DESIGNING AN EXPERT FUZZY SYSTEM TO SELECT THE APPROPRIATE KNOWLEDGE MANAGEMENT STRATEGY IN ACCORDANCE WITH APO MODEL AND BLOODGOOD KM STRATEGIES: A CASE STUDY

Abstract

Purpose: Selection of knowledge management strategies (KMS) is one of the most important and effective factors in acquiring the competitive advantage and elevating the knowledge level of the organizations. Those organizations that have taken steps towards knowledge management necessarily need to pay utmost attention to the matter of KMS before taking any further steps in their activities. One of the effective ways in adopting the proper KMS is evaluating the knowledge management maturity level in the organization. The purpose of this article is designing an expert fuzzy system to adopt the KMS based on Bloodgood model in accordance with the maturity level of the organization.

Methodology: In this method, with the help of expert fuzzy system, a model has been designed, by utilizing Matlab software, to adopt the KMS. The KM maturity level, tacit knowledge, and explicit knowledge are as inputs, and each one of Bloodgood's KMS (production, transfer, and protecting the knowledge) are chose as outputs. To perform the system, the maturity level of knowledge management of an industrial organization that has been evaluated by the standard APO questionnaire is used as the input which has been given to expert fuzzy system. Then, considering the output of the system, KMS for the organization have been recommended.

Results and findings: knowledge management maturity level of the organization is on level 4; considering the expert fuzzy system that has been designed, "knowledge production" strategy is recommended for the organization under study.

Originality/ value: An expert fuzzy system has been designed regarding maturity of knowledge management and Bloodgood model that can be used as a guide for organizations and academic people as an appropriate practical model for selecting knowledge management strategies.

Keywords: knowledge management, knowledge management strategy, knowledge management maturity, expert fuzzy system

Introduction

One of the most important assets of each organization is knowledge which can bring about stability and profitability for the organization. Competitiveness of organizations in today's world entails proper utilization of knowledge; a lot of organizations have stepped towards trying to better take advantage of knowledge. Knowledge management is the area that organizes these endeavors as well as materializing them, and its presence as one of the methods to achieve favorable performance and being competitive is essential. Organizing knowledge management activities and having a plan for successful performance of the activities regarding knowledge management are of utmost importance; commensurately, in order for the organizations to compete in succeed in ups and downs there is the need for making use of adaptable and smart

strategies which cover the processes of knowledge management (Philsoophian et al,2016) Knowledge management strategies specify the knowhow for the organization on how to use their knowledge resources as wells their capabilities (Choi & Lee, 2003, Mehralian et al, 2012); proportionally, recognizing the knowledge management strategy is of great necessity for the organizations to differentiate. One of the most effective factors in choosing correct and systemic strategy for knowledge management is recognizing the maturity on a surface level (Akhavan et al, 2017). Thus, by recