Presenting a Interpretive- Structural Model to Prioritize the Organizational Knowledge Sharing Obstacles of Shahab Danesh Higher Education Institute

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ABSTRACT

Background: Today, knowledge is one of the most important corporate assets, so that management and effective implementation of this capital has crucial role in success of the organization. Knowledge is a competitive advantage for any organization. But in recent years the motto of “Knowledge is power “has changed in to ““sharing knowledge is power”. One of the principal objectives of knowledge management in organizations was to improve the sharing of Knowledge between the individuals within an organization. As well as between individuals and organizations in order to create competitive advantages. Since, nowadays knowledge sharing is considered crucial. Failure to identify obstacles and problems related to the process of knowledge sharing will be problematic. The aim of this study is to identify barriers of knowledge sharing and categorizing of barriers using structural - interpretive equation model that examines the interactions between elements of the system. In order to achieve the research objectives, two methods such as documentary (the study of the history and theoretical research) and field (survey) were used. Because the method is based on expert opinion, of 15 experts in knowledge management and university professors have been employed. The results of this study showed that the barriers “lack of an appropriate organizational structure,” “lack of top management commitment” and “meritocracy considered as the most influential barriers to knowledge sharing”. It shows that the above cases are the most radical organizational barriers to knowledge sharing. Therefore, it is important to consider these factors in the successful implementation of knowledge sharing and if this does not happen, other administrative efforts will be ineffective.

INTRODUCTION

Regarding the importance of knowledge as the organizations’ vital source in the modern world, it seems necessary for these organizations to establish proper grounds for knowledge optimal usage. Management science introduces the knowledge management as a way for knowledge optimal usage.

One of the most important and general processes introduced for knowledge management is knowledge sharing. As a complicated but valuable activity, knowledge sharing is the basis for many of the organizations’ knowledge management strategies [1]. Effective knowledge sharing among the organization members leads to costs reduction in knowledge production and guarantee for propagating the best work methods in the organization and makes the organization capable of solving its problems [2].

As a complicated but valuable activity, knowledge sharing is the basis for many of the organizations’ knowledge management strategies [3]. Thus, as this subject is influential in organization success for making competitive merit, it is necessary to take steps toward understanding and removing or confining its obstacles to prepare more proper grounds for knowledge sharing.

For an organization to do knowledge sharing, regardless of the point that it is for making new products or improving the previous products quality or lowering the costs in production or such as these, the final result is to reveal the company profit increase. This kind of profit cannot be reached by an individual or compound company endeavor [4]. Sharing the knowledge occurs both in the individual and organizational levels. In the individual status, knowledge sharing is to speak with other colleagues to help them act better, more quickly and efficiently. In the organizational status, knowledge sharing aims for accessing, organizing and interchanging...

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experiment based knowledge that exists in the organization and for making the knowledge accessible to other businesses [5].

In the current years, an increasing growth can be viewed both in the world and in Iran, in paying attention to knowledge sharing by researchers and managers of the organizations, particularly in using the best methodologies. Thus, it seems necessary for any organization that is after implementing knowledge management, to identify knowledge sharing obstacles and distance between current situation and ideal situation of the knowledge sharing activities and to take proper steps in removing obstacles and moving toward ideal situation. The aim of this paper is to render an interpretive - structural model for identification of knowledge sharing obstacles.

**Knowledge Management:**

The most basic trait of the 21th century is the emphasis on knowledge and information. Unlike the previous organizations, the modern organizations have advanced technologies and need to gain, manage and exploit the knowledge and information in order to improve the efficiency, management and pursuit of unending changes. Knowledge is a potent means that can bring change in the world make the innovations possible [6].

The importance of knowledge cannot be neglected in the current universal and complicated environment. The organizations that know how to access, distribute and manage information effectively will be the industry leaders. We are currently moving toward an age in which competitive merit is gained not only by accessing information but more importantly by producing new knowledge [7].

Knowledge management is an inter-field trade model that deals with all knowledge aspects including creation, coding, sharing and usage for elevating the learning and innovation in the organization context. Knowledge management deals with both technological means and organizational current methods; production of new knowledge; gaining valuable knowledge from external sources; using this knowledge in decision making; entering knowledge in processes, products and services; coding the information in documents, softwares and databases; facilitating knowledge growth; transmitting knowledge to other parts of the organization; and finally measuring the knowledge assets and effectiveness of knowledge management [8].

For better services to customers and remaining in an industry, companies should reduce production time span, operate with minimum fixed assets, reduce product development time, make the employees potent, elevate the compatibility and flexibility, capture information, create and share the knowledge. None of these will occur without continual concentration on creation, updating, making accessible, knowledge quality and using it by all the employees and working teams.

Nap (1998) has defined knowledge management as the art of transmitting the information and reasonable assets into stable and durable values for organization customers and employees [9]. Darooch (2003) defines knowledge management as processes which create knowledge and manage its sharing, propagation and usage inside the organization [10]. Debsky (2006) has also defined knowledge management as the process of identification, classification, organizing and distributing subjective asset which is vital for organization long run operation [11].

**Importance of Knowledge Sharing:**

This process consists of knowledge distribution among employees and even beyond that, out of organization. Knowledge is the only known asset when others share it will increase, and its sharing and distribution will help its growth [12]. Knowledge sharing is a key factor in the organization success since it can cause knowledge expansion to those parts of the organization which can utilize it. Knowledge sharing causes sharing the ideas. Ideas when have the utmost impact that have widespread use everywhere, instead of being hold only by few numbers.

Knowledge sharing necessitates the tendency of members and teams in the organization for knowledge propagation in order to reach bilateral benefits, and knowledge sharing will not occur unless the organization employees and working teams have a high level of sharing tendency behaviors [12]. McDermott states that a person would share his knowledge with another so that both can understand the conditions better. The person who shares his knowledge should be aware of the knowledge aim, its use case and the necessitude and needs of the person who receives the information. Otherwise, knowledge may be transmitted to one who does not need it and it is not utilized [13]. Knowledge transmittance and propagation will provide the organization with opportunities to maximize its potentiality to satisfy its needs, to increase its efficiency in solving problems and to reach competitive merit.

One of the main priorities announced by knowledge management researchers is to motivate members to share their knowledge [14]. The role of knowledge sharing is so important in knowledge management that some writers state that knowledge management existence is for knowledge backup [15].

To mention some merits of knowledge sharing we can state that this process lowers the costs, improves service delivery to customers, decreases the new products development time, decreases delay time in delivering
goods to customers, and finally decreases the related costs to find and access to various valuable knowledge inside the organization [2].

Knowledge Sharing in University:

Higher education has been the axis of development and evolution in different societies and is the main center of training expert and educated manpower in every society. Fulfillment of knowledge management, its sharing and documentation in the universities is one of the basic necessities of modern knowledge based society. Before using in various levels, knowledge should at first be shared inside the university. If knowledge sharing culture is accepted in university environment, the scientific interaction resulted from accepting this culture by the faculty members prepares the grounds for providing efficient education and effective learning in university environment and even prepares the ground for the students to hypothesize, conceptualize and understand more their special field and to gain needed skills after graduation.

Study Background:

One of the main obstacles in sharing knowledge in the organizations is the dominant culture on companies. Organizational culture means all dos and don'ts and norms accepted by all organization members. In many cases, particularly in companies that have many branches or in international companies, organizational culture factor is very important. In a study by Rosen et al, on knowledge sharing obstacles in virtual teams, cultural limitations in virtual teams was identified as one of the main obstacles in information sharing. In another study, Ridge also emphasized on the important role of cultural obstacles in the organization for advancing knowledge sharing [16].

Lack of needed technology is another important obstacle for knowledge sharing in the organizations. Lack of appropriate beds for information technology slows down or even makes impossible the knowledge sharing trend in the organization. To access knowledge sharing program, technology infrastructures such as information saving possibility and so on are necessary. Researchers like Rosen, Ridge and Keshavarzi have pointed to the role of this factor as an obstacle in knowledge sharing. The most commonplace knowledge management system to work efficiently, a sense of trust should exist in the organization and this trust is necessary for opening information sharing. Sharing occurs where there is trust and common sense about the goals [17]. What makes members trust each other and willingly and actively share their knowledge and viewpoints is the existence of informal networks. Keshavarzi quotes from Dlang: existence of relationship between the organization, its subsets and members has a direct impact on communication flow in the organization and thus affects on the shared knowledge volume inside the organization units and also between the organization units and branches [18,19,20,21].

In another study, Mychaylav et al [22] and Soheil et al announced that the amount of members' tendency toward knowledge sharing brings a compatible power in them for knowledge sharing. When members' internal tendency or motivation for knowledge sharing is little, no interest is formed for doing this. Reward can also be internal or external which motivates members to cooperate in knowledge sharing. This reward motivates members and if management cannot use these motives correctly to share knowledge in system, the employees undoubtedly will not cooperate in the trend of knowledge sharing [23,24,25].

