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- Bowersox, Donald J., Closs, David J., (1996), "Logistical Management." Tata McGraw, Hill, New Delhi.
- Hunker, H.L. and A.J. Wright (1963), "Factors of Industrial Location in Ohio," Ohio State University.

CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

UNPUBLISHED DISSERTATIONS AND THESES

- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Economic and Political Weekly, Viewed on July 05, 2011 http://epw.in/user/viewabstract.jsp

IDENTIFYING AND PRIORITIZING THE MAIN BARRIERS TO KNOWLEDGE MANAGEMENT

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ABSTRACT

Knowledge has been recognized as an important source of competitive advantage and value creation, as an indispensable ingredient for the development of dynamic core competencies and, more generally, as a determinant factor for firms with global ambitions. Thus, successful knowledge management can be the chief determinant for the survival of an enterprise in a knowledge-based economy. Nevertheless, hurdles to efficient and effective knowledge management are many. In this paper we first, identify the barriers of knowledge management according to literature review and experts' points of view. In fact, for extracting the barriers, we have used qualitative method called focused group. In second step, we used ANP (quantitative method) to propose a model to prioritize the most critical barriers which have effect on knowledge management. The output of research indicates that 12 criteria are indentified as barriers. The most important barrier is Managers constraints for motivating employees. Finally we have offered some recommendations for overcoming the identified barriers.

KEYWORDS

Analytical Network Process (ANP), Knowledge Management, barriers, focused group.

INTRODUCTION

It is widely recognized that knowledge is an essential strategic resource for a firm to retain sustainable competitive advantage. Knowledge is the main factor for production in teams, organizations and societies (Chua and Heng, 2009; Massa and Testa, 2009). As knowledge is created and disseminated throughout the firm, it has the potential to contribute to the firm's value by enhancing its capability to respond to new and unusual situations. There is growing evidence that firms are increasingly investing in knowledge management (KM) initiatives and establishing KM systems in order to acquire and better exploit this resource (Choi et. Al., 2008). Knowledge management has been proposed as a methodology that can manage the knowledge of the organization. Knowledge Management is the process of sharing, distributing, organizing, creating, storing and understanding of knowledge about organization policies, processes and products (Ahmad and Khan, 2008).The knowledge processes are briefly described here (Massa and Testa, 2009):

- Knowledge creation/acquisition is the process of generating knowledge internally and/or acquiring it from external sources. It is worth noting that the effective acquisition of knowledge from external sources depends on the ability of the firm to recognize the value of new external information, assimilate it and apply it to commercial ends. Cohen and Levinthal (1990) label this capability a firm's absorptive capacity, which is largely a function of the firm's level of prior related knowledge. According to this perspective, what is just information for some constitutes valuable knowledge for others and vice versa.
- Knowledge storage and retrieval refers to the processes of knowledge structuring and storing that makes it more formalized and accessible.
- Knowledge transfer and sharing refers to the processes of transferring, disseminating and distributing knowledge in order to make it available to those who need it.
- Knowledge application can be defined as the process of incorporating knowledge into an organization's products, services and practices to derive value from it.

The growing importance of knowledge as a critical resource has encouraged managers to pay greater attention to the firms' KM strategies. Appropriate KM strategies are important to ensure that the alignment of organizational process, culture, and the KM-related information technology deployment produce effecttive knowledge creation, sharing, and utilization (Choi et. al., 2008). Cumulative evidence from past research in organization and management suggests that knowledge management is critical element of success of organizations (Fugate, 2009). Successful knowledge management can be the chief determinant for the survival of an enterprise in a knowledge-based economy. Several factors that contribute to the importance of managing knowledge are referenced below (Ahmad and Khan, 2008):

- *Competitive Advantage* - Knowledge can be an organization's most competitive advantage. Wealth results when an organization uses its knowledge to create customer value by addressing business problems. A firm's competitive advantage depends more than anything on its knowledge, or to be slightly more specific, on what it knows, how it uses what it knows and how fast it can know something new.
- *Technology* - Because of the tremendous advances in technology, enormous amounts of information can be disseminated to people regardless of their geographic location or time zone. The speed of transmission and frequency in which this information is received requires an adaptable, skilled and

educated workforce. From a knowledge management perspective, the complexities associated with these technological changes will cause us to think differently about the manner in which people learn.

