Enterprise knowledge tree model and factors of KMS based on E-C

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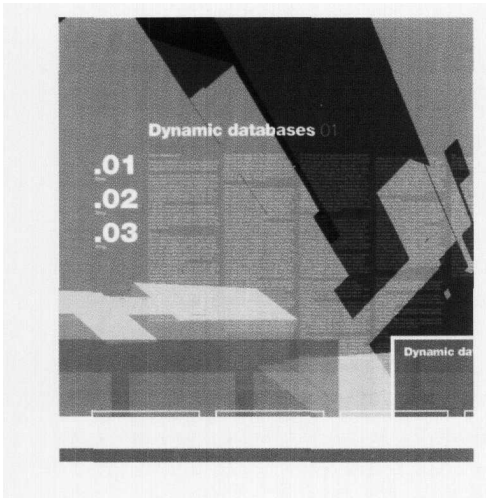
Abstract In the emerging economy, knowledge is now recognized as an important basis for competitive advantage and many firms are beginning to establish knowledge management systems (KMS). Within the last few years, although the topic of knowledge management (KM) has been studied, our understanding of how the design of the KMS affects its use and definition of KM is still rather limited. This paper presents a model of the enterprise's knowledge trees, which is related to several knowledge management processes. The gray information and knowledge are, in their respective capacities, to provide the enterprise with great effectiveness. The gray dimension of enterprise knowledge is defined in line with the model of enterprise knowledge and fractal dimension. Also the key factors of KMS of shared knowledge are discussed in this paper. The results of the study will benefit not only the design of KMS, but also the business model transformation of competitive advantage.

Keywords Model, Knowledge, Knowledge management, Electronic commerce, Knowledge processes

Introduction

Peter F. Drucker (1988) once argued that many organizations were slow to adapt their strategy to the changing business environment. They were hobbled by their past recipes of success. However, in the emerging economy, knowledge is the primary resource for individuals and for the economy at large. Though the land, labor, and capital etc., the economist's traditional factors of production do not disappear, they are to become secondary factors. When the Internet is used to help organizations manage their business processes, the task support systems of the organizations shall aim at providing direct support to those knowledge-dependent activities. This knowledge is generally related to different aspects of the management of an organization: its processes, customers, suppliers, markets, activities, past experts, polices, guidelines, constraints, and so on. The storage, retrieval and processing of this type of information are beyond the capacity of the available MIS; it calls for studying on enterprise knowledge and KMS. Within the last few years, the topic of KM has aroused a lot of interest from among the enterprises and researchers. With regard to the new conditions, this paper carries an original analysis over a new perspective of



KM, followed by suggestions for the managers as to how to effectively deploy it in the Internet age of e-commerce. For such purposes, several aspects are decided as the priorities for the discussion in this paper. Section 1 gives a brief investigation of the general Internet situation in China and the basic concepts of E-C, knowledge and knowledge management. Section 2 presents the model of the enterprise's knowledge trees. In Section 3 some factors of KMS based on e-commerce are discussed. And Section 4 offers some conclusions.

The growth of the Internet and the Web in virtually every corner of the globe has effectively created a new market, in which the geographical distances are no longer a factor for consideration in commerce, while other important resources – information and knowledge – are becoming more and more vital to the global business. The investigation of the CNNIC (CNNIC, 2002) until 15 January 2002 shows that the number of the Chinese net citizens accounts for 33.70 million, which has been increasing rapidly, more than doubling every half of year. The investigation of the CNNIC until 30 June 2001 shows that the number of the Chinese net citizens accounted for 26.5 million; in December 2000: 22.5 million; in July 2000: 16.9 million. But in 1999 the number accounted for only 4 million, and in 1996: only 0.1 million. The Internet offers access to knowledge collection in linking individuals using IT for e-commerce. A hallmark of the new economy is the ability of organizations to realize economic value from their collection of knowledge assets as well as their assets of information, production distribution, and affiliation. The primary purpose of this paper is to guide executives on choices to initiate KM projects according to goals, organizational character, and technological, behavioral, or economic biases to propose strategies, or schools. We have traced, in pragmatic terms, some of what we know about knowledge, information technology, KMS and a complementary KMS. Knowledge is now recognized as an important basis for competitive advantage. And, to our delight, many firms are beginning to establish KMS, which includes efforts to codify knowledge in repositories as well as efforts to link individuals using IT based on Internet, Intranet and Extranet to overcome geographic and temporal barriers to accessing knowledge and expertise. KMS, to be successful, needs to build the context of generation, location, and shared knowledge. The KMS situated organizational learning perspective reveals that knowledge is embedded in individuals, in connections between individuals, and in artifacts as a useful lens to examine phenomena related to the establishment of KMS initiatives. We highlight the factors responsible for the limited success of the initiative in the firm. A consideration of the situated knowledge web and the alignment of the initiatives with the features of the knowledge web are key to success in KM efforts in firms. This paper will provide an understanding and appreciation for the use of KMS to successfully manage an enterprise in the knowledge economy age.