Another factor addressed by the researchers is leadership incapability in the organizations. Organization leaders should care about employees' ideas and remind them that their knowledge is vital for organization progress. The leader, who cannot penetrate in his employees and manage their relations, never can lead his employees to consensus for problem solving. Leaders have a significant role in the teams and make the trust inside them. Leader's incapability in directing and deciding about members around knowledge sharing is accounted as a real risk for organization learning [26,27].

Time limit, organizational structure and hierarchy, lack of teamwork and faith among the team members, low awareness about KS merits, limits in relationships and knowledge flow, internal competitions among different units, shortage of organizational sources, lack of social networks, education shortage in information technology and fear of losing job security are among the factors that based on reviewing related theories to knowledge sharing in organizations impede knowledge sharing. The following table shows the theoretical background of influential obstacles in the way of knowledge sharing.

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<tr>
<th>Row</th>
<th>Knowledge sharing obstacles</th>
<th>Source</th>
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<tbody>
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<td>1</td>
<td>Inappropriate culture dominant on companies</td>
<td>[2,30,29,16,20,28,26]</td>
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<tr>
<td>2</td>
<td>Lack of proper rewarding system &amp; lack of interest among employees</td>
<td>[24,18,25,26,2]</td>
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<tr>
<td>3</td>
<td>Lack of trust and security among employees</td>
<td>[19,25,22,31,2,24,18,32]</td>
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<tr>
<td>4</td>
<td>Senior management non-commitment</td>
<td>[25,18,16,29,27]</td>
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<tr>
<td>5</td>
<td>Inappropriate organizational structure and creating limitation in organization social &amp; communicative networks</td>
<td>[33,27,25,22,19,18]</td>
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<tr>
<td>6</td>
<td>Teamwork weakness among team members</td>
<td>[16,27,3,26,18,21]</td>
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<tr>
<td>7</td>
<td>Lack of awareness toward KS merits</td>
<td>[28,33,26,25,19,18]</td>
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</tbody>
</table>
Internal competitions among organization different units [33,25,22]
Meritocracy [24,18,25,26,2]
Unwillingness toward KS [30,22,15]
Worry about risking job security [18,33,15]
Insufficient care about experienced workers [31,1,22]
High complexity [23,16,28]

Research Method:
This study is applicatory regarding its goals and is scaling regarding data collection. Study data collection will be done by library investigations and field method. Data collection tool is interview and questionnaire. Statistical universe in the interpretive-structural modeling method consists of experts and specialists. Based on that, experts' ideas familiar with knowledge management are used in this study.

To execute this study, interpretive-structural modeling method is used. This method is an interactive process in which a set of different and related elements in a comprehensive systematic model are structured (Warfield, 19740). This methodology will help to create and direct the complicated relations among elements of a system (Faysal et al, 2006). This technique is taken from network and graph theory. Interpretive-structural modeling by Warfield was introduced and explicated. This technique enables members and teams to draw the complicated relations among many elements in a decision complicated situation. This technique turns the discontinuous and opaque subjective models to well defined observable useful models. This technique can act as a tool to organize and direct the relations complexity and chaos among variables.

Different steps of ISM are as the following.

Diagram 1: Different steps of ISM method.

The first step: Standards or considered elements (obstacles of knowledge sharing) are listed.

The second step: Using criteria or variables identified in the first step, a substantive relationship between them considering each set of the criteria is defined. The substantive relationship means the conceptual relationship between the components composed of system in terms of meaning and content which is appropriate to the goals of the system. Substantive relationship between the two components is classified into several ways including the defined relationship, comparative relationship, effect relationship, time relationship spatial relationship and the mathematical relationship.

The third step: A self-structural interaction matrix (SSIM) is developed for the obstacles that reveal the relationship between knowledge sharing obstacles.

The fourth step: Accessing Matrix is developed using a self-interactive matrix structure and this matrix is investigated in order to extend it. Extending is the relationship between the substantive of a basic assumption in the interpretive structural modeling. Extending means if the variable "variable alphabet" is associated and the variable "b" with the variable "c" is also relevant, as a result the variable "a" is related to "c" variable.

The fifth step: Accessing Matrix in fourth step is segmenting into different levels.

The sixth step: According to the relationships that are defined in accessing matrix, a directed graph is plotted and extending relationships are eliminated.

The seventh step: The final diagram used replacing the name of variables or parameters instead of nodes becomes an interpretive structural modeling.