- *Organizational Change - Due to organizational changes, restructuring, mergers and* acquisitions, companies have lost some of their valued history and cultural norms. An organization's ability to create, acquire, process, maintain and retain old and new knowledge in the face of complexity, uncertainty and rapid change is critical.
- *Enhanced Decision-Making* **-** Learning from and applying past experiences can accelerate the completion of future work and enhance the decision-making process.
- *Workforce Demographics* **-** An aging workforce, coupled with retiring baby boomers and the loss of intellectual capital or institutional memory are creating a new sense of urgency for organizations. Although predicting employee separations is at times challenging, knowledge transfer is vital to sustaining critical business functions. While many employees may continue employment beyond retirement eligibility, these employees will inevitably leave the workforce.

Some of the benefits of an effective knowledge management program are as following (Hislop, 2005):

- Cultivating innovation by encouraging the free flow of ideas
- Improving customer service by streamlining response time
- Improving employee retention rates by recognizing the value of employees' knowledge and rewarding them for it
- Streamlining operations and reduce costs by eliminating redundant or unnecessary processes
- enhancing customer responsiveness by creating and delivering innovative products or services
- managing or enhancing relationships with existing and new customers, partners and suppliers
- Administering or improving more efficient and effective work practices and processes

KNOWLEDGE MANAGEMENT BARRIERS

Most knowledge management initiatives, however, fall short of their goals. Some surveys alert us to a grim reality. For example, Ruggles (1998) studied 431 US and European companies with knowledge management initiatives under way, and found that only 13 percent of the respondents felt they were successful in transferring knowledge from one part of the firm to the other, whereas only 46 percent ranked their firm high on the ability to generate new knowledge. A primary reason for this is the view that IT is a silver bullet. Although it can enable people to transcend distance and time barriers through the use of tools such as e-mail and group support systems, it cannot motivate people to share knowledge. The biggest hurdle to knowledge management is not implementing a cutting-edge IT solution, but getting people to talk and share their know-how. Knowledge originates in the minds of individuals, so we must realize that unless organization members are motivated to share, no IT solution can deliver the desired goals (Desouza, 2003).

Desouza believes that some barriers prevent effective and efficient knowledge management. These barriers are (Desouza, 2003):

- Lack of expert managers for motivating employees. Some managers do not have enough expertise to find appropriate incentives for employees to share knowledge and insights with their peers, as well as providing rewards for those who do so
- Requisite knowledge too hard to capture and categorize. Most knowledge managers measure the success of knowledge initiatives by the amount members contribute to databases and by how much of the knowledge the firm is using. One reason for such superficial metrics is ease of use; it is easy to see access or control statistics on a particular document in a database—it is much more difficult to find out whether those who accessed it actually used those insights. Most specialized domains, such as software engineering, strategy consulting, and finance, contain knowledge that is highly tacit in nature, much of which cannot be articulated well or be put in an explicit format. Moreover, when one wants to contribute insights into the knowledge management system, the cost of doing so tends to outweigh the perceived benefits.

Much of the knowledge in software engineering is highly contextual in nature, which calls for focused applicability. How a logical error was fixed in one scenario may have no bearing on another. Hence, to truly contribute insights one has to capture not only the new knowledge but also contextual factors in an explicit format, which can be a costly endeavor.

- Lack of adequate communication and action. Knowledge management does call for changes to employees' daily routine operations, and until they see fullfledged support for the initiative they are unlikely to follow suit. The use of a knowledge management system calls for training of personnel and involves a learning curve. Most employees view the use of these systems as a luxury to their job, rather than a requirement. Thus, they seldom take training seriously and resist using what they have learned. Clear communication and direction from the executives is crucial here, because employees—as the knowledge providers and users—are key ingredients in the knowledge management revolution. Although the executive team normally has clear objectives and a clear purpose for the new systems, these are almost never conveyed effectively to the rest of the firm. Employees are left to come up with their own notions.

