

Identification and Prioritization of Key Success Factors of Knowledge Management in Learning Organizations

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ABSTRACT

At this era of knowledge, organizations witness dynamic and challenging environments day by day. Alternation and evolution is an inseparable component of today's world and today the intangible and spiritual properties which are called knowledge are considered as an important and vital factor. The noticeable point is that, accessing to knowledge is not feasible without learning. Learning is a key to achieve knowledge assets and knowledge is a supply for the learning organization. Knowledge management has a vital role in protecting organization learning because it facilitates allotment of organization's overall knowledge.

The learning organization by creating a team-based, team-oriented and flexible structure facilitates an effective and propitious learning which results in knowledge creation and knowledge improvement. As a result, there will be growth, development, and better compatibility with the variable environment. The learning organization is a path for organic learning. In this organization, learning and knowledge are the two fundamental elements and intertwined. It means learning leads to knowledge creation and learning the new thing for the second time, brings about a new knowledge.

Now a question is being asked, with the importance of knowledge management in learning organization at the moment, what are the key successes. In this study these factors are identified. Organizational learning and teamwork have the highest priority from expert point of view and performance measurement and organizational learning have the least importance. Results of this study can serve as a guide to learning organization.

KEY WORDS: Knowledge Management, learning organization, Organizational Learning, DEMATEL method

1. INTRODUCTION

In the third Millennium, the basis of competitiveness is on an economy based on knowledge and its now one of the advantages of pioneer organizations. Also the main concentration of information systems is altered from information management to knowledge management. Businesses capable of knowledge management procedures, in their products and services, have specific advantages over their rivals (Akhavan, 2006). In developed countries, and also developing countries most of organizations are knowledge based, hence, it's essential to have knowledge management in these organizations (Chong SC 2006). Today, knowledge management is deeply understood by managers and economists. The nature of knowledge is an inseparable part of the business. But the concern is in successful implementation of knowledge management being done by staff. (Bozbura FT, 2007).

Many of organizations are about to implement knowledge management but there's no proper understanding and adequate reliability of their work (Moffett, et al, 2002). The studies show that, a socially and biologically combined view can lead to success. (Wong and spinwall and 2005). Therefore identification and prioritization of key success factors in knowledge management results in a better implementation of knowledge management. point of view that states that, a faster learning can be the only stable advantage over other rivals, in 21st century. Today we observe an increasingly continuous learning in organizations. And if an organization's tendency to learning would be slower than its surrounding environment, it will inevitably collapse. Hence all of them must be of learning organizations. A learning organization and knowledge management each have common attitudes and are related to information acquisition and storing, data interpreting, knowledge development and learning improvement. It's important for an organization to manage its own knowledge for organizational development. Through doing such studies, all learning organizations can grasp key factors for implementation of essential knowledge management (Akhavan, 2008). In developing countries the role of learning companies is outstanding due to privatization and growth of knowledge-based companies and determining key factors in KM can lead to generate an appropriate pattern for learning organizations to increase the quality of processes and competitive power of the organization.

This study has focused on characteristics of learning organizations through exact study of literature review and has revealed the factors in identifying key success factors. And also the question is answered whether the key success factors have the same importance and priority. Learning organizations and KM cannot exist without each other

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(Aggestam , 2006). This needs a complete understanding of priorities and different relations between them. Figure 1 represents conceptual model of KM and learning organization.