1. The study of knowledge and knowledge management based on e-commerce

1.1. Definition of e-commerce

Seddon (1997) has suggested that "the world has just entered into a third new phase in the evolution of IT capabilities: the Internet era". The suggestion divides the

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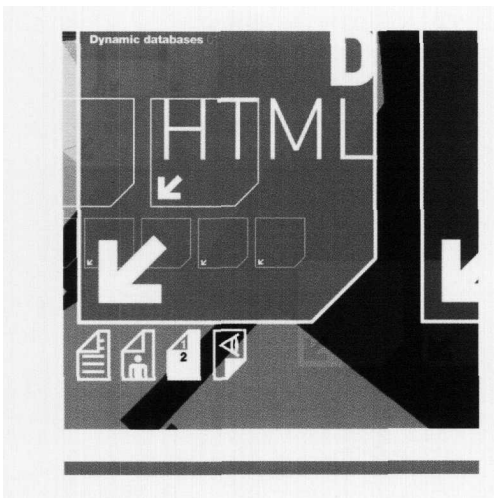


evolution of IT into 20-year periods: 1955-1974, the EDP era; 1975-1994, the MIS era; and 1995-2014, the Internet era. He defines the e-commerce as commerce enabled by Internet-era technologies. A more general definition of e-commerce is given by Wigand (1997) as "... the seamless application of information and communication technology from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of a business goal. These processes may be partial or complete and may encompass business to business as well as business to consumer and consumer to business transactions". A European Union Web site (Esprit, 1997) gives the definition of e-commerce as a general concept covering any form of business transactions or information exchange executed through using information and communication technology, between companies, between companies and their customers, or between companies and public administrations. Whiteley (2000) proposes and uses another definition of e-commerce as formulation commercial transactions at a site remote from the trading company and then using electronic communications to execute that transaction. From the above four definitions we conclude that e-commerce can discover the knowledge of customers, suppliers, retailers and other enterprise knowledge through the Internet technologies. While the enterprise external market information and knowledge will play a much greater role in determining the internal logistics of the product and service. The demand for a company's products and customer service support becomes more fickle with supply chain in dynamic price. Many companies put emphasis on knowledge assets, intangible assets and intellectual capital. Business model innovation in Internet-era is the key level for global market share. Porter's (1980) model of competitive rivalry is still widely used in business. The model shows five forces of competitive rivalries: competitive rivalry among existing firms in the trade sector; threat of potential new entrants to the sector; threat of a substitute product or service to the existing trade; the bargaining power of the buyers; the bargaining power of the suppliers. Internet e-commerce is a technology that can facilitate new entrants to existing markets without the need to match the IT and infrastructure investment of the existing players. Examples of such new business models include Amazon com and e-Toys, relatively new entrants that are threatening the traditional business model of the need to invest in a chain of high street bookstores. The new business models can achieve competitive advantage by using e-commerce for direct sales. It can save costs of distribution, allow an organization to differentiate its products and services and focus its attention on selected segments of the market. Also, the use of e-commerce can involve some possible competitive edges such as reduction of entry costs; new sales channel, new service opportunities; cost reductions; quick response; lock-in; dis-intermediarization; customer information and knowledge; cost direction; originality and focus etc. The enterprises when faced with the new dynamically changing business environment, therefore, need to be adept at creation and application of new knowledge, reconciling knowledge management and e-commerce strategy.

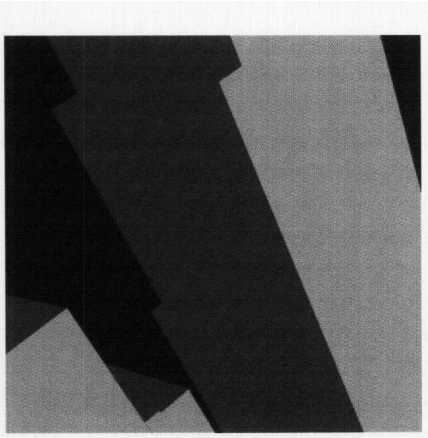
1.2. Knowledge and knowledge management

Knowledge can be divided into four categories in nature: know-what (about the fact); know-why (about the objective rules and patterns of objects, falling in the science category); know-how (about skills, technology and abilities, falling in the technology category); and know-who (about special social relationship, social division and the special skills levels, concerning with the experience and judgment category). The former two and knowledge part of the third categories can be coded, thus they are easy to be acquired. The other part of the third and the fourth category are concealed and decisive ones. Sensitive knowledge, which is difficult to acquire, is, generally speaking, the

> **“ Knowledge can be divided into four categories in nature: know-what; know-why; know-how; and know-who. ”**

knowledge based on certain new field. From a broader scale, it is information by using of symbols. Information is the intention and substance of knowledge. Symbols are extension and form of information. In computer science, knowledge presented by the computer must satisfy the unified structure model, and the limited identical symbols, which constitutes a reasonable system. It is a three-level knowledge system manifested by ''concept-truth-regulation''. It can be divided into three levels: concept knowledge, truth knowledge and regulation knowledge. The nature of knowledge can be revealed through the true, relative, incomplete, indistinct, precise and compatible characters. It can also be manifested, saved and handled.

From management information system to knowledge management system, the scarce resource is not concerned with data and information, but knowledge, knowledge shared and human attention. Malhotra (2000) has described knowledge management, from information processing to knowledge creation below as three key myths relevant to the new world of e-business. Myth 1: knowledge management technologies can deliver the right information to the right person at the right time; Myth 2: knowledge management technologies can store human intelligence and experience. Myth 3: knowledge management technologies can distribute human intelligence. The KM involves electronic transmission of information, verification of information resources and services, reconstitution of decision-making support tools and the life cycle of handling information. Ford Motor Company, Ingram Micro and Chevion have been successful in applying KM and achieved good sales performance. KM comprises various technologies. There is no unified definition for KM so far. For example, KM utilizes a group intelligence to increase flexibility and creative ability. KM is the knowledge used to manage and utilize knowledge. KM is the process of utilizing a company's knowledge capital efficiently to create business opportunities and technology. KM is management activities, it develops and utilizes enterprises' knowledge resources efficiently, and increase creative ability, thus increasing the enterprises' ability of value-producing; KM is a measure, aiming at the application, survival of the organization and to cater for the increasingly environmental changes enterprises face. In nature, it consists of the process of organization development. It combines ability to dealing with data and information technology provided and human beings' inventive and creative ability. From the above definitions of KM, we realize that it is just a start for us to fully understand the nature of KM. We're not clear yet about the characteristics of knowledge and KM. So we describe the characters of KM as follows: KM should be marketing tactics, knowledge sharing cost, methods and technology which can help us gain edges in fierce competition of market globalization and help cut down organization layers. It can contribute to sharing information resources, which include database, text, knowledge base, expert suggestions and employees' experiences. It can increase the flexibility of enterprises. In terms of technology, it is knowledge bases and intelligent agent, text management, research, Internet and Intranet of enterprises. Based on the above arguments, it seems logical to account for the ways in which the organizations acquire, store, transfer, and share knowledge, as well as create new knowledge and innovative application of knowledge in products and services.



2. Model of enterprise knowledge trees

In the context of effective enterprise KM, we proposed model of enterprise knowledge tree as shown in Figure 1. In this model of knowledge trees, it may be divided into more small sections.

Define 1. If $k(a_1,a_2,a_3...a_n) = 111...1$, then the knowledge is called enterprise white knowledge.

Define 2. If $k(a_1,a_2,a_3...a_n) = 000...0$, then the knowledge is called enterprise black knowledge. Between the white knowledge and black knowledge, it is called enterprise gray knowledge.

Define 3. G as gray dimension of enterprise knowledge $G = m/n$, referee m as the number of digit zero in $k(a_1,a_2,a_3...a_n)$'s $a_1,a_2,a_3...a_n$, $0 < G < 1$. If G almost near to zero, it is almost near to white knowledge. If G is almost near to 1, it is almost near to black knowledge.

