Barriers to knowledge management success in all private and public organizations and ranking with fuzzy topsis

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Abstract

One of the factors that lead to the success of organizations and is somehow their trump card on exceptional circumstances, is the knowledge created in that organization and its effective and proper use in special circumstances which is called the knowledge management process. Setup and use of knowledge management is an issue, but the success in the implementation of knowledge management in the organization is another important issue. If we don't know the barriers to the implementation of a project well and don't have a strategy in order to overcome them, we will always have problems during implementation and at the end we may even fail in the implementation of the project which results in the loss of time and investment. This article attempts to identify barriers to successful knowledge management using other articles and resources, extending them to knowledge-based private and public organizations. In this study, after identifying barriers to the success of knowledge management in these organizations, we use the fuzzy topsis method to rank them.

Keywords: knowledge management, private and public organizations, fuzzy topsis.
1-Introduction

At the moment there is intense competition between organizations. Among the most important competitive advantages in this era is created knowledge in the organizations. In order to make the best use of the created knowledge, this knowledge must be well managed from production to use. In private organizations the level of innovation is so high that companies are inevitable to be permanently innovative and creative [1]. To succeed in this environment, use of knowledge management and its procedures arises not only as a privilege, but also as a necessity, and knowledge management has become an important source of competitive advantage for organizations that its importance is increasingly raising [2].

in the private and non-private organizations which are active in the field of information technology, according to their specialized and knowledge-based nature, the knowledge produced in the company is one of the main assets of the organization. For this reason, management of the created knowledge from production to use is the main concern of the directors of such companies so that it can best be used to maintain the competitiveness of their organization.

In a report published in 2007, the Bain & company firm (one of the largest companies in the world in the field of management consulting) presented studies on 25 management tools usually used by managers to solve organizational problems. The survey began from the 1993 for a period of 14 years and has been developed over 11 courses of extensive survey based on the opinions of thousands of senior executives of powerful organizations in more than 70 countries (in North America, Europe, Asia, Africa, the Middle East and North Latin). The aim of this study was to determine the effectiveness and challenges of using the most widely used management tools by senior managers in the organizations and among them the knowledge management is also studied as one of the management tools. Among the 25 evaluated tools, knowledge management in terms of application, ranked eighth in the world. Interestingly, the rank of knowledge management in Asian companies was seven. But the more interesting thing was that when the managers were asked about level of satisfaction from the use of management tools, knowledge management ranked 22 (high interest, low satisfaction)[3], according to the above report it can be concluded that there are many obstacles in the way of successful implementation of knowledge management. In private and public information technology organizations, given the vital role of knowledge in the organization, identification of barriers to the success of knowledge is of greater importance.

2-Literature review

One of the important aspects of knowledge management for making it through is to identify obstacles to success as if by identifying these factors it is possible to create a mechanism to deal with them. It should be noted that the most important factor of failure of knowledge management, is the failure of its success factors. Rockart [4] considers the key success factors to include a limited number of areas that their satisfactory results ensure successful performance for the person, entity, group or organization and in other words, create value. Tat and Hase [5] believe that three basic elements from the knowledge management key challenges include understanding and awareness of employees, defining the objectives and to support them. Ranjbar [6] considers the identification of the processes of knowledge creation in the organization as one of the
knowledge management challenging important obstacles, and states that knowledge management should be implemented based on business processes.

In another study by Seyed khsan and Rowland [7], they assume the influencing factors to be organizational culture, technology, human resources and political orientation. Linder and Wald [8] studied more than 414 industrial organizations and identified organizational culture, organizational structure and IT tools as important issues.

Quaddus [9] conducted a study among Australian companies using qualitative case study and interview and mentioned key elements of organizational culture, senior management support, and profit for individuals and knowledge management strategy.

Seyed Javadin¹ deals with knowledge management in small companies and entrepreneurs and effective factors in Iran's Informatics industry. Then, he addresses important role of creation and transfer of knowledge in these organizations, which has to provide a conceptual framework consisting of culture, structure, technology and management resources.

Akhavan and Jafari [10]² assume the knowledge management failure factors to be the senior management's lack of knowledge and support for the knowledge management, no separate budget allocation, inadequate knowledge management team and organizational resistance to change. Later Akhavan et al. [11]³ present a conceptual framework in this area that is composed of the foregoing. In this article, considering the vital role of knowledge management in private and public companies, barriers to its successful implementation are addressed.