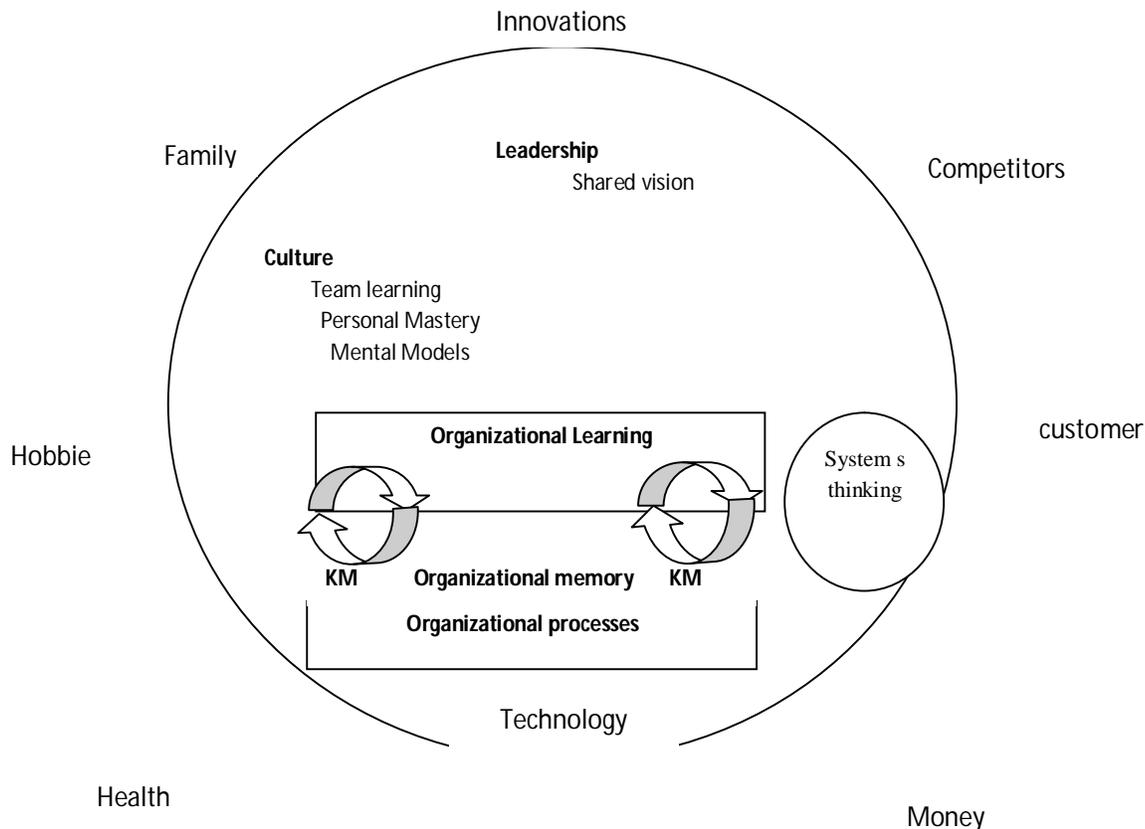


Fig 1. Conceptual model of KM and learning organization

2. KM KEY FACTORS LITERATURE REVIEW

The literature review shows that, vast majority of factors are involved in KM, for instance, technology, senior management support are important considerations in this area (Grover and Davenport, 2001). However, there has been systematic work to specify a coherent collection of these factors, in the areas of learning organizations (Aggestam , 2006), to determine key factors in a learning organization can help these organizations, consider the mentioned factors while implementing KM. Key factors are a part of organization that results show, they create competitive advantage and increase effectiveness. One of the most important definitions states that key success factors are some of limited activities that lead to competitive performance (Rukart, 2010). In another description, states that, key success factors are, characteristics, conditions and variables that in the case of an appropriate management, can considerably effect positional competitive success (Bruno and Valid, 2010). Based on mentioned descriptions above, key factors in this study are those inner factors that are under control of the organization. Outer factors such as environmental effects are not considered as there's not much control on them during KM implementation. Hence, description of conceptual-understandable model is essential that can express the close relation and key factors in KM can affect learning organization and as a subsystem can result in changes in an organization. KM analysis and learning organization show that the most of the concept is the same in both (Aggestam, 2006). Elements related to learning organization cover external factors, and system thinking and Elements related to KM include organizational memory, technical aspect and organizational infrastructure. A learning organization is a part of universal organization and as a subsystem, must be in complete interaction and be able to manage rivals and customers. This is vital for the survival of the organization. KM process is considered as a subsystem in organization (Chong SC, 2006). Since one of the main reasons of this project is to determine KM key success factors in an organization, through adaptive compare and study, the main factors presented by experts of this field of study has been gathered in this study. Finally 13 factors of literature review have been selected and presented in table 1.

