

# The investigation of knowledge management role to improve the function of virtual organizations

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## Abstract

Knowledge management contains the extensive range of activities which is applied to manage, transfer, create or improve the mental capital in major level. Knowledge management is designed processes, tools, structure intellectually used in order to increase, renew, share or improve the knowledge application which will be appeared triple mental capitals including structural, human and social elements in each of them. Knowledge management is a process to help organizations in order to recognize, select, organize and distribute the important skills and information as organizational memory existing as non-structured ones. This causes the organization management enable to solve learning problems, make strategic planning and dynamic decisions effectively. The transformation of industrial business model was for the organization capital basically as financial tangible capital (production facilities, machines, land, etc) to move toward organizations with intangible basic capital and it was mixed to knowledge, abilities and management to produce creative employees. In virtual organization, the relationship between employees, managers, partners and customers will begin and terminate irregularly. This continuous change endangers organization knowledge as the most valuable capital in it. The lack of good management may cause to a lack of the most knowledge due to these relationships. This risk is possible more for individual knowledge which is formed by the expansion of relations or new procedures. But, even the explicit organization knowledge may be gone whether it is not attained and interpreted as regular method. The effective Knowledge management enables organizations to protect themselves against losses even when employees and partners stopped their relationships

and also it facilitates the increasing key ideas in subsets of organization and will increase the cooperation between different work teams.

**Keywords:** Knowledge management, organizational learning, virtual organization, information technology

## Introduction

As the new organization became more extensive and virtual, the relationship between employees, managers, partners, customers and vendors will begin and terminate more irregularly. The most successful relationships lead to distinctive relational behaviors and pleasing interaction customs. They may attain new vision about products and services; production and distribution processes; customers or markets. The technical and engineer partnerships make the certain technology developments related to their projects; but in general there is low motivation in individuals to save and distribute this new knowledge basically. The effective Knowledge management enables organizations to protect themselves against losses even when employees and partners finished their relationships and also it facilitates the increasing key ideas in subsets of organization and will increase the cooperation between different work teams. A basic Knowledge management control process requires transferring knowledge in five steps: capture, storage, interpret, dissemination and auditing. This process aims to increase organization interest resulted from the knowledge of its best peoples. Knowledge management is a method to transform the non expressed ideas of employees to structured information and then its change to useful knowledge. This knowledge can be transfer to other employees so that enjoy it well. Knowledge

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will lead to learning if it influences on the nature and range of employees behaviors (Cangelosi & Dill, 1965, 175-203)

### Virtual organization

Today, it is appeared new innovations and a new type of organizations named virtual organization is appearing. This organization has been formed because of combining the diffuse groups and units by helping the relational networks and a new structure has been formed. The virtual organization is a model of future organizations which their complexity, extent and operation volume cause to not manage them as concentrated and single organization, but they need other organizations to continue their activities. The main factor in virtual organization is to transfer some activities to other organizations and provide goods and services in accompany with foreign units and joining to them.

The more extensive transfer lead to more virtualization and this needs the sharing organization knowledge to other organizations and the transfer of this knowledge correctly so that they perform their activities better to meet the common purposes (Alvani, 2004, 375-376)

### Knowledge management systems

Information technology guarantees the development and performance of Knowledge management systems and it is developing now. Today, all steps of Knowledge management can be supported by current technologies, but this needs the considerable development in band width, the interpreting algorithms and other aspects which are necessary to perform Knowledge management systems (KMS).

Many authors (Huber, 1991; Malhortra, 1996) considered the applicability of information technology in different steps of Knowledge management, but they warned that this technology can limit the human aspects of Knowledge management (Argyris & Schon, 1978; Huber, 1991, 89-115).

The internet technology by using internal and external networks in organization to establish KMS will increase its application and also to decrease the compatibility challenges (Telleen 1998, 11-12). It is supposed the potential factor of intranet strong relationship and its common application as basic knowledge for company information can transform interior networks to natural policy of

knowledge management (KM). As Rosalski (2001) mentioned organizations need a general architecture style of KM to search and recover the information, determine experts and encourage the cooperation in organization. Technology is a necessary factor to attain KM purposes but it isn't enough. Management processes must be used to assess some matters such as cooperation, personal affairs, semantic interpretation and access ability. The lack of good management can't attain to a potential factor of employee's interaction to KMS in order to retain and increase the value due to the valuable capitals of organization knowledge.

### Information types

Chandler (2001) considered three basic ranks for company's knowledge technological, operational and managerial. Technology knowledge is a rank which is connected to KM and it is related to the rules body or principle which can be defined the application of organization products or services.

KM development can differentiate a company products away from its competitors in market. Operational knowledge is referred some processes which a company can produce and deliver its products and services by them.

