# A KNOWLEDGE CREATING ORGANIZATIONAL MEMORY : FROM YIN YANG PERSPECTIVE

Jaegyong Chang[1] Heeseok Lee[2]


KAIST, Management Graduate School [1]
Faculty, KAIST, Management Graduate School[2]

Seoul, Korea

## ABSTRACT

*This paper proposes KCOM(Knowledge Creating Organizational Memory to store the organizational knowledge for knowledge creation on the basis of Oriental Yin Yang thought. KCOM sharpens knowledge creation by the dialectical circulation of organizational knowledge. Application in real-life e-Business demonstrates the practical usefulness of KCOM.*

## KEYWORDS
**Organizational Memory, Knowledge Creation, e-Business, Yin Yang Thought**

## 1. KCOM(Knowledge Creating Organizational Memory)

The complexity and rapid shift of business paradigm requires organizational knowledge as a competitive weapon for success. Organizational memory has been an important research issue on how to store the organizational knowledge for the purpose of organizational effectiveness.

This paper reviews organizational memory as dialectical circulation of organizational knowledge under the foundation of the Oriental Yin Yang thought including five elements. An architecture for KCOM (Knowledge Creating Organizational Memory) is developed.
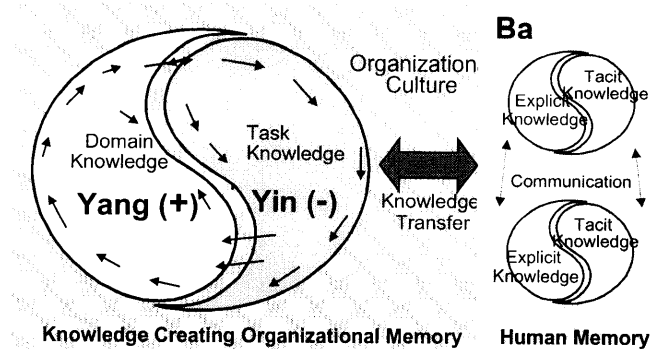


Figure 1 Knowledge Creating Organization

From an Yin Yang perspective, KCOM in Figure 1 categorizes the organizational knowledge into two types such as task knowledge(Yin) and domain knowledge(Yang), which is the digital knowledge stored by information technologies. Table 2 shows our definition of domain and task knowledge and their examples.

| | Task Knowledge | Domain Knowledge |
|---|---|---|
| **Definition** | A set of procedural knowledge captured during the process of knowledge creation | A set of declarative knowledge about specific domain to reuse the knowledge assets |
| **Properties** | • Difficult to store and formulate into knowledge<br>• Need appropriate knowledge | ♦ Should be reorganized in order to reuse effectively |
| **Example 1:**<br>New Product<br>Development<br>(Intranet) | • Executive meeting memo<br>• NPM (New Product Memo)<br>• Technical memo<br>• Customers' response memo | ♦ Documents, Reports<br>♦ Competitive intelligence<br>♦ NPA(New Product Approval)<br>♦ Analysis of market trends |
| **Example 2 :**<br>Project Management<br>(Intranet) | • Project meetings memo<br>• User interview memo<br>• Technical memo | ♦ Online manuals of software tools<br>♦ Staff manuals, Proposal<br>♦ Project system<br>♦ Final reports |
| **Example 3:**<br>A Shopping Mall Site<br>(e-Business) | • Consumer opinions (BBS)<br>• Customers' ranking<br>• FAQ about products<br>• Help desk of order/delivery | ♦ Product catalogs<br>♦ Best brands selected according to consumer opinions<br>♦ Buying guide |
| **Example 4:**<br>A Community Site<br>(e-Business) | • Community board (BBS)<br>• Make friends(Chatting)<br>• Personal calendar/scheduling | ♦ Member profiles<br>♦ Relationships between members<br>♦ Personal contents(physical condition, fortune etc) |
| **Example 5:**<br>A Portal Site<br>(e-Business) | • Internet café (Chatting)<br>• Internet columns (BBS) | ♦ Contents of various domains<br>♦ Best 5 of Internet café<br>♦ Best 5 of Internet columns |