Table 1. Effective factors on KM in learning organization

No.	Variable	Reference
1	knowledge sharing in organization	Swan et al. (1999), McDermott and O'Dell (2001), Smith (2001), garvin (1993), Alawi et al. (2007), Davenport (1998), Liebowitz (1999), Yu & Lee (2006)
2	organizational culture	Swan et al. (1999), McDermott and O'Dell (2001), Smith (2001), Chang and Lee (2007), Davenport (1998), ryan and prybutok (2001), moffett et al (2003), tocan madalina (2009), Alawi, Marzooqi & Mohammed (2007), Park, Ribiere & schulte (2004), Liebowitz (1999), jennex and zakhavova (2005), wong (2005), skyrme & amidon (1997), Gold et. al. (2001), Bhatt (2001), Hackett (2000), Sambamurthy & Subramani (2005), McDermott & O' Dell (2001), Chua (2004), Chua & Lam (2005), Jennex & Olfman (2006), Buckman (1999), Greco (1999), Ryan and Prybutok (2001), Wild et al. (2002), Moffett et al. (2003)
3	Staff motivating	Bennett & O'Brien (1994), Davenport (1998), Liebowitz (1999), jennex and zakhavova (2005), Holsapple & Joshi (2000), Hasanali (2002)
4	senior management support	Davenport (1998), ryan and prybutok (2001), moffett et al (2003), tocan madalina (2009), lakshman (2007), Singh (2008), Politis (2001), crawford (2005), /migdadi (2005), Asoh, Beraldo & crnkovic (2007), Senge (1990), Watkins and Marsick (1993, 1996), Huber (1991), Dodgson(1993), dibella (1995), Marquadt (1996), Ribbens (1997), Watkins & Marsick (2003), Chanjnacki (2007), Herrera (2007), Zhang et al. (2004), Tang (2003), Kumar & Idris(2006).
5	teamwork	Ryan and prybutok (2001), moffett et al (2003), tocan madalina (2009), Gold et. al. (2001), Bhatt (2001), Hackett (2000), Sambamurthy & Subramani (2005), McDermott & O' Dell (2001), Chua (2004), Chua and Lam (2005), Jennex and Olfman (2006), Watkins and Marsick (1993, 1996), Senge (1990), O'Reilly et al. (1991), Chatman and Jehn (1994)
6	information systems infrastructure	Ryan and prybutok (2001), moffett et al (2003), tocan madalina (2009), Davenport (1998), Alawi et al. (2007)
7	employment empowerment	moffett et al (2003), tocan madalina (2009), Watkins and Marsick (1993, 1996)
8	performance measurement	tocan madalina (2009), jennex and zakhavova (2005), wong (2005), Davenport et al. (1998), Holsapple and Joshi (2000), Hasanali (2002), Bennett & O'Brien (1994)
9	organizational learning	jennex and zakhavova (2005), Bennett & O'Brien (1994)
10	organizational structure	Rhodes et al (2008), abdullah & sinha (2009), Chourides et al (2003), Hung et al (2005), Yang (2007), Roberts (2008), Chang & Lee (2008), Saenz et al (2009), Alawi et al. (2007)
11	knowledge transfreng channels	Wong (2005), Davenport et al. (1998), garvin (1993), Argote et al (2003), Bilimoria (2004)
12	continuous learning	Petrides (2004), Watkins and Marsick (1993, 1996), Gorelick (2005)
13	Knowledge management strategy	Liebowitz (1999), jennex and zakhavova (2005), wong (2005), Senge (1990), Huber (1991), Dodgson (1993), dibella (1995), Marquadt (1996), Ribbens (1997), Watkins & Marsick(2003), Chanjnacki (2007), Herrera (2007), Zhang et al. (2004), Tang (2003), Kumar & Idris(2006).