The Eighth step: Interpretive structural modeling which was developed in the seventh step will be revised in order to be not incompatible in terms of substantive, if any inconsistency, then the needed modifications is done.
Self-structure interaction matrix (SSIM):

The interpretive structural modeling suggests using expert opinions based on the different management such as brainstorming, nominal group etc. in development of substantive relationship among the variables. As a result, it has been used 25 comments of experts in order to determine the relationship between the substantive knowledge sharing barriers. The experts were asked regarding any criteria pair to comment on the relationship between the two measures. Than 4 signs to show how the relationship between two criteria i and j are used.

(1) If i criteria affected over j and also i criteria affected i.
(2) If the only criteria j affected over criteria i.
(3) If there is no effective relationship between two criteria i and j.
(4) If both criteria i in j and both criteria j over criteria affected each other.

According to Varfield instructions (1974) it has been used expert opinions in order to determine the relationship between knowledge sharing barriers.

Initial reachability matrix:

Structural self interaction matrix turns into matrix zero one called initial reachability matrix. There is just numbers zero and one in this matrix. The rule of replacing zero and one with the fourfold initial numbers (0, 2, 1, 1) is as the following:

- If the intersection of criteria (i,j) in SSIM is 1, the cell (i,j) is 1 in the initial reachability matrix and the cell (i,j) becomes zero.
- If the intersection of criteria (i,j) in SSIM is 2, both the cell (i,j) and the cell (i,j) become 1 in the reachability matrix.
- If the intersection of criteria (i,j) is 0 in SSIM, both the cell (i,j) and the cell (i,j) become 0 in the reachability matrix.
- If the intersection of criteria (i,j) is -1 in SSIM, the cell (i,j) becomes 0 and the (i,j) becomes 1 in the reachability matrix.

In matrix D which is the initial reachability matrix, numbers zero and one are placed instead of \( d_{ij} \) signs, \( C_j \) also shows the knowledge sharing obstacles.

Final reachability matrix:

Final reachability matrix for criteria is gained regarding the extended relationship so that the initial reachability matrix gets compatible. To do so the initial matrix should be in k+1 exponentiation so that the stable status is established. In this way some zero components will turn into 1.

After constructing the relation matrix or initial reachability matrix, the final reachability matrix should be gained using the following relations (T is the identity matrix):

\[
M = D + 1
\]

\[
M^* = M^k = M^{k+1}, \quad k > 1
\]

In the big and complex systems, each component is supposed not to be reached from itself. Thus, all main diagonal entries of the system final matrix is always 1. Therefore, the identity matrix is added to initial reachability matrix to gain the final matrix. The following is one of the properties of the final matrix:

\[
M^2 = M
\]

For this purpose, the gained final matrix should be in exponentiation so much that the emergency state occurs and the gained matrix is the final matrix. The number of 1s placed in the first line show the lines or effects resulted from the first criterion. The number of 1s placed in the first column show the effects which are placed on the first criterion. The component which affects all the system components and is not affected by any component else is called source.

Antecedent and succedent set:

Each of the system components (criteria) has two different antecedent set (A) and succedent or reachable set (R) which have a substantial role in the final matrix structure as well as system design. The antecedent set of
each criterion includes the criteria which end to that criterion or affect that criterion. In other words, the criteria which in the related column to a criterion number 1 is placed in front of them, is an antecedent set on that column criterion. For example, if the criteria 2, 3 and 4 affect the criterion 1, these criteria constitute the antecedent set of criterion 1. On the contrary, the succedent set shows the criteria which are affected by a criterion or system component. For example, if the criterion 1 affects 2, 3, 4 and 5, thus the criteria 2, 3, 4 and 5 are the succedent set of criterion 1. Succeedent set is also called reachable set.

Criteria classification:

To classify the criteria in the reachability matrix, each of the driving force and dependency components should be calculated. Driving force of a component or criterion is the number of criteria which is affected by the related criterion namely the criterion that criterion. Dependency power is the number of criteria that affect the related criterion and lead to reach that. These driving powers and dependency are used in the matrix analysis of multiplier impact of classification mutual applied cross reference (MIMAC) in which the criteria are classified into four groups of autonomous, dependent, connective and independent (driving criterion). The aim of matrix analysis is the multiplier impact of the mutual applied cross reference of the analysis of the driving force and power and dependency of the variables (Metiazan et al, 2013). Variables are classified into four clusters. The first cluster includes the autonomous criteria which have weak driving force and dependency. These criteria are almost isolated from system which have indeed little connections with other system components, of course their connections may be strong. The second cluster includes dependent criteria which have weak driving force but high dependency power. Third cluster includes hybrid criteria which have both strong driving force and strong dependency power. These criteria are indeed non stable since any action on these criteria will have an effect on other criteria or a feedback to themselves. Fourth cluster include independent criteria which have high driving power along with low dependent power. A criterion with strong driving power is called key criterion and is placed in the dependent or hybrid variables.