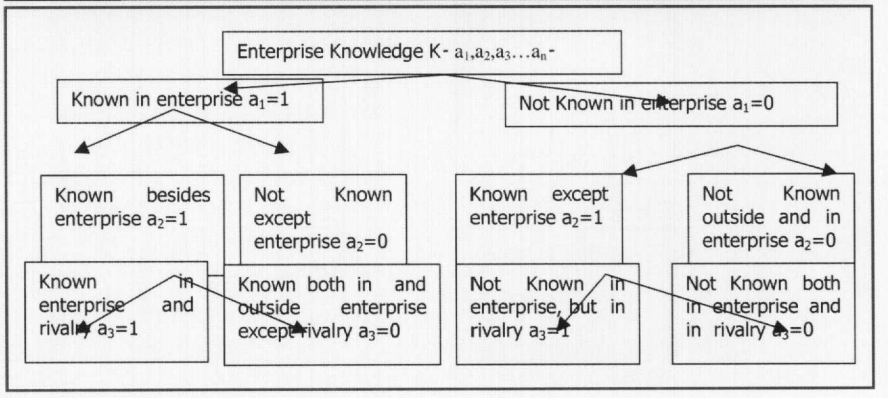
The enterprise white knowledge is easy to be shared in computer networks on Internet. Near to black knowledge is required virtual private networks (VPN) that is difficult to be shared with high cost in knowledge acquisition. The ways of near to knowledge acquisition are auto-acquisition tools such as KAS, ACKLOWEDGE2, machine learning and data mining, multi-agent systems, semi-auto-acquisition, and artificial-acquisition. An intelligent agent is an artificial intelligence system that can move around your computer or network performing repetitive tasks independently, adapting itself to your preferences. The intelligent agent built-in enterprise's near to black knowledge can carry out specific repetitive, predictable tasks; and function in the Internet. The knowledge representation is another key problem. As the traditional conceptual modeling languages like the entity-relationship (ER) formalism or UML are very limited due to their lack of semantic expressiveness, a well-established knowledge representation formalism, the conceptual graph (CG) formalism has very attractive features .One of the sources of further information on these topics can be found in Guy *et al.* (2000).

3. Factors and cost of KMS based on e-commerce

3.1. Factors

For reconciling knowledge management and e-commerce, we discuss the factors of KMS based on e-commerce as follows: k-station is a station based on the Web for knowledge reusability with emphasis on KMS and repositories using DHTML, safe

Figure 1 Model of enterprise knowledge trees



technologies. Synthesis of knowledge from a wide variety of sources can provide four distinct types of knowledge reuse situations according to the knowledge reuser and the purpose of knowledge reuse. The k-station supports shared work producers, who produce knowledge they later reuse; shared work practitioners, who reuse each other's knowledge contributions; expertise-seeking novices; and secondary knowledge miners. Each type of knowledge reuser has different requirements for knowledge repositories. Owing to how repositories are created, reusers' requirements often remain unmet. Repositories often require considerable rework to be useful for new reusers, but knowledge producers rarely have the resources and incentives to do a good job of reputation knowledge. Solutions include careful use of incentives and human and technical intermediaries.

The Internet offers the opportunity to buy and sell almost anything. What you want, when you want it by e-commerce. Collaborative filtering recommendation system (CFRS) can help the user with the items that they might wish to purchase based on collaborative filtering. Knowledge-based recommend system (KBRS) can help the user with the items that they might wish to purchase based on knowledge. The knowledge-based bargaining system can help the consumer with satisfying dynamic prices. Tools of KMS are the tools of management knowledge resource in the system way. Ways of knowledge transmitting can build knowledge distribution diagram. Much knowledge, particularly knowledge with rich tacit dimensions, is transferred informally through processes of socialization and internalization. The two transfer mechanisms – mentoring and storytelling in the workplace – that can leverage the knowledge of an organization, particularly its tacit knowledge. The organization and individuals are using the Internet to help solve knowledge-transmitting problems.

A knowledge infrastructure consisting of technology, structure, and culture along with knowledge process architecture of acquisition, conversion, application, and protection are essential organizational capabilities or preconditions for effective knowledge management

It has been estimated that the amount of information stored on the Internet doubles every 18 months. The speed of increase of homepages can be even faster: some people estimate that it doubles every six months. Information overload also has become a serious problem. Knowledge retrieval is critical factor to KMS, which includes search engines, meta-search engine, and intelligent agent, and with which software program with built-in knowledge can carry out specific repetitive, predictable tasks for individuals and can work in computer networks. Intelligent agents (tireless assistants) can act as personal assistant, finding and retrieving information from your company's database, or finding and retrieving information across networks.