3. RESEARCH METHODOLOGY

In this study in addition to KM key factors identification, prioritization for successful implementation of KM projects is revealed. Now the research questions are:

- What is the KM key success factor in learning organization?
- What are interaction impact and impact intensity of these factors on KM?

The main factors in implementation of successful KM in learning organization and also prioritization based on experts view. KM key success factors in learning organization are listed in table 1.

Initially the factors with impact on the others based on experts' view were gained using the absolute maximum. The results are presented in table 2 then the matrix gained from experts' view is divided on the matrix with the highest number rows and based on the table 2 Relative intensity matrix governing the whole relation was gained. And other stages were executed based on DEMATEL method.

3.1. DEMATEL (Decision Making Trial and Evaluation Laboratory)

The DEMATEL method can be summarized in the following steps:

Step 1: Find the average matrix. Suppose we have H experts in this study and n factors to consider. Each stakeholder is asked to indicate the degree to which he or she believes a factor i affects factor j . These pairwise comparisons between any two factors are denoted by a_{ij} and are given an integer score ranging from 0, 1, 2, 3, and 4, representing 'No influence (0),' 'Low influence (1),' 'Medium influence (2),' 'High influence (3),' and 'Very high influence (4),' respectively. The scores by each expert will give us a $n \times n$ non-negative answer matrix $X^k = [x_{ij}^k]$, with $1 \leq k \leq H$. Thus X^1, X^2, \dots, X^H are the answer matrices for each of the H experts, and each element of X^k is an integer denoted by x_{ij}^k . The diagonal elements of each answer matrix X^k are all set to zero. We can then compute the $n \times n$ average matrix A for all expert opinions by averaging the H experts' scores as follows:

$$a_{ij} = \frac{1}{H} \sum_{k=1}^H x_{ij}^k \tag{1}$$

The average matrix $A = [a_{ij}]$ is also called the initial direct relation matrix. A shows the initial direct effects that a factor exerts on and receives from other factors. Furthermore, we can map out the causal effect between each pair of factors in a system by drawing an influence map. DEMATEL can convert the structural relations among the factors of a system into an intelligible map of the system.

Step 2: Calculate the normalized initial direct-relation matrix. The normalized initial direct-relation matrix D is obtained by normalizing the average matrix A in the following way:

$$\text{Let } s = \max \left(\max_{1 \leq i \leq n} \sum_{j=1}^n a_{ij}, \max_{1 \leq j \leq n} \sum_{i=1}^n a_{ij} \right) \tag{2}$$

$$\text{Then } D = \frac{A}{s} \tag{3}$$

Since the sum of each row j of matrix A represents the total direct effects that factor i gives to the other factors, $\max_{1 \leq i \leq n} \sum_{j=1}^n a_{ij}$ represents the total direct effects of the factor with the most direct effects on others. Likewise, since the

sum of each column i of matrix A represents the total direct effects received by factor i , $\max_{1 \leq j \leq n} \sum_{i=1}^n a_{ij}$ represents the total direct effects received of the factor that receives the most direct effects from others. The positive scalar s takes the lesser of the two as the upper bound, and the matrix D is obtained by dividing each element of A by the scalar s . Note that each element d_{ij} of matrix D is between zero and less than 1.