Data analysis:

For this stage the opinions of 15 experts were used who have scientific and theoretical experiences in knowledge management. The results of their opinions are summarized in a matrix (table 2). To sum up the participants opinions, a concept of mode (status that has the most frequency among the respondents' answers) is used.

Table 2: Structural self interactive matrix.

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<th>factor</th>
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Regarding the gained self-interactive matrix and the expressed rules, the initial reachability matrix is gained as table 3 and then the final reachability matrix is gained as table 4.

Table 3: initial reachability matrix.

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relationships with each other and with the factors of previous and next

Fig. 1: interpretive structural model of influential factors on tourism industry development.
As can be seen in the interpretive structural model, the factors 4 and 5 (i.e. lack of proper organizational structure and lack of high management commitment) are placed in low levels. This matter shows that the above points are the most rooted obstacles in organizational knowledge sharing. Therefore, regarding these two factors is important in successful execution of knowledge sharing and if this is not fulfilled, other executive efforts will be ineffective.

Also, the placement of factors 2, 3, 6, 8 and 12 (lack of proper awarding system, lack of confidence and security in personnel, group work weakness among team members, internal competition among organization different units, insufficient care for experienced workers) in the highest level of model makes us conclude that the existence of internal completion is the result of other factors interaction. Thus, the best thing is to control their previous factors.

Except the above points, other factors (worry for risking the occupational security, lack of awareness for knowledge sharing merits, inappropriate culture dominant in companies, lack of tendency toward knowledge sharing, high complexity) are placed in the intermediate levels. These factors need special care as well, since they are indeed the bridging gap between the antecedent and succedent factors.

**Conclusion:**

The purpose of this study was to identify and analyzing the obstacles to knowledge sharing. Considering to the experts view of this study, 14 main obstacles of sharing knowledge has been approved and selected. It was used an interpretive and appropriate structural modeling approach in order to analyze the relationships among them. Based on the analysis performed, the results showed that, as a conceptual model also suggests, lack of organizational structure is great importance and considering the proper organizational structure will be especially helpful. This study has provided a new insight on the obstacles to knowledge sharing. According to the principal logic of the method used which is an approach in order to design and analyze the system, other factors have the greatest impact on the obstacles that have been characterized as the most important ones. As the results indicate a lack of proper organizational structure is known as the greatest obstacle to knowledge sharing.

The director of any organization as a leader plays an important role in any organization and also leadership strategies have a direct impact on achieving organizational goals, after the appropriate organizational structure, the lack of senior management commitment has a high priority to other factors. The next effective obstacle is lack of meritocracy in the organization which interacts other factors.

People will be more willing to learn and exchange knowledge and information. Research findings; On the other hand indicate that It is very important for employees to feel appreciated even more progress. Thereby expressing of the values and benefits of knowledge transfer activities by the organization through the reflecting of the value of knowledge exchanges and the expressing the financial savings and revenue of exchanged knowledge among the employees as presented as quantitative facts and figures can fulfill the emotional needs of them.

**Fig. 2:** power of influence – dependency.

To discuss and illustrate the results obtained in the previous stages, analysis power influence of dependency can be used. To perform this analysis, constraints based on power of influence and the dependency levels are arranged in four categories. These four categories are autonomous, dependent, linkage and the independent. Autonomous agents are factors that have little power of influence and the dependency. These factors have
limited relationships with other variables in the system and this will have little impact and inspiration. 14,5,12 obstacles and 8 are arranged in this category.

Second category is interrelated factors that influence low-power and high dependency. Many of these factors are interrelated and generally less effective but arranged on the top of interpreted structural model. The system under investigation in this study, of 11, 7, 10, 2 and 13 fall into this category.

The factors that placed in the third category are known as linking agents. These factors also have both power of influence and a high level of dependency. Factors linked are unstable, this is because any changes influence other obstacles and the feedback change affects on them again. The fourth and final class of this classification is independent factors. These factors have a high power of influence and low dependency. These characteristics cause since they usually placed in low levels of interpretive structural modeling. Among the obstacles knowledge sharing, items 4, 1, 3, 6 and 9 are independent. The following diagram schematically illustrates the above points.

REFERENCES