The knowledge discovery may collect shallow knowledge and further knowledge discovery using these data mining tools including query-and-reporting tools, intelligent agents, and multidimensional analysis (MDA) tools. Query-and-reporting tools are similar to SQL and report generators in the typical user and goods database environment. Intelligent agents utilize various AI tools such as neural networks and fuzzy logic to form the basis for "information discovery" in OLAP. MDA tools are slice-and-dice techniques that allow you to view multidimensional information from different perspectives. We highlight that outlier mining is an important part of data

"The amount of information stored on the Internet doubles every 18 months."

mining. Data mining is the process of extracting patterns from large sets of data. It is defined as the non-trivial extraction of implicit, previously unknown and potentially useful information from data. Data mining can be considered to be an inter-disciplinary field involving concepts from machine learning, database technology, statistics, mathematics, clustering and visualization, among others Johnny S.K. Wong *et al.* (1998) and Xia Huosong *et al.* (2000).

The rules of inspiration provider for knowledge can be concluded as follows:

The knowledge work refers to work that primarily involves the creation of new information or knowledge. Knowledge work and workers play such a large role in the firm. Scholars refer to our society and other economically advanced societies as information and knowledge economies. Knowledge workers are distinguished by the amount of formal schooling required in order to perform their jobs and by a large creative component in their work. The rules of inspiration provider for knowledge include building CKO organization (e.g. Gao Jianhua is appointed CKO on November 1, 2001 by HP in China), giving a reward or prize to whoever primarily creates new information or knowledge.

The ways of KMS include electronic document management (image, formatted and marked-up text), knowledge workers management, communication management *et al.*

The shared knowledge platform including four different situations of organizational ownership (information vs. expertise/internal vs. external sharing) is considered. The study shows that a belief in self-ownership is positively associated with organizational ownership, suggesting a collaborative type of ownership situation for both information and expertise and for both internal (intra-organizational) and external (inter-organizational) sharing situations. Organizational culture and the type of employee also influence the beliefs of organizational ownership in all four scenarios. Shared knowledge and protected knowledge are contradictions to each other.

The knowledge chains include creating knowledge through analytical processing and conveying knowledge to whoever needs it. The analysis of the overall knowledge chain is called knowledge management system (KMS). The key factors of KMS discussed above form the result of a complex web of relationships between creating knowledge, knowledge acquisition, knowledge representation, knowledge store, knowledge trade, knowledge shared and reuse. Each stage in the supply chain adds value, while the interfaces between the stages require the exchange of information and KMS can be utilized for many of these interfaces. Recently, much attention from both workflow area and CSCW area has been paid to the integration of the definition and the execution on flexible, dynamic enterprises' processes. The dynamic process KM in virtual enterprises has been studied such as AIS Workware and XCHIPS. KMS has the characteristics of non-linearity, complexity and uncertainty of complex management system. Of course, the simple KMS such as document database, people finder database is sometimes very effective.

3.2. Shared knowledge cost

The shared knowledge has cost. The factors in cost of shared knowledge involve the platform of hardware, the platform of system software and application software, transform the management way cost, lean cost, private information and knowledge cost, cost of acquire expert and staff members.

The model of cost in knowledge sharing can be described as follows:

Define 4. Given $S = O, A, V, F$ representing the knowledge share systems, O as a set of objects, A represents some limiting share cost attribute $A = \{a_1, a_2, a_3 \ldots a_m\}$; V represents the value set of the share cost attribute; $V = \{v_1, v_2, v_3 \ldots v_n\}$, v_1 represents the platform cost of hardware; v_2 represents the platform cost of system software; v_3 represents the platform cost of application software; v_4 represents the transform manage cost; v_5 represents coordinate cost between special use and agile use knowledge; v_6 represents share information risk cost(maybe betray business secret); v_7 represents cost of acquiring expert knowledge; v_8 represents encourage cost of acquiring members; and F represents cost function,

$F: O \times A \rightarrow V$.