Step 3: Compute the total relation matrix. A continuous decrease of the indirect effects of problems along the powers of matrix D , e.g. $D^2, D^3, \dots, D^\infty$, guarantees convergent solutions to the matrix inversion similar to an absorbing Markov chain matrix. Note that $\lim_{m \rightarrow \infty} D^m = [0]_{n \times n}$ and $\lim_{m \rightarrow \infty} (I + D + D^2 + D^3 + \dots + D^m) = (I - D)^{-1}$, where 0 is the $n \times n$ null matrix and I is the $n \times n$ identity matrix. The total relation matrix T is an $n \times n$ matrix and is defined as follow:

$$T = [t_{ij}] \quad i, j = 1, 2, \dots, n$$

$$\begin{aligned} \text{where } T &= D + D^2 + \dots + D^m = D + D^2 + \dots + D^m = D(I + D + D^2 + \dots + D^{m-1}) \\ &= D[(I + D + D^2 + \dots + D^{m-1})(1 - D)](1 - D)^{-1} = D(I - D)^{-1}, \text{ as } m \rightarrow \infty \end{aligned} \tag{4}$$

We also define r and c as $n \times 1$ vectors representing the sum of rows and sum of columns of the total relation matrix T as follows:

$$r = [r_i]_{n \times 1} = \left(\sum_{j=1}^n t_{ij} \right)_{n \times 1} \tag{5}$$

$$c = [c_j]_{1 \times n} = \left(\sum_{i=1}^n t_{ij} \right)_{1 \times n}' \tag{6}$$

where superscript $'$ denotes transpose.

Let r_i be the sum of i -th row in matrix T . Then r_i shows the total effects, both direct and indirect, given by factor i to the other factors. Let c_j denotes the sum of j -th column in matrix T . Then c_j shows the total effects, both direct and indirect, received by factor j from the other factors. Thus when $j = i$, the sum (r_i^+) gives us an index representing the total effects both given and received by factor i . In other words, (r_i^+) shows the degree of importance (total sum of effects given and received) that factor i plays in the system. In addition, the difference (r_i^-) shows the net effect that factor i contributes to the system. When (r_i^-) is positive, factor i is a net causer, and when (r_i^-) is negative, factor i is a net receiver (Tzeng et al. 2007; Tamura et al., 2002).

Step 4: Set a threshold value and obtain the impact-relations-map. In order to explain the structural relation among the factors while keeping the complexity of the system to a manageable level, it is necessary to set a threshold value p to filter out some negligible effects in matrix T . While each factor of matrix T provides information on how one factor affects another, the decision-maker must set a threshold value in order to reduce the complexity of the structural relation model implicit in matrix T . Only some factors, whose effect in matrix T is greater than the threshold value, should be chosen and shown in an impact-relations-map (IRM) (Tzeng et al., 2007). In this paper, the threshold value has been decided by experts. As long as the threshold value has been decided, the final result can be shown in an IRM as table 2.

Table 2. Dominant Intensity matrix on direct and indirect relations

	Information system infrastructure	Organizational structure	Organizational culture	Staff motivating	Senior management support	Team work	Employee empowerment	Performance measurement	storage, and sharing the knowledge	Knowledge management strategy	Continuous learning	Knowledge transfer channels	Organizational learning
Information system infrastructure	0	0	0.222	0.274	0	0.424	0.353	0.161	0.436	0.353	0.503	0.325	0.555
Organizational structure	0	0	0.076	0.102	0.074	0.231	0.122	0.008	0.100	0.073	0.132	0.065	0.205
Organizational culture	0	0	0.178	0.350	0	0.448	0.420	0.019	0.361	0.174	0.452	0.160	0.468
Staff motivating	0	0	0.171	0.209	0	0.377	0.70	0.028	0.325	0.257	0.415	0.155	0.407
Senior management support	0	0	0.311	0.389	0	0.483	0.442	0.033	0.289	0.311	0.466	0.176	0.500
Team work	0	0	0.308	0.385	0	0.356	0.459	0.022	0.393	0.204	0.500	0.253	0.527
Employee empowerment	0	0	0.238	0.288	0	0.357	0.224	0.014	0.197	0.127	0.369	0.114	0.375
Performance measurement	0	0	0.205	0.259	0	0.197	0.270	0.011	0.149	0.102	0.304	0.082	0.293
storage, and sharing the knowledge	0	0	0.213	0.263	0	0.439	0.448	0.033	0.276	0.306	0.483	0.308	0.520
Knowledge management strategy	0	0	0.346	0.318	0	0.479	0.494	0.132	0.464	0.226	0.573	0.338	0.588
Continuous learning	0	0	0.194	0.249	0	0.298	0.192	0.012	0.169	0.111	0.211	0.098	0.333
Knowledge transfer channels	0	0	0.311	0.364	0	0.490	0.466	0.037	0.437	0.347	0.524	0.207	0.550
Organizational learning	0	0	0.224	0.376	0	0.465	0.467	0.037	0.429	0.342	0.517	0.292	0.417