Table 1: Two types of Organizational Knowledge

## 2. Dialectical Circulation of Organizational Knowledge

KCOM is more likely to generate business values through the dialectical circulation between task and domain knowledge, as a newbeing is created via the harmony of Yin and Yang. Through this dialectical circulation, domain knowledge provides appropriate input for the task knowledge; the task knowledge creates a new value by problem solving or customer satisfaction which is integrated with the domain knowledge.
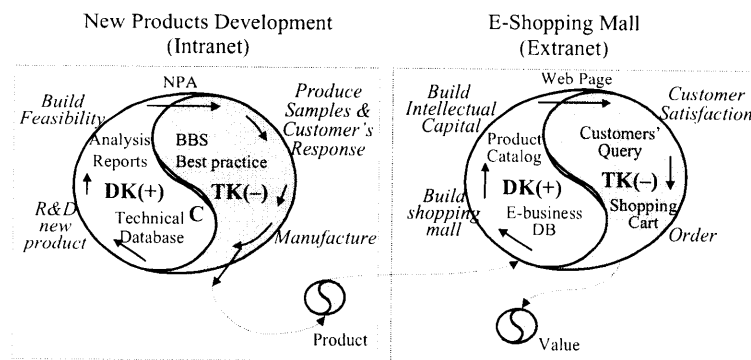


Figure 2  Dialectical Circulation and Its Value Creation

As an illustrative example, Figure 2 shows a simple knowledge flow from developing new products to sales (or from Intranet to Internet in a business). This example highlights that the value creation process needs two circulations. The first circulation creates new products and second creates financial values. If the two memories are integrated, the left memory corresponds to the domain knowledge about new products and the right memory corresponds to the task knowledge for sales.

## 2. 1 Four Subtype of Organizational Knowledge During Dialectical Circulation

Each organizational knowledge can be further split into two types. It has been known that internally Yin and Yang have both Yin and Yang. As shown in Figure 3, the domain knowledge can be split into the domain-domain knowledge and the domain-task knowledge. Four subtypes of organizational knowledge are circulated for the purpose of the value creation. This is a preliminary draft of organizational knowledge in the case of a simple e-business.
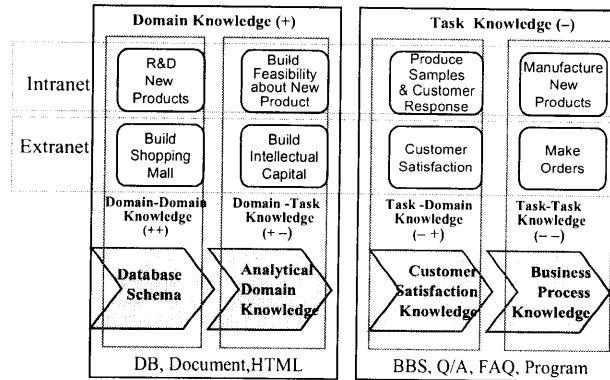


Figure 3　Four Types of Organizational Knowledge according to Dialectical Circulation

The domain-domain knowledge is composed of well-structured database scheme. The domain-task knowledge includes the analytical domain knowledge created by applying data mining or OLAP tools. The domain knowledge can be represented in the form database, HTML documents, etc.

The task knowledge includes the task-domain knowledge and the task-task knowledge. The first is collected from customers via BBS directly or queries in shopping mall search engine. The task-task knowledge includes know-how related to manufacturing or sales, and often results in business patents.

### 2. 2 Five Components of KCOM

In KCOM, a dialectical interaction between task and domain knowledge is possible by the collaboration of five components: agent, thought, process, object and content. These five components are introduced because they explain the balanced knowledge creating organization effectively. These five components correspond to those from Yin Yang thought such as tree, fire, earth, metal and water as shown in Table2.
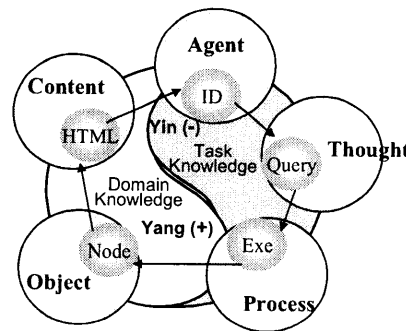


Figure 4　Five Components of KCOM

| Component Specification | Object | Content | Agent | Thought | Process |
|---|---|---|---|---|---|
| **Element** | Entity (Node) | Text(HTML) | ID(Identification) | Query | Execution |
| **Example** | Display title | Browse text | Access | Write query | Push execution |
| **Property** | Structure the object of knowledge | Reorganize the content for flexible reuse | Consume or produce knowledge | Express customer's thought | Work and produce value |
| **Five Elements (Yin Yang)** | Tree | Fire | Earth | Metal | Water |

Table 2:  Five Components and Their Elements

**Object Component as Information Technology Management**

Object components include objects such as goods, patents, software systems, documents, or drawings. Object components interact with process components. Object components reorganize and store knowledge for the flexible reuse. They consist of a variety of metadata on the business domain in the form of database, data warehouse, or document management system. In e-Business they are stored in an application database system for customers, orders, products , or distributors.

**Content Component as Intellectual Capital Management**

Content components store the intellectual capital such as product catalogs, financial sheets and reports. In addition, they can store knowledge form web, commercial databases, journals or books. It may be derived from object components through analytical process or feasibility test. They provide the common knowledge space directly and need to be managed as an integrated knowledge base such as thesaurus or inference rules.

**Agent Component as Community Support Management**

Agent components are people, partners, experts and employees who cultivate knowledge in organization. They may be groups who can facilitate the task according to the organizational chart. Agent components empower their capabilities by acquiring knowledge from content components. Agent components can store know-how, skill, practice, observations and emotions captured from people during tasks. They may store knowledge shared among people or groups through e-mail, bulletin board, and groupware.

**Thought Component as Customer Support Management**

Examples of thought component include new themes of business activities, the concepts about new products, assignments and questions during tasks. They consume knowledge from other components. For example, they receive knowledge about the customer dissatisfaction and the niche market from the process components, the business intelligence and new technology from the content components, the sales prediction and customer segmentation from object components and the insights and judgements from agent components. Thought components use question/answer. In case of e-Business, customers define their needs and select the goods. They refer to other's buying experience and collect information such as best quality, cheapest price, and after service.

**Process Component as Supply Chain Management**

Process components include business processes, activities and workflow. They store methodological knowledge such as best practices and strategies especially from object components and agent components. In case of e-Business, process components need the secure transactions.

| Component | Elemen | Definition | Examples (Intranet ) | Examples (Internet Sites) |
|---|---|---|---|---|
| **Object** | Entity | Objects related to information technology management | •Application system<br>•Datawarehouse<br>•DMS(Document Management System) | ◆ Cyber trading<br>◆ Cyber banking<br>◆ Shopping mall |
| **Content** | Text | A set of the analytical classification for the purpose of intellectual capital management | •Library<br>•Thesaurus<br>•Knowledge base<br>•Encyclopedia of CASE<br>•Financial sheet | ◆ Digital Library<br>◆ Product catalogs of Shopping mall<br>◆ Most sold products lists<br>◆ Lowest price/product |
| **Agent** | ID | People and group of organization whose activities formulate the human network | •Groupware<br>•Mentor system<br>•E-mail<br>•Employee to employee management | ◆ Community portal site<br>◆ BBS<br>◆ Log on/off<br>◆ E-mail |
| **Thought** | Query | Problem from chaos to new knowledge in order to acquire the organizational goal and customer satisfaction | •Group decision support system<br>•E-meeting sys<br>•Question/answering system<br>•Project management system | ◆ Community portal with specific issue<br>◆ Search box (price, product, content etc)<br>◆ Internet poll<br>◆ Panel research |

| | | Safe transaction related to business process, activity and workflow | •BPR •Workflow system •ERP | ♦ Search engine ♦ Auction ♦ Supply chain management ♦ E-trading |
|---|---|---|---|---|
| **Process** | Exe | | | |

Table 3 : Examples of Five Components

## 3. Applications of KCOM to e-Business

Organizational knowledge is easier to capture in e-Business. It has been found that task knowledge is difficult to capture in the organizational memory. However in e-Business task knowledge can be optained via bulletin board or query directly.

This paper classifies e-Business sites into four types depending upon their KCOM usage patterns: domain knowledge type, task knowledge type, incomplete KCOM type and KCOM type.

### Domain Knowledge Type

Typically e-Business sites of domain knowledge type provide the information by using homepage. These sites are in the elementary stage for Internet usage. They store domain knowledge in the form of HTML. Although it can provide a query box for searching its own database, the resulting queries are not collected for any purpose. They push their domain knowledge to internet users but do not pull users' thought.
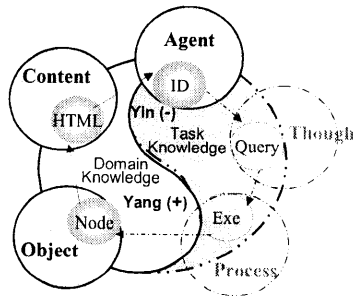


Figure 5 Domain Knowledge Type

| Type of major Sites | Home page, Content Provider, Broadcasting |
|---|---|
| Properties | · To store own domain knowledge and provide it uni-directionally |
| Examples | Korea Blue House(www.bluehouse.go.kr) KAIST Graduate Management School(kgsm.kaist.ac.kr) Donga.com (www.donga.com) etc |
| Recommendation for KCOM | Provide information service according to individual needs (query) |

Table 4 : Domain Knowledge

### Task Knowledge Type

Users for task knowledge type e-Business provide opinions, thoughts, questions and answers via bulletin board, internet polling and panel research.
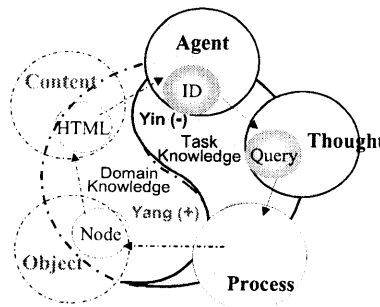


Figure 6 Task Knowledge Type

| Type of Major Sites | Community Site |
|---|---|
| Properties | · To collect thought of user and make it into task knowledge |
| Examples | Cyworld (www.cyworld.com)<br>Daum Internet Café (www.daum.net)<br>Epinion (www.epinion.com)<br>Entalk(www.entalk.co.kr) |
| Recommendation for KCOM | Provide domain knowledge (such as best 5, guidances) derived from a variety of opinions |

Table 5 : Task Knowledge Type

## Incomplete KCOM Type

Organizational memory for incomplete KCOM type e-Business has both task and domain knowledge but does not have all five components as shown Figure 7. An Internet search engine helps to find appropriate information by using queries. However it provides no specific domain knowledge like information broker.
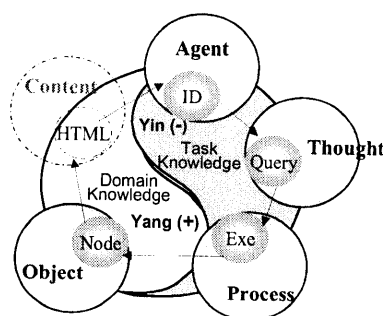


Figure 7  Incomplete KCOM Type

| Type of major Sites | Search Engine Site |
|---|---|
| Properties | ♦ Can find the appropriate knowledge from much information but can not get value by itself<br>♦ Gateway to create the value |
| Examples | Yahoo(www.yahoo.com),<br>Lycos(www.lycos.com)<br>Alta Vista(www.altavista.com) |
| Recommendation for KCOM | Hub portal site (Combine shopping site with search engine) |

Table 6 : Incomplete KCOM Type

## KCOM Type

KCOM type e-Business applies two types of organizational knowledge to create values. Organizational knowledge is collaborated with five components. From Yin Yang perspective, this type of KCOM is a KCOM in a true sense.
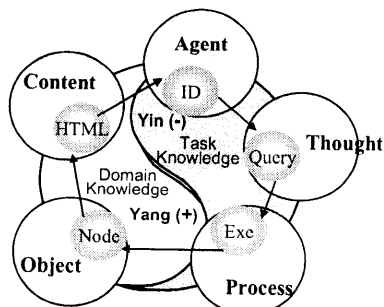


Figure 8  KCOM type

| Type of Major Sites | One Stop Shopping Site |
| --- | --- |
| Properties | • Profitable through the collaboration of five components<br>• Can satisfy customers' needs<br>• Can reuse the results of customer satisfaction in other similar cases. |
| Examples | Amazon (www.amazon.com),<br>Priceline (www.priceline.com) |

Table 7 : KCOM Type

## 4. Conclusion

KCOM highlights that it is important to circulate organizational knowledge dialectically for the purpose of value creation. From an Yin Yang perspective, organizational knowledge is categorized into task knowledge(Yin) and domain knowledge(Yang). This two category is shown to consist of five components. Task knowledge and domain knowledge interactive by the collaboration of five components: agent, thought, process, object and content. The five components illustrate the importance of their harmony.

Current e-Businesses differ in adapting KCOM. Four major types are addressed. It is found that several e-Business sites should face difficulties in creating values, due to incomplete dialectical circulation of organizational knowledge.

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