Mandelbrot, the founder of fractal theory, studied cotton price by using self-similarity and scale disparity in 1960s. Non-smooth and irregular set and $D(x)$ were taken as morbid status. Since Benoit Mandelbrot introduced fractal geometry concept in 1975 for the first time, it has been applied in all fields of nature science. In fact, irregular set reflects more nature phenomenon than classic geometry graph does. Fractal theory provides the study of such irregular set with a general framework. Set D is fractal, which has the following typical characteristics:

Shared knowledge cost

(1) D has got precise framework, that is, it has various small irregular segments;

(2) D is so irregular as cannot be described by traditional geometry language, differential and integral calculus in whole or in part;

(3) D normally has certain self-similarity. It may be approximate or approximate in statistics;

(4) generally, fractal has multi-medians, the multi-medians of D are strictly bigger than its geometry medians;

(5) in much more interesting cases, D may be defined in simple ways through alternatives;

(6) D often has the appearance of nature, in fact, fractal involved in nature and each applicable science field is similar to each other in large proportion. Fractal will disappear when we observe from certain proportion (such as criterion narrow to molecule size).

Define 5. Given D represents share knowledge fractal dimension $D >= 1$. D is bigger, and the share knowledge systems are more complicated and more irregular. Suppose the new share knowledge systems similar to the old systems are expanded L times the old systems. L represents expanding L times, K represents the new share knowledge systems similar to the old systems $D = \ln K / \ln L$.

Define 6. We give the formula total cost of shared knowledge for KMS as follows:

$F = \{v_1 + v_2 + v_3 \ldots v_8\} * D / (1 - G)$

$c = P - F$ where P represents increasing profit as shared knowledge.

If $\Delta > 0$, then the share knowledge is effective. The difficulty is in how to estimate $v_1, v_2, v_3 \ldots v_8$, D, P. Some factors $\{v_1, v_2, v_3 \ldots v_8, P, D, G\}$ can be computed easily,

while some other factors need new algorithms. General procedures of computing the measure of $v_1, v_2, v_3 \ldots v_8$, P, D, G are prescribed as follows:

Step 1. Determine v_1, v_2, v_3, v_4, v_5, v_6.

Step 2. Find the satisfactory v_1, v_2 in game theory.

Step 3. According to the model of enterprise knowledge tree, compute value of G.

Step 4. According to the character of fractal theory, compute value of D.

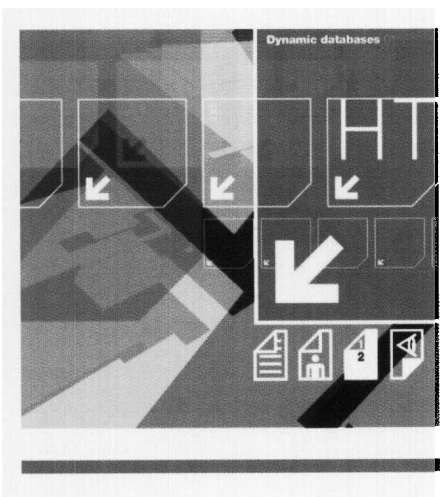
Step 5. Estimate the value of P (profit as shared knowledge).

Step 6. Compute Δ.

Step 7. Select implementation plan of KMS based on e-commerce.