Two common themes that result from lack of communication are confusion and negative perspectives. Employees tend to have their own perceptions of knowledge management system usage, and as they spent time discussing it with their peers, they became more confused. When no clear statement of purpose was made, the negative perceptions of the systems overwhelmed the positive.

- Forcing employees. There is a tendency in firms for people to over-manage, or micro-manage. Knowledge management cannot be fostered under these settings because people feel pressured and are less motivated to engage in dialogue. Moreover, changing to a knowledge management culture does not happen overnight. Senior executives need to be aware of this and avoid imposing strict guidelines on what knowledge can and cannot be shared. They must be more concerned with just getting people talking, which has a direct bearing on moving to a knowledge orientation. It is important to let employees experiment with and exploit new technology at their own pace. If it has benefits intended to improve their performance, they will get around to using it. Employees prefer that their peers tell them to use something rather than a senior executive. Hence, it is pivotal to let nature take its course. Executives need to provide clear communication and set the examples, but they cannot make employees talk, nor can they make them use something at the desired pace.

Rosen, Furst and Blackburn identified six barriers to knowledge Management (Rosen et al., 2007):

- Lack of trust among team members
- Time constraints and competing deadline pressures
- Technology constraints on knowledge sharing
- Team leader constraints on knowledge sharing
- Failure to develop a transactive memory system
- Cultural constraints on information sharing

Lin, Tan and Chang classified knowledge management barriers into five categories (lin et al., 2008):

- *Knowledge characteristics*: Causal ambiguity and non-validated knowledge hinder knowledge flow. The first occurs when the reasons for success or failure in replicating a capability cannot be determined. Tacit knowledge involves human skills and is difficult to measure. In addition, knowledge without a record of past usefulness is likely to be questioned by the recipient.
- *Knowledge source barriers:* Efficient sharing depends on people being willing to contribute material to the organization. However, they often have invested resources in building a competence feel it is theirs unless incentives are given.
- *Knowledge receiver barriers:* A precondition for knowledge transfer is that the receiver has sufficient related knowledge to assess its value, and does not resist using material from outsiders.

- *Contextual barriers:* During problem-solving, people develop and modify their understanding, and the context emerges and transforms. Context influences people's attitudes and choices, thus, context influences what problems are considered to be solvable or are solved. knowledge inertia
- *Inadequate/lack of mechanisms:* Knowledge flow mechanisms are either intangible, such as mentoring, formal meetings and informal occasions or tangible, such as journals and IT.

Liao (2002) using the principles of inertia in physics to knowledge management, states that knowledge inertia is a barrier to knowledge management and may inhibit an organization's capability to learn and solve problems. O'keefe and Wright contend that Knowledge inertia is defined as the degree of the level of commitment to the organization's current strategy, will grow over time as current ways of operating become deeply emdded in an organization, regardless of, and generally without reference to, developments in the environment (O'keefe and Wright, 2009). Barnett and Pontikes (2008) believe that inertia describes the tendency to remain with the status quo and the resistance to strategic renewal outside the frame of current strategy.

Knowledge inertia may pose significant barriers to Knowledge management; for example reduce the options considered feasible and inhibit the development of more appropriate strategies (Baker and Collins, 2009, p: 1944). Knowledge inertia may also be a significant barrier to change, innovation and adaptation in turbulent economic environments (Collinson and Wilson, 2006, p: 1361). Routine problem-solving approaches and similar reasoning will be adopted to save time and effort and also avoid risks. Everything stemming from past experience and knowledge without revision and updating would imply predictable management behavior and problem- solving strategy of an enterprise (Liao, 2002). That is to say, inertia would result in lack of innovation and expected behavior, which may jeopardize the survival or undermine the advantage of an enterprise in a highly competitive environment (Liao et al., 2007; Liao et al., 2008).

RESEARCH METHODOLOGY

Research in scientific method has been recognized as the collection of rules and principles which show the way of searching for finding realities about a subject. This research includes two separate stages. The first stage is a qualitative part of research being in relation with collecting and arranging concerned barriers. In order to gather aforesaid factors, different sources are assessed. These sources are:

1. Research background.
2. Forming focused groups and exploring criteria from interviewing with expert individuals.

In the second stage being performed in quantitative part, ANP technique has been used for structuring and arranging factors.