3-Knowledge management

Knowledge management is recognized as a method of control and guidance of tangible and especially intangible knowledge assets so that the application of knowledge within and outside the organization facilitates knowledge generation, value creation, innovation and improvements in the organization.

Knowledge management is an interdisciplinary concept and its emphasis on knowledge, distinguishes it from other managerial approaches. Without this emphasis, knowledge management is merely a repetitive concept and without a clear explanation of knowledge, the knowledge management discussion falls apart from its goal. Therefore, knowledge forms the identity and nature of knowledge management [12]⁴. One of the senior managers of the "Hewlett-Packard" company said: "If Hewlett Packard knew what he knew, his profitability would be tripled".

¹ Adli (2005)
Based on definition by Mohammadlou [13] knowledge management is an internal systematic business model that has recently emerged in the field of science and organizations and deals with a wide scientific range with all its aspects. This wide range can include knowledge generation, scientific legislation and scientific collaboration and eventually lead to learning promotion and innovation.

In another definition by Pearlson and Saunders [14], knowledge management is considered as a process for creating, considering, documenting and distributing the knowledge in the organization for achieving competitive advantage.

However, some like Jones and George [15] have defined knowledge management as the following: knowledge management is sharing and integration of knowledge and skills within and between the organizational sections through interconnected and real-time information technology. As it is clear, in this definition the emphasis is on the use of information technology in knowledge management.

Given its managerial nature, knowledge management is responsible for targeted implementation and evaluation of knowledge that helps the organization to develop using internal and external knowledge.

4- types of barriers to knowledge management in private and public organizations:
In these organizations different structures such as hierarchical, flat, matrix, project and etc. are usually used, but it should be pointed out that similar units with almost the same activities are used in most of these organizations. For example, in most of these organizations production unit, technical unit, support unit and are used. So obstacles to the success of knowledge management in these organizations can be the followings:
1. Senior management
2. Organizational culture
3. Different business processes in units of the organization
4. Economics
5. Knowledge Management Team
6. The use of appropriate software and tools to implement knowledge management
7. Resistance to Change
8. Organizational Structure
In the following each of the foregoing will be discussed.

4-1. Senior management
As Davenport [16] considers the management support as one of the key challenges in knowledge management, senior managers' lack of cooperation with knowledge management in organizations and lack of support for such projects in organizations are contributing factors in the failure of organizations. The followings are the influencing factors of senior management in public and

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5 2004
7 Jones and George (2003)
8 Davenport 1998 – successful knowledge management
private organizations which are considered as barriers to successful knowledge management is in these organizations:

1. The lack of full support for of knowledge management
2. Not Specifying the objectives of knowledge management implementation in organizations
3. Improper choice of knowledge management team

1) The lack of full support for of knowledge management
One of the important factors for successful implementation of knowledge management is management support. When senior management have more commitment and awareness towards knowledge management, greater success in its implementation in the organization will be achieved. Private organizations usually benefit from small structure and low number of personnel that leads to greater proximity between personnel and managers at different organizational levels. As a result, in these organizations the personnel closely and clearly observe the behavior and performance of their managers, so in the absence of full support for the knowledge management from senior management, they will also become indifferent and as a result, the cooperation that is necessary for success cannot be created between staff. In general, experience has shown that in any organization as long as the managers in the organization have not been harmonious and collaborative to implement a process, that process hardly gets close to success. Here we get close to the concept of leadership which means that the managers should have the leading role and implement the knowledge management at the beginning and prior to their employees.

2) Not Specifying the objectives of knowledge management implementation in organizations
If the managers in these organizations do not specify the objectives of the implementation of such projects, it will be transferred directly to personnel and personnel will consider such projects apart from the goals of their organizations and will set their priorities on other matters and consider it trivial.

3) improper choice of knowledge management team
If the senior management select an improper project management team, it will become one of the barriers to the success of knowledge management in the organization. Since this factor apart from the role of senior management, has other important influencing parameters according to the nature of public and private organizations, it will be taken into account as one of the main factors and we will separately discuss it.

Explicit positioning of command and control systems for achieving coordination can reduce people's motivation, which is not desirable for operating systems in complex environments. Systems are designed to ensure the establishment of coordination, but they pay little attention to the identification and correction of gaps between the inputs, process logic, the output of the organization and the organization's essentials of survival [17].

4-2. Organizational culture
According to Martinez [18] there are 5 key factors for the success of knowledge management and the most important of them weighing about 50% is organizational culture. As organizational culture has a strong role in success, it can also influence and play an important role in the failure.