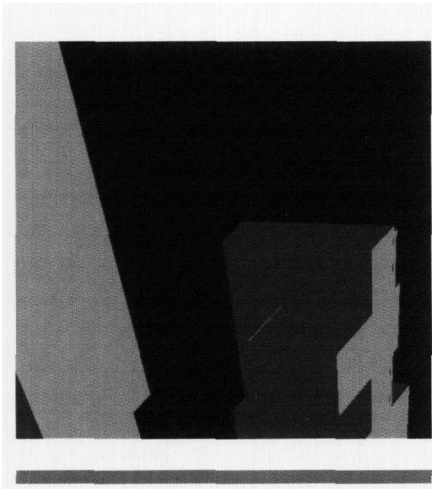
4. Instance of KMS based on e-commerce

One of the main manufacturers of wheel loaders in GuangXi in China (supposing the name of object 1 as secrecy) leads in the ratio of marketing in the wheel loaders industry. In recent years, more and more manufactures of wheel loaders are continuously entering the market in China. Foreign wheel loaders are continuously bringing new technologies and new designs. How does the object 1 make decision to development counter-measures of the wheel loaders faced with competitions when facing entering WTO and western exploitation? The object 1, therefore, needs to be adept at creation and application of new knowledge, reconciling knowledge management and e-commerce strategy. The object 1 of wheel loader's evolution of KMS based on e-commerce is described as follows: before 1997, building MIS; 1998-1999, building Intranet, during which many electronic compound documents that involve multiple types of media such as images, video clips, word-processed text, graphics, and spreadsheets were shared, especially documents of every machine of wheel loaders. And the document management has become joint from the corporate information systems; 2000-2001, building integrated sales and marketing system; 2001 – now beginning building KMS based on e-commerce. Now the customer service support is becoming an integral part of KMS. The service department is responsible for receiving reports on faulty machines or inquiries from customers via telephone calls. As some engineers handle day-to-day maintenance and small-scale troubleshooting, expert advice is often required from object 1 for more complex maintenance and repair jobs. Such suggestions are based on past experiences. Prompt response to a request is needed to maintain customers' satisfaction. Therefore, a customer service support of KMS must be set up from customer service database and knowledge base, which contains previous service records that are identical or similar to the current problem. The customer can try to solve the problem and subsequently confirm the results through the manufacture's Web, if the problem is resolved. Otherwise, service department would dispatch a service engineer to the customer's premise for an on-site repair. Meanwhile the service engineer may access the Web, by running a browser program for expert advice, past record (include comprehensive document of the wheel loader) of the customer's machine, and related electronic manuals. The KMS can support decision support and machine fault diagnosis.



According to the model of the enterprise knowledge tree, the policy of knowledge shared is determined. First, the knowledge sharing culture is to be formed step by step for object 1. Second, the salary system, e.g. salary of every staff members is to be reformed as follows:

$$S_i(t) = F + R(t) * (d_i + d_i(t)) \text{ (measured in yuan)}$$



Where $S_i(t)$ represents the "t" month's salary of manufacture's member i ($i = 1, 2 \ldots n$); t represents time, $t = 1, 2, \ldots, 12$ (measured in months); F represents basic fixed allowances in the lowest, every member being the same, e.g. $F = 400$ (measured in yuan); d_i represents member i ($i = 1, 2 \ldots n$) basic fixed number, (measured in unit); $d_i(t)$ represents number of member i ($i = 1, 2 \ldots n$) given with a reward or prize due to creating new information or knowledge, shared knowledge, creation of new knowledge and innovative application of knowledge in products and services, it is related to "G" of model of enterprise knowledge tree (measured in unit); $R(t)$ represents every unit can earn money. Compute as follows: total sales revenue times ratio, then divided by $(d_i + d_i(t))$, e.g. ratio = 0.05, total sales revenue in January ($t = 1$) is 37 million yuan, $\sum(d_i + d_i(t)) = 10000$, then $R(t) = (37000000*0.05)/10000 = 185$ ($t = 1$).

Third, shared knowledge cost is to be analyzed as follows: Determine v_1, v_2, v_3, v_4, v_5, v_6, every year. It is ratio (e.g. ratio = 0.01) of total year sales revenue and distributes proportion among v_1, v_2, v_3, v_4, v_5, v_6. Find the satisfactory v_7, v_8 in game theory, cost of knowledge acquisition including supply chain policy of the marketing, custom, the technologies and design of engines, power-trains, hydraulic systems, attachments, control systems and cabs from both internal and external. Other cost is estimated.

Finally, KMS is built according to the above discussion.

The manufacture of wheel loader has indeed achieved the goals of the front in ratio of marketing and profit in wheel loaders industry in recent years partly because of IT and partly because of learning organization such as KMS and new business model.

5. Conclusion

Over the last few years, although the topic of KM has been studied, our understanding of how the design of the KMS affects its use and definition of KM are still quite limited in the emerging economy. This paper has presented the model of enterprise knowledge tree and factors of knowledge management system based on e-commerce. The establishment KMS of supporting a firm for effective KM is partly because of globalization, development of IT and partly because of new organization of new business model. It is important to build the model of knowledge sharing cost. The model of enterprise knowledge tree, some factors of KMS and the model F are offering new ideas. Through analysis of KMS from above, this research models and uncovers some key aspects of the shared knowledge dimension. The results provide a basis for understanding the competitive predisposition of a firm as it enters into a program of KMS. This paper presents a detailed instance study of a wheel loader manufacture based on the above discussion. It is, therefore, necessary to develop better, more effective, and more accurate understanding of enterprise knowledge management.

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