The statistical population was of professors of Management College of Tehran University included seven fields of study. Whereas statistical sample in research system in focused group is conventional, 8 persons were considered. As we know, focused groups are generally included from 6 to 12 persons.

INSTRUMENTS OF GATHERING DATA

Gathering data is performed in three separate stages. In the first stage, different factors of research literature and interview with experts were collected. It should be mentioned that method of interviewing with focused groups is utilized in order gather information from experts. In the next state, instrument of questionnaire is used to screen principle factors of experts' perspective. In this study, two instruments including questionnaire and interview were used for collecting information. In this stage, numbers of factors from 34 were reduced to 8 principle factors through utilization of questionnaire instrument.

Concerned questionnaire was designed on the basis of a quintuple spectrum of Likert including unimportant, low important, pretty important and very important. Instrument of interview is used in the method of focal group. The performed interview is collectively accomplished. The reason of performing team interviews is to create brain storm among focused group members and reduction of time in research interviews. This method emphasizes that thoughts are mentioned uncontrolled, unorganized and imaginative. So, every thought being come in brain about presented subject, is welcomed. By performing team interviews, some of reproofs like thinking group and collectivism were propounded. The principle origin of these conceptual errors can be known in the topic of power in group. But whereas numbers of groups were in scientific parallel place, effectiveness of these factors has been reached to lowest rate.

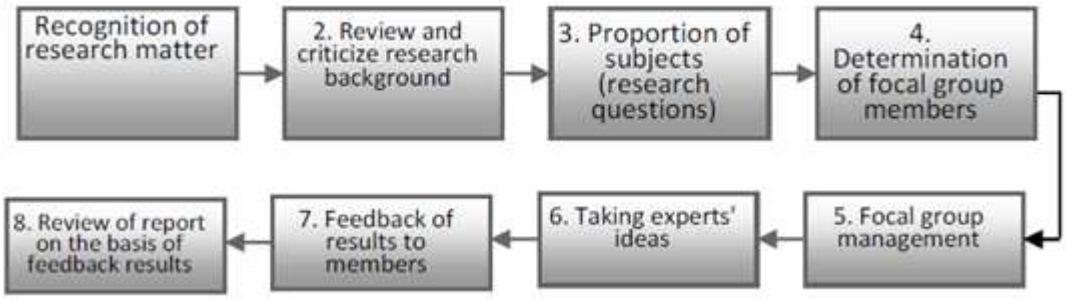
FOCUSED GROUPS

In this research, focused groups' method was utilized in order to analyze the research matter. Focused group is a qualitative methodology by which researcher can show common ideas of individuals in terms of the phenomenon. Using focused groups' method with regard to pathology of infected dilemmas in organization and university centers is previously known. Among, this method was used in Canzas University of USA in order to have scientific communication between researchers in the preliminary stages. Focused group includes experienced individuals in relation with research subject being selected by the researcher. They represent their ideas and discuss about research matter. Focused group has advantages like:

- Synergy :collective process leads to collect more information beside deep individual interviews
- Facilitation (snowball point): equanimity of respondents will lead to represent thoughts and ideas.
- Stimulation: individuals whom avoid from representing ideas are stimulated to cooperation.
- Extemporization: whereas a specific individual is not asked, responses are answered on the basis of conceptual imaginations.
- Structure: modification of subject of discussion can be simply leaded.
- Speed: it is faster than individual interview (one to one)
- Security: it can be supervised by research team members.

Process of Focused group utilization is performed as the follow: after selection of group members, questioner enacting as a mediator and manager of the meeting, turns to ask the questions being previously determined. Registration of Answering question and interviewing is continued for 2 hours. After accomplishing record and analyzing discussion, it is better to represent the collected and analyzed text to the audience, so that that if there would be ambiguous about mentioned problems, researchers can correct them. Figure 1 shows the Process of focused group technique.