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9 Sharifzade, Boodlaei (2008)
10 Mertins et al. (2003)
In private organizations it is easier to create or change organizational culture compared with public organizations.

According to the theories of Smith [19][11] and Celemmons [20][12], sharing the knowledge is of components of defining knowledge. Sharing the knowledge is directly related to the organizational culture. In private organizations, given that positions are more precarious than in public organizations and the competition between personnel is much more, if the organizational culture is not appropriate, hoarding the knowledge becomes the culture which is a serious obstacle to the success of knowledge management in the organization. Cultures and values in the organization must create learning environments in which all people are committed to become better. Failure and risk must be tolerable and external opinions should be welcomed.13

4-3. Different business processes in units of the organization
According to Bosilj [21][14] knowledge management should be implemented by considering processes which are source of organizational knowledge. As the properties of private information technology companies were mentioned above, usually similar units that have different business processes are used in these organizations. Similar units include:
1. Production Unit
2. Support Unit (including help desk, etc.)
3. Sales and Marketing Unit
4. Department of Human Resources
In the production unit the process of knowledge creation is different from support unit, so these differences in processes and how to create knowledge in these processes must be identified and the knowledge management implementation must be done with different attitudes towards processes. For example, in the production unit the knowledge sharing is one of the obstacles, but in the support unit knowledge storing is one of the biggest problems.
Ranjbar et al.15 with inspiration from classification of Rago and Vinze, divided the business processes into 4 groups as follows:
1. Flow-oriented processes
2. Decision-oriented processes
3. Information-oriented processes
4. Participatory processes
He continued with the characterization of each process and identified barriers to knowledge management for them. For successful implementation of knowledge management in information technology private organizations, the obstacles should be identified according to the business processes and the knowledge management should be executed by creating mechanisms to deal with these obstacles.

11 Smith, reid (2001)
12 Celemmons rumizen , m. (2002)
13 Adli,2005, page 235
14 Bosilj vuksic (2005)
15 Ranjbar (2012)
4-4. Economics

In such companies, according to type of their activity, they are highly dependent on economic issues such as time and manner and by making these assumptions it can be concluded that most of these companies have money crisis.

An important issue for successful knowledge management is separate and appropriate budget allocation for such projects. In private organizations with regard to the costs and expenses, separate budgeting is difficult and budgeting priorities are the current expenditures such as staff salaries, health insurance contributions and so forth. It should be noted that with the passage of time and rise of financial problems, the lack of funding for implementation of knowledge management project at the beginning causes these projects to become unimportant and even may be left in the middle.

4-5. Knowledge Management Team

For the implementation of knowledge management, a team from outside the organization or from the members of the organization is used for guidance. As Hall [22]¹⁶ mentions the case referred to the Calibres Company’s knowledge management project, appropriate choice of the knowledge management team is a parameter which determines success or failure of such projects. If individuals and the chosen team do not have experience in knowledge management area and do not know the structure and relations in the organization well, the probability of success in the implementation of this project is low. The team members should either be of the organization's high-level staff or have strong connection with high-level staff so that when an obstacle arises, they would have decision-making power and adequate maneuverability in the organization. Important factors in this regard include:

1. Complete mastery of the knowledge management team over tools and selected software
2. The lack of sufficient knowledge to plan, schedule, and determine appropriate funding for project implementation

1) Lack of complete control of knowledge management team over the tool of choice and knowledge management topics
Since personnel in public and private organizations have adequate information about the information technology due to nature of their job and also due to the fact that knowledge management is highly dependent on the related software, most of the personnel consider the knowledge management as a type of information technology. This leads the personnel to have their own attitude towards working with the knowledge management team and in most cases this will cause disagreement and lack of cooperation.

If the knowledge management team does not have sufficient abilities, proper knowledge about the executive software and enough power in the organization, it will become an obstacle to knowledge management success.

¹⁶ Hall, Hazel (2004)
2) Lack of sufficient knowledge to plan, schedule, and determine appropriate funding for project implementation.

Just like other projects, wrong planning and incorrect prediction of project is another factor of failure. If at the beginning of the project, its implementation duration is predicted to last for 6 months but in practice it takes more than a year, proper feedback and mentalities will not be created in the organization towards the project. As the allocated budget for the implementation of knowledge management process will be costly, it is necessary to allocate appropriate and separate budget, so that the project will not experience financial constraints during its implementation. It should be noted that in the discussed organizations, nature of the job is mostly project-based, so users will have good project-based perspective. If the knowledge management project does not have strong and systematic planning, users will simply recognize it and will not welcome it.

