nevertheless, the study is an exploratory study so that there are many logical pitfalls, and empirical evidences. But through this study we attempt to show an alternative viewpoint to KM. Moreover, we expect that this alternative perspective can be developed further.

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