FIGURE1: PROCESS OF FOCUSED GROUP



ANALYTICAL NETWORK PROCESS (ANP)

Analytic hierarchy process (AHP) is one of the widely used approaches to handle such a Multi Criteria decision-making problem. However, a significant limitation of AHP is the assumption of independency among various criteria of decision-making. Analytic network process (ANP), on the other hand, captures interdependencies among the decision attributes and allows a more systematic analysis. It also allows inclusion of all the relevant criteria (tangible or intangible, objective or subjective, etc.) that have some bearing in arriving at the best decision (Saaty, 1980). Contrary to AHP, ANP provides a more generalized model in decision-making without making assumptions about the independency of the higher-level elements from lower-level elements and also of the elements within a level. Despite all these merits, the applications of ANP are not very common in a decision-making problem. However, in recent years, there has been an increase in the use of ANP in multi-criteria decision-making problems (Jharkhariaa and Shankar,2007).The steps to run the ANP are coming as below (Chung et al, 2006):

Step 1: Model construction and problem structuring: the problem should be stated clearly and decomposed into rational system like network. The structure can be obtained by the opinion of decision makers through brainstorming or other appropriate methods.

Step 2: Pairwise comparisons matrices and priority vectors: In ANP, like AHP, decision elements at each component are compared Pairwised with respect to their importance towards their control criterion, and the components themselves are also compared pairwise with respect to their contribution to the goal. Decision makers are asked to respond to a series of pairewise comparisons where two elements or two components at a time will be compared in terms of how they contribute to their particular upper level criterion (Meade and Sarkis, 1999). The relative values are determined with Saaty's 1-9 scale (Table 1), where a score of 1 represents equal importance between the two elements and a score 9 indicates the extreme importance of one element (row component in the matrix) compared to the other one (column component in the matrix) (Meade and Sarkis, 1999).

Table 1: Saaty's 1-9 scales for AHP

Definition	Intensity of importance
Equal importance	1
Moderate importance	3
Strong importance	5
Very strong importance	7
Absolute importance	9
Intermediate importance	2, 4, 6, 8

Like AHP, pairewise comparison in ANP is made in the framework of a matrix, and a local priority vector can be derived as an estimate of relative importance associated with the elements (or components) being compared by solving the equation 1:

EQUATION - 1

$$W_n = \begin{bmatrix} 0 & 0 & 0 \\ w_{21} & w_{22} & 0 \\ 0 & w_{32} & I \end{bmatrix} \quad A \times w = \lambda_{\max} \times w$$

Where A is the matrix of pairewise comparison, w is the eigenvector, λ_{max} is the largest Eigenvalue of A.

Step 3: Super matrix formation: the super matrix concept is similar to the Markov chain process (Saaty, 1996). To obtain global priorities in a system with interdependent influences, the local priority vectors are entered in the appropriate columns of a matrix. As result, a super matrix is actually a partitioned matrix, where each matrix segment represents a relationship between two nodes (components or clusters) in a system (Meade and Sarkis, 1999). Let the components of a decision systems be C_k, k=1, 2… n, and each component ***k*** has m_k elements, denoted by: e_{k1}, e_{k2}… e_{kmk}.

The local priority vectors obtained in step 2 are grouped and located in appropriate positions in a super matrix based on the flow of influence from a component to another component, or from a component to itself as in the loop. A standard form of a super matrix is as Figure 2:

FIGURE2: SUPER MATRIX

$$W = \begin{array}{c|c} & \begin{array}{cccc} C_1 & C_2 & \cdots & C_N \\ e_{11}e_{12}\cdots e_{1n_1} & e_{21}e_{22}\cdots e_{2n_2} & & e_{N1}e_{N2}\cdots e_{Nn_N} \end{array} \\ \begin{array}{c} C_1 \\ \\ \\ C_2 \\ \\ \\ \vdots \\ \\ \\ C_N \\ \\ \\ \end{array} & \begin{array}{c} e_{11} \\ e_{12} \\ \vdots \\ e_{1n_1} \\ e_{21} \\ e_{22} \\ \vdots \\ e_{2n_2} \\ \vdots \\ e_{N1} \\ e_{N2} \\ \vdots \\ e_{Nn_N} \end{array} \begin{bmatrix} W_{11} & W_{12} & \cdots & W_{1N} \\ W_{21} & W_{22} & \cdots & W_{2N} \\ \vdots & \vdots & \vdots\vdots\vdots & \vdots \\ W_{N1} & W_{N2} & \cdots & W_{NN} \end{bmatrix} \end{array}$$