4-6. The use of inappropriate software and tools to implement knowledge management
As Mathi\textsuperscript{17} [23] and Martinez pointed out, the most important factors in knowledge management include information technology's infrastructure and tools. Private and public information technology organizations often do not have a problem in the field of information technology's context and infrastructure in their organization due to the nature of their work but the important issue is the choice of software that users have to work with.

In these organizations since the users are either producers of software or experienced at using several different types of practical software, they have different and appropriate expectations from practical software. If the software of choice does not have appropriate standards it will be certainly not welcomed by users and this leads the knowledge management to face crisis and failure. According to Akhavan\textsuperscript{18} [24] knowledge management systems should always be assessed and the factors that should be considered in the evaluation process include:

- Integration of the system
- Level of user friendliness
- The effectiveness of the system in achieving organizational goals
- Publicity campaign
- Confidentiality and access in the system
- Proper side facilities
- The security of information in system
- Proper reporting of the status of knowledge
- And ...

4-7. Resistance to change
One of the highly important factors that plays a role as a barrier to the success of knowledge management, is the resistance to probable changes due to the implementation of knowledge management.

\textsuperscript{17} Mathi (2004)
\textsuperscript{18} Akhavan- knowledge Management from idea to Execution (2010)
As Hall\textsuperscript{19} has proposed in his studies about the barriers in Calibres company, personnel and users unwillingly stand up against possible changes and prevent cooperation in these areas as far as they can.

Akhavan et al.\textsuperscript{20} in their model on barriers to the success of knowledge management suggested that one of the key elements is resistance to change and this is where the role of change management will be highlighted.

In the private and public organizations the personnel have found that according to the nature of their job, in order to stay in the competition they should always get along with changes. But these changes are regarding the tools and methods of their job. In knowledge management big changes happen in case of structure and culture and these cases still continue to be accompanied with resistance in such organizations.

4-8. Organizational structure

One of the factors that affect the knowledge management is organizational structure. As Sharifzadeh\textsuperscript{21} suggests, appropriate structure has the required flexibility and dynamism so that the communications do not be limited to the team, sectional or even organizational borders and the staff have the ability to simply communicate with the outside of the organization. In other words the informal aspect of organizational structure plays an important role in the development of interactions. As a result, rigid and hierarchical structures are not favorable for knowledge management.

In private organizations mostly flat structures are used and in such organizations, project and matrix structures are also used. The argument made here is that improper management causes the suitable flat and matrix structures to lack required flexibility and dynamism and the communications between users be limited to the structure, which causes rise of major obstacles to the success of knowledge management.

5- How to determine the conceptual model of the relations of barriers to success of knowledge management

By specifying the alternative as barriers to the success of knowledge management, the 4 criteria were identified as being time consuming, costly, having positive impact on the obstacles and having impact on the organization's strategy. The alternative was assessed and an attempt was made to rank them according to the results. Fuzzy topsis method is used for ranking the alternatives.

It should be noted that in order to identify the weight of each criterion and the relationship between criteria and alternatives, closed questionnaires were used and for each of them 5 alternatives of very low, low, medium, high and very high were designed. The distribution of

\begin{align*}
\text{2004} \quad & \\
\text{2006} \quad & \\
\text{2008} \quad & \\
\end{align*}
questionnaires among 18 experts in this field has lead to selection of answers that had the most number of votes and then fuzzy topsis method was employed and ranking was done.

Fuzzy topsis

This method was developed in 1981 by Hwang and Yoon. According to this method, each MCDM type of problem with m alternative that is evaluated by the n criteria, can be considered as a geometric system of m points in an n-dimensional space. Topsis method aims to choose the alternative which has the the longest geometric distance from the negative ideal solution. The remarkable point is that the ranking is based on quantitative data, but given the qualitative environment of the research and the collected questionnaire responses from experts on the relationship between criteria and alternative, which are qualitative, attempt has been made to use Fuzzy topsis method that is suitable for this model. According to Chen [25] Fuzzy topsis has been introduced as the following:

step one:
The decision matrix as follows:

\[ D = \begin{bmatrix} x_{11} & \cdots & x_{1n} \\ \vdots & \ddots & \vdots \\ x_{m1} & \cdots & x_{mn} \end{bmatrix} \]

\[ W = [w_1, \ldots, w_n] \]

In This is matrix:

Row: the number of alternatives examined = m

Column: The number of criteria = n

Relationship between the criteria and alternatives as fuzzy number is calculated as follows.

\[ X = (a_{ij}, b_{ij}, c_{ij}) \]

And the weight of each criterion is as follows.

\[ W_j = (w_{j1}, w_{j2}, w_{j3}) \]

Step Two:

Normalizing the decision matrix. One of the most important steps in the compensatory decision-making methods, is normalising the decision matrix that can be done in different ways.