Tables 3 show the results of DEMATEL technique. Finally cause and effect table of effective factors on KM in learning organizations is shown in figure 2.

Table 3. Results of DEMATEL technique

No.	Element	Impact intensity (C _i)	Impact Intensity(R _i)	Impact intensity (R _i -C _i)	Impact intensity (R _i +C _i)
1	Knowledge management strategy	2.932	3.958	1.026	6.891
2	Knowledge transfer channels	2.572	3.734	1.162	6.305
3	Information system infrastructure	0	3.604	3.604	3.604
4	Organizational learning	5.737	3.566	-2.171	9.303
5	Team work	5.043	3.407	-1.636	8.450
6	Senior management support	0.074	3.399	3.326	3.473
7	storage, and sharing the knowledge	4.024	3.288	-0.736	7.312
8	Organizational culture	2.99	3.029	0032	6.027
9	Staff motivating	3.827	2.713	-1.115	6.450
10	Employee empowerment	4.726	2.301	-2.425	7.027
11	Performance measurement	0.546	1.873	1.327	2.419
12	Continuous learning	5.448	1.867	-3.580	7.315
13	Organizational structure	0	1.188	1.188	1.188

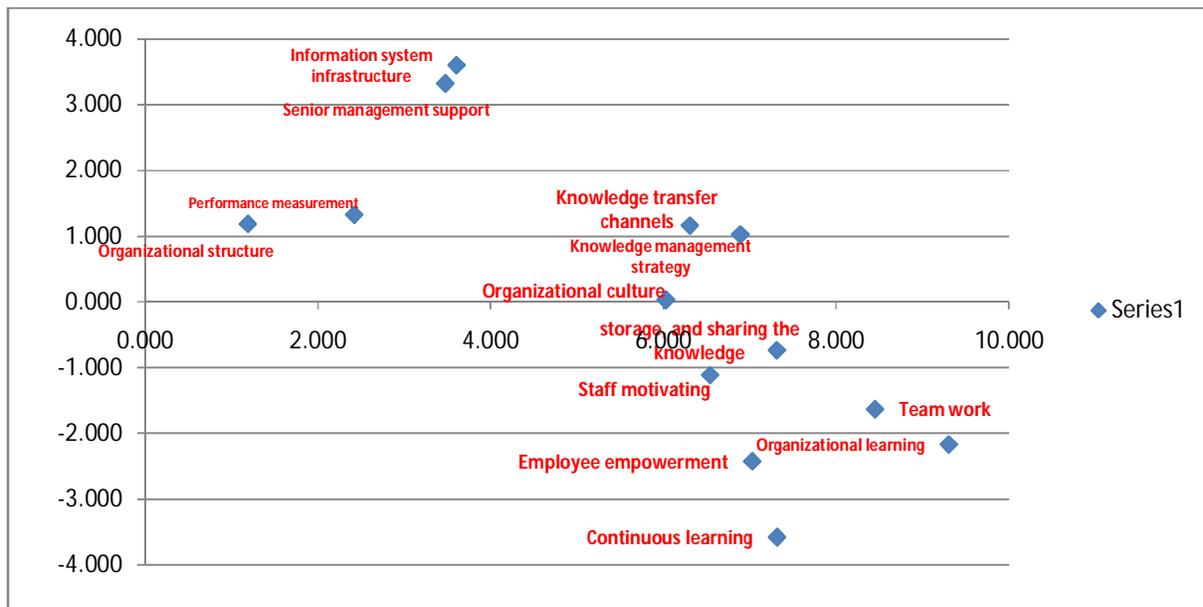


Fig 2. Cause and effect table of effective factors on KM in learning organizations

4. RESULT AND DISCUSSION OF CSFS

In this study key success factors were identified. KM and learning organizations experts calculated the effect of each factor on the others via MCDM and Dimetel technique. With regard to X , we tend to analyze the resulted data. It's important to note that, the analysis is based on the experts point of view. Based on the Dovenport el al. (1998) observations, KM projects were shown to have high significance including: organizational culture, organizational structure, motivational aids and senior management support. Key success factors are different from mentioned factors though. This can show the different point of view presented by experts and KM researchers that are important for implementation of KM in learning organization.

Organizational learning and continuous learning play an important role in learning organizations. Hence, one of the particular characteristics of today's organizations is their learning-based formation. Therefore managers and staff are increasing their learning ability and gaining new skills, because organization authority is in direct relation with continuous learning of the organization. Learning organizations' tendency is to increase their creativity, innovation and evolution, which provided through learning and promotion of human resource ability.

The second most important factor is team working. Today, organizations' belief is that team working is one of the necessities of an organization. Teams become crucially important when it comes to manage culture, processes, systems and communications. Today teamwork is an essential part of the organization success, which can effect and alter organizational structure. Hence teamwork is the secondly most important factor from expert point of view in this study. The more the team work is promoted, the more prominent can it be in KM implementation. Table 3 shows that, performance measurement index and structural organizations are main factors with the least effectiveness and influence from experts' point of view.

Since organizational knowledge is a quality criterion, and its measurement is not an easy task, but in obvious that in case if not measuring a performance, we are not able to manage that correctly. Other success, applying previous and current experiences, benchmarking of successful organizations, the speed of knowledge transfer, learning rate and teaching are performance measurement criteria which organizations tend to emphasize on them. Since, organizational structure forms decisions and processes, is the first driver of change, concentration, Recognition, how information flows between units, document condition and confidential documents, are structural factors which directly affect on creation, transfer and storage of knowledge in an organization. The structural evolution shows that, hierarchical structure is turning to an organic and flexible structure. Therefore, formal aspects and its components do not suffice to respond to knowledge and learning organizations and more attention must be paid to structural aspects. So structure must be flexible and dynamic and informal relations play an important role in them which makes the team turn to main business units.

5. Conclusion and recommendation

Based on the key success factors in knowledge management studied by experts, 13 factors are extracted in this study. Therefore these factors are examined by learning organization and knowledge management experts and its validity and reliability is admitted. Based on these extracted data from expert point of view, prioritization of these key factors are sorted upon effectiveness and influence of these indices that showed the importance of team work in an organizational learning. Organizational structure and performance measurement are considered as the least important factors. For organization leaders who tent to implement the KM in their organizations is suggested that:

Hence KM and learning organization are tied together; an understanding of priorities and ranking identification can serve as guide to successful implementation of KMs in developing countries. Researchers can apply prioritization of extracted indices for better productivity and improvement of KM in learning organizations. With regard to identification and importance of these indexes in this model, is suggested that, these factors be analyzed in an organization and to determine their desired present position to exchange the organization to a successful learning organization. With regard to critical analysis of success factor in KM, it's suggested that in future studies these indices be measured in an organization and after indices implementation, the desired and the current condition of the organization be examined to lead to a learning organization

In regard to limitation of learning organization in developing countries, in this study, expert method and MCDM are applied. in future years, with the growth of learning organizations, its suggested that factor analysis be implemented.

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