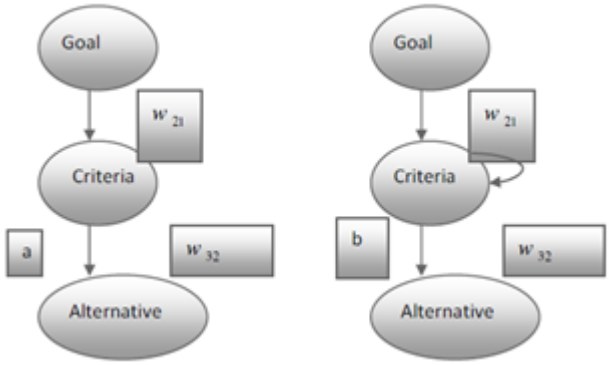
As an example, the super matrix representation of a hierarchy with three levels is as shown in equation 2 (Saaty, 1996).

EQUATION - 2

$$W_h = \begin{bmatrix} 0 & 0 & 0 \\ w_{21} & 0 & 0 \\ 0 & w_{32} & I \end{bmatrix}$$

Where w_{21} is a vector that represents the impact of the goal on the criteria, w_{32} is a matrix that represents the impact of criteria on each of the alternatives, I is the identity matrix, and entries of zeros corresponding to those elements that have no influence.

FIGURE3. A: AHP, B: NETWORK (CHUNG ET. AL., 2006; MOMBOH AND ZHU, 2003)



For the above example, if the criteria are interrelated among themselves, the hierarchy is replaced by a network as shown in Figure 3. The entry of W_n given by w_{22} would indicate the interdependency, and the super matrix would be as equation 3 (Saaty, 1996).

EQUATION - 3

$$W_n = \begin{bmatrix} 0 & 0 & 0 \\ w_{21} & w_{22} & 0 \\ 0 & w_{32} & I \end{bmatrix}$$

THE RESEARCH MODEL

Concerning research literature and interview with focused groups and questionnaires of pairewised comparisons (Figure 4), barriers of knowledge management can be arranged as follow:

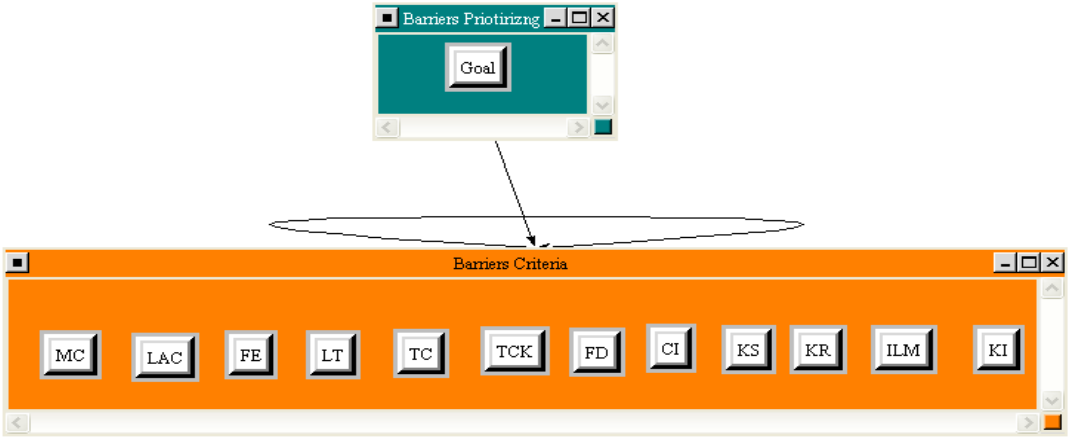
- Managers constraints for motivating employees (MC)
- Lack of adequate communication (LAC)
- Forcing employees (FE)
- Lack of trust among employees for knowledge sharing (LT)
- Time constraints and competing deadline pressures (TC)
- Technology constraints on knowledge sharing (TCK)
- Failure to develop a transactive memory system (FD)
- Cultural constraints on information sharing (CI)
- Knowledge source barriers (KS)
- Knowledge receiver barriers (KR)
- Inadequate/lack of mechanisms (ILM)
- Knowledge inertia (KI)

The model of research is structuralized as figure 5.