Step Three:

Creating the weighty normalised phase matrix \( W_j \), given the vector V as input to the algorithm.

Step Four:
Identifying the fuzzy positive ideal (FPIS, A^+) and fuzzy negative ideal (FPIS, A^-) for components

Step Five:
Calculate the sum of distances of each components from the positive and negative ideal

Step Six:
Calculate the relative closeness of the i-th component from the positive ideal.

Step Seven:
Ranking the alternatives. numbers and of fuzzy basis used in this study are the numbers presented by Cheng\(^\text{22}\) [26].

The sample matrix V is shown in the following figure

<table>
<thead>
<tr>
<th>Verbal expression</th>
<th>Fuzzy numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>(1,1,3)</td>
</tr>
<tr>
<td>Low</td>
<td>(1,3,5)</td>
</tr>
<tr>
<td>Medium</td>
<td>(3,5,7)</td>
</tr>
<tr>
<td>High</td>
<td>(5,7,9)</td>
</tr>
<tr>
<td>Very high</td>
<td>(7,9,9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Time</th>
<th>Cost</th>
<th>Strategy</th>
<th>Other Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior management</td>
<td>(5,7,9)</td>
<td>(5,7,9)</td>
<td>(7,9,9)</td>
<td>(7,9,9)</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>(5,7,9)</td>
<td>(7,9,9)</td>
<td>(7,9,9)</td>
<td>(7,9,9)</td>
</tr>
<tr>
<td>Different business processes of the organizations</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
<td>(1,3,5)</td>
</tr>
<tr>
<td>Economics</td>
<td>(3,5,7)</td>
<td>(5,7,9)</td>
<td>(5,7,9)</td>
<td>(3,5,7)</td>
</tr>
<tr>
<td>Knowledge management team</td>
<td>(1,3,5)</td>
<td>(5,7,9)</td>
<td>(1,3,5)</td>
<td>(3,5,7)</td>
</tr>
<tr>
<td>Software</td>
<td>(1,3,5)</td>
<td>(3,5,7)</td>
<td>(1,1,3)</td>
<td>(1,1,3)</td>
</tr>
<tr>
<td>Resistance to change</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
<td>(5,7,9)</td>
<td>(3,5,7)</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
<td>(3,5,7)</td>
</tr>
</tbody>
</table>

Afterwards, after carrying out the following steps the final output is

\(^{22}\) Cheng (1996)
Conclusions:

As indicated in the figure below, the alternative ranking has been determined. The first priority is the organizational culture and after that, the role of senior management is more pronounced. These factors are also affecting other obstacles.

<table>
<thead>
<tr>
<th>Options</th>
<th>Proximity factor</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>0.5216</td>
<td>8</td>
</tr>
<tr>
<td>Knowledge management team</td>
<td>0.3677</td>
<td>7</td>
</tr>
<tr>
<td>Different business processes of the organizations</td>
<td>0.3210</td>
<td>6</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>0.2695</td>
<td>5</td>
</tr>
<tr>
<td>Resistance to change</td>
<td>0.2461</td>
<td>4</td>
</tr>
<tr>
<td>Economics</td>
<td>0.1742</td>
<td>3</td>
</tr>
<tr>
<td>Senior management</td>
<td>0.1244</td>
<td>2</td>
</tr>
<tr>
<td>Organizational culture</td>
<td>0.0887</td>
<td>1</td>
</tr>
</tbody>
</table>
Selection of the software and how to implement it is an important factor that is highly influenced by the knowledge management team in organizations. The team must have a certain sensitivity in this case. The other factors are affected by the rest of factors and experience has shown that good management could turn them into the success factors.

Finally, given the important role that science plays and will play in these kind of knowledge-based organizations, they should be managed with the utmost care and sensitivity. According to the barriers to success of knowledge management mentioned and described in this article, it can be concluded that implementation of knowledge management is one of the huge projects of the organization that the whole organization must contribute to its success. As long as the majority of organization are not sympathetic and accompanying, success in knowledge management cannot be achieved, which would disable the organization from taking advantage of its biggest asset.
References