The operational advantage is the lower cost, fewer delivery times, better customer services, higher quality and faster delivery of new product in market. The managerial knowledge is referred a method which a company can consider employees, partners, customers and their interaction. This knowledge rank often has been ignored in management knowledge. But in market economy, all three ranks can make a competitive advantage in a company and became a barrier against the entrance of competitors.

Jacko *et al.* (in press) combined four quarters of knowledge (Collins, 1993, 95-116) to two dimensions of knowledge (Iam, 2003) and performed them in a knowledge system based on internal network. This supposed the knowledge from in organizational and cognitive dimensions.

The cognitive dimension will begin from explicit toward explicit knowledge. The explicit knowledge is accessible for employees and can expressed it by codes and marks. The implicit knowledge is a part of bigger process and it isn't seen clearly. It can be recognized in text and it is represented outside of certain processes difficulty. But, Rosalski (2001) re-

ports 42% of knowledge is implicit in company and it is vulnerable about loss due to employees leave and the end of cooperation.

Organizational dimension moves from personal knowledge toward collective knowledge personal knowledge often has been used by few employees to complete activities. The collective knowledge is known well and it is a part of activities which can be completed in employee's interactions. Four quarters mentioned in Jacko et al works are defined as below:

- Mental knowledge (personal –explicit) is personal, formal, abstract and theoretical and it is related to recognitive skills and abilities.
- Codified knowledge (collective – explicit) is transferred by marks and signs and it can be used in common organizational processes.
- Personified knowledge (personal-implicit) is personal, practical and based on activity and also is related to practical experiences of employee.
- Hidden knowledge (collective – implicit) is a set of implicit knowledge which is existed in common policies and organization criteria .

Each of them can help organization in different rates and they must exist in every KMS. But Lam (2000) found the organization intend to be controlled based on different knowledge types which are prevail on their processes. There are significant notice about how to be performing a KMS in regard to both prevalent knowledge and management style. The concentrated organizations will control their knowledge more than non-concentrated and entrepreneur organization.

### Developed model of KM in virtual organization

This model contains each five stages of KM (capture, storage, interpretation, dissemination and auditing).Figure1represents the important points can determine the effectiveness of every step. The following part explains each step in regard to basic challenges in effective knowledge management.

#### Learning

Knowledge capture from employees and partners is critical to develop basic knowledge. There isn't any knowledge without effective capture policy and technology so that can be attaining KMS completely. The capture systems can be known or unknown. The unknown systems control the employee's relationships and their work products in or-

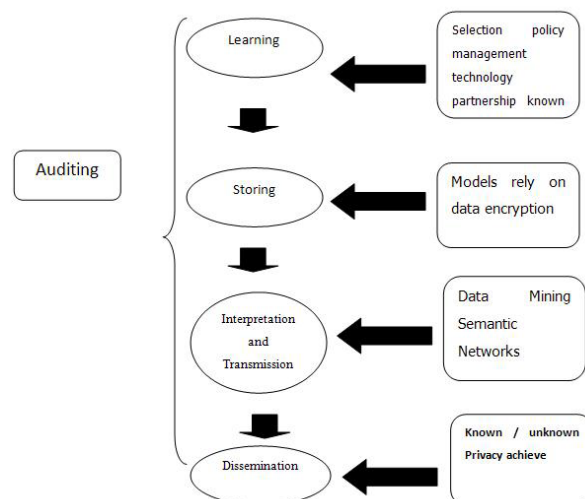
ders to recognized and capture information to place them in basic knowledge.

The hidden channels include the works out-comes such as reports, lecture papers, director board reports, messages and attachments of emails to phone control, agenda and summary of negotiations. Filtering the vast information to recognize what is placed in KMS is valuable process and it is difficult to delete the additions in unknown system because of great volume of data which is transfer during the work by employees.

Storage must be accessible to save the vast extent of temporary data during the filtering and also to save the basic full knowledge. The requirements of band width must not endanger the effectiveness of employees in their common work activities.

Due to hidden and sudden of unknown systems when the private or sensitive connections are controlled, it is so important to make and transfer policies about private bounds and cooperation. The employees are sensitive about two matters in their private bounds of work place .when the personal documents or connections are controlled by system it must be cautioned to avoid the human contact.

If the system intends to ignore every hidden personal matter, some of real work information will be losses. But If the system intends to capture the work information, some of personal information may be placed in knowledge base.



**Figure 1. A five-step KM model with management requirements for per step.**

A matter in private bound is that whether the information of basic knowledge is related to employees who produce them or not. The anonymous

cause to decrease the fear to record personal information of employees. Since knowledge is so related to contact, when the identity of employees is anonymous, so the meaning of information may be loosed. Also system can reserve the identity but do not offer it to users. So, if an employee has a question about text, an anonymous connection will inform to the responsible employee about entering the information to the system.

Cooperation policy is a critical subject especially because of existence of customers and partners. The private bound and effectiveness cause to avoid the system when many of employees are permitted. The policies can be arranged in regard to discretion to offer different choices to participant in order to use different channels. For example, may be it is necessary to check employees documents and emails but the phone control will be ignored.

Customers have this right to ignore all control, unless there is significant interest to enter this system. Anyway Rosalski (2001) reports the added value of cooperation by customers and partners.

The known systems request employees to offer information directly. These systems require the employees' consideration about when the valuable information has been created and will enter to system. The required added time and effort can cause to decrease cooperation and make critical cooperation management. Employees must receive a significant interest from system (Stepanek 2000). But when participants offer information directly, they can codify them well and this cause to decrease errors interpretation step. Both systems will facilitate the capture of mental and secret knowledge. Employees can not aware the personified knowledge and not to express it. The mediator of KMS performs a significant activity to help employees to enter this kind of knowledge. The collecting of covert knowledge is difficult in anonymous form, because it isn't expressed in common employees' connections. Even in dynamic systems, the collecting covert knowledge is difficult because of verbal problems. The mediator must become coordinated to the mental model of employees about information. Even when employees can express information, they may be can't transfer it in acceptable form for KMS mediator.

## Storing

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After capturing the raw data, the first challenge is to determine which data are sufficient to organi-

zation and must be placed in KMS. The automation of filtering process is very difficult because the current artificial intellect technology is not so developed, so those anticipate what is important in future job decisions. The avoidance of extravagance is a complex problem because it is possible that employees find and express the similar information in different method. Most systems intend to store what is useful but this will increase the storing needs.

Some KMS's reserve every input as a full text, audio file or even video file which can be search by users for key words (Rosalski, 2001). This is applicable when data volume is high and data coding isn't applicable. But there is a practical solution for small organization that just searches text channels. The bigger organization can us this method just in limited area. The other solution is to produce data models for every area and text in order to coding data. This is easy in known system because employees are responsible to determine which information is sufficient for required parameters. In unknown systems, the more advanced data analyses algorithm are developing but any accessible business KMS cannot do this well especially for video and audio inputs.

The precision filters are important to avoid the input of volume data into the system. Unknown systems are very sensitive to errors because they cause to incorrect text context or wrong concepts coding. Most of these systems are faced to diversity of full text .But even know systems are faced to employee's errors and errors result of designing data models to form input mediator. It is difficult to judge text when employees don't know how to use information in future.

The second pars of storing are data coding based on the trust rate about sufficient text and area. In know systems, this trust will form by user directly. The user may enter many codes for every text individually. In unknown systems, the coding can be interpreted by semantic analyze but this needs to express confidence rate and system can interpreted them.

The current systems cannot do this work. Often the confidence based on data is related to text, and as a result, it may be a complex coordination between certain subjects and confidency rating in different areas. This is a challenge to design the future KMS.

## Interpretation

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The full text systems just need to store a data base of key words which can connect each of them

to the related files. But KM in future will interpret information to generalize texts and areas and even to make new knowledge. In auditing process, the interpretation should be done carefully.

In first development steps, an interpreting basic knowledge must capture information from multiple references and compress it for users in low controllable method. The more advanced systems must be able to transform the unrelated data to a semantic network of practical knowledge. The addition of text and confidence rating in semantic network makes it stronger. This is main base of real KM but it needs more development so that KMS systems can use it in data based on real world context effectively. Now, transfer processes are possible just in limited area such as customer services (Gianforte 2001) or certain technological processes.

The basic interpretation just needs to make data models. But, when KMS can capture knowledge from different please of organization and announce it to a generalized semantic network systematically; the system force will increase progressively. Network ranking based on certain areas can help to decrease the complexity but this decrease also the general ability and system force. So, KMS is a derivation of connected full semantic network to make new relation. This knowledge which was unknown for everyone can produce by system itself. This process needs to cooperate technological solutions with active interpretation of human experts. The information interpretation is most complex problem and it has access in KMS development.

The significant development in artificial intellect is necessary to perform interpretation step, but this unbelievable promise is postponed to the future. The confidence coding process seems complex in interpretation step. The deductive confidence level from one area to others can be completed by enquiry of main employee, but if his identify be protected. Otherwise this inquiry can be sent to division chairman or project manager or interpreted it from text which data collected from it.

## Dissemination

Dissemination of organization knowledge via internal network has been limited based on KMS with secure subjects and with the received interest from database by users. The security can be controlled by legal politics and address determination technology.

The legal licenses guarantee that every user is

limited in each of attained information. This license can be used to coding and security systems in order to determine users identify who have access to system.

These technologies are developing. The increasing database interests for organization needs the continued development of license regulation to information applicability and sensitivity in different participants. The complexity of this problem needs to the continued consideration. The KMS value will increase by customers and partners cooperation (Rosalski 2001), but this cause to decrease the security and it is difficult to determine address.

The received interest is a socialization process which we attain it when KMS is performed first time. The contradiction of received interest is that the development time is begun currently with more participation in KMS, while there is few information in access. But this time is not valuable for users. The participants in new systems can receive to interest very fast and they are coded in passive dimensions. The users decide about desirability of them and their applicability in future. The certain management processes are so important to increase the received interest and more cooperation.

The complexity of this problem is this fact KMS needs time to develop more. Stpank 2000 recommends the necessity of cooperation to reach more development chance and then study this matter that the employees are permitted to avoid this system or not. In capture step, dissemination relations can be known or unknown. In known systems, the employees must request data and offer parameters which define their needs. The system can search the response in database to deliver question in this area (Rosalski, 2001).

The unknown systems control employee's activities to offer their recommendations by direct information or storing documents. The dissemination relations about cooperation management or private affairs enjoy similar challenges of capture process. In big systems with unknown dissemination, there is a risk to saturate users by recommendation. In these cases, it is necessary to control or the users are allowed to arrange their priorities in order to decrease the contacts numbers. Dissemination of secret information must interpret by users correctly (Wise, 2000). It is focused on the importance of user conformity with information abilities and limits by system. This can be performed by training or offering detailed description of codes.

When KMS is developing in quantitative esti-



mation of codes text for employees, the research in protective decision making system have shown that the similar cases may be not considered because of personal factors such as self- confidence (Wise, 2000). When users sure a system, they will over-estimate its reliability and may be not considered the low degree of confidence. The converse of this may be happened.

## Auditing

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Auditing is a step which offer is ignored in KMS performance. Changes in dynamic market, marketing purpose, technological development and other developments will decrease the practicability and precision of information even in exact input time. The rate of coded information will change when it enter to system.

Moreover, the additional codes and reforms such as text will be changed or more data collected and they must added to system. The increasing size and complexity of database will complicate this matter. Some systems can estimate the useful information based on their using times (Gianfort, 2001). The coding rate will decrease automatically during the time and this information can be deleted after the regulated time. This can be coordinated to information time or its using times. This strategy can be changed to a semantic network by changing the stability of relationship between the concepts o using times. Another term is to hire experts to estimate information, units and their relationship to improve network. This process is long in wide database but it can increase the reliability and confidence of KMS.

## The advantages of KMS

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Levitt and March (1988, pp.319-340) stated that people behave based on coordination process of recognized procedures-KMS can help employees to diagnose the more sufficient behaviors and improve company performance by selecting an act which will increase the considered results. Also, wick (1991, pp.41-73) defined the necessary learning elements: producing new response from similar incentive.

The lack of effective knowledge dissemination cause to employees continues past acceptable results. KMS can determine the secondary improvement in behavior patterns and offer better operation. Miner (1990) stated the employees must have

some purposes for experiments and this lead to accept new knowledge. KMS experiments have verified that a new action can make better performance by offering documents and justification. KM can transform an organization to a form that learning is a continuous and invisible process. This is what Senge (1994) referred to it as learning organization. The learning organizations have recovery systems which can be used to solve problem for new situations (Argiris and Schon, 1978; Senge, 1994).KMS makes an extensive technology which can determine the solution explicabilities in every area and offer on time informing and guidance. So, learning organizations learn continuously and forget them (Hedberg, 1976), and re-design themselves by experiments and recovery.

## Challenges related to KMS

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Jacko et al (in press) listed many challenges related to effective performance of KMS. Technologically, both software and hardware must, have developed. System development is important to transform a bit of data to the user data and semantic networks. The compatibility and data management will increase the KMS development problem. There are many managerial challenges. The extensive performances of KMS cause to impose many organizational norms and regulations. Most of managerial styles cannot support the extensive information subscription.KMS also can increase time of workers to process information so that perform the repeated , currents , cooperation management is a repetitive challenge so that form new incentive and compensation strategies.

## Conclusions

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The effective performance of KMS is required to combine the sufficient technology, management control, advanced semantic processing, continuous auditing and development . In an effective environment, KMS can be a strong tool to protect the rapid developments of products and service into and out of organization. This causes to return more capital and direct interest based on organization. Argote (1999) says the learning capacity in one organization expressed the diversity of function in competitors.

Anyway, some related subjects such as cooperation policies, personal affair policies, access and technological limits of data transfer channel, data

mining algorithm and storage abilities are basic challenges in performance. In future, KMS make the competitive advantage in organization success. Due to the required time to develop database, the organization must make data-bases.

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