FIGURE 4 - PAIRWISED COMPARISON MATRIX

Inconsistency	FD	FE	ILM	KI	KR
CI	↑ 6.0	← 4.0	↑ 5.0	↑ 7.0	← 3.0
FD		↑ 7.0	↑ 5.0	↑ 9.0	← 4.0
FE			↑ 4.0	↑ 6.0	↑ 3.0
ILM				↑ 9.0	↑ 4.0
KI					← 8.0

FIGURE 5 - MODEL OF RESEARCH



RUNNING THE MODEL AND CONCLUSION

For solving the problem we used Super decisions software. The results of running the model are shown in Figure 6.

FIGURE 6- PRIORITIZING THE BARRIERS

Here are the priorities.

Icon	Name	Normalized by Cluster	Limiting
No Icon	Goal	0.00000	0.000000
No Icon	MC	0.32204	0.322038
No Icon	LAC	0.00000	0.000000
No Icon	FE	0.00000	0.000000
No Icon	LT	0.00000	0.000000
No Icon	TC	0.15695	0.156945
No Icon	TCK	0.00303	0.003026
No Icon	FD	0.00000	0.000000
No Icon	CI	0.15695	0.156945
No Icon	KS	0.15695	0.156945
No Icon	KR	0.03399	0.033994
No Icon	ILM	0.15695	0.156945
No Icon	KI	0.01316	0.013160

As we see in Figure 6 the priority of the barriers is as follows:

1. Managers constraints for motivating employees (MC)
2. Time constraints and competing deadline pressures (TC)
3. Cultural constraints on information sharing (CI)
4. Knowledge source barriers (KS)
5. Inadequate/lack of mechanisms (ILM)
6. Knowledge receiver barriers (KR)
7. Technology constraints on knowledge sharing (TCK)
8. Lack of adequate communication (LAC)
9. Forcing employees (FE)
10. Lack of trust among employees for knowledge sharing (LT)
11. Failure to develop a transactive memory system (FD)
12. Knowledge inertia (KI)

According to Figure 6 the most important barrier to knowledge management is the first barrier (Managers constraints). To overcome this barrier considering these points are helpful:

- Managers should be sure that everyone has a voice on an issue before moving on.
- Managers should frequently call for updates and provide updates of other members' work.
- Managers should be sure that information is shared in a timely manner and encourages conversation.
- During quarterly visits and monthly conference calls, Managers should give everyone the opportunity to speak about his or her own experiences and ideas.
- Managers can talk offline with subgroups of team members to discuss an issue to insure that all team members fully understand issues and ideas.

The next most important priorities are Time constraints and competing deadline pressures, Cultural constraints on information sharing, Knowledge source barriers and Inadequate/lack of mechanisms. For overcoming these barriers the following recommendations should be considered:

- Setting clear objectives with documented due dates on which everyone on the team can agree. If a team member has an idea or can help with a specific objective, encourage the member to make such an offer to the full team.
- Working together face-to-face at least once a month helps to develop trust.
- Scheduling regular (e.g., weekly, bi-weekly, or monthly) conference calls to ensure team members share information on a regular basis.
- Creating a web site where members can post and retrieve information.
- Provide training on new technologies to ensure that team members are comfortable with and motivated to use those technologies when needed.
- Monitor e-mail discussions to prevent over-use, particularly when issues become complex and could benefit from the use of richer, more sophisticated technologies
- Establishing agreed-upon rules for participating in the team, including the importance of sharing information and knowledge. Team leaders should model these behaviors.
- Creating a spreadsheet or other document with each team member's knowledge profile and areas of expertise.
- helping team members gain knowledge of expertise, ask members for suggestions or support before searching external sources.
- Sending special requests for information to other team members soliciting advice before pursuing external sources for information.
- Educating team members at the outset regarding possible cultural differences in communication and conflict styles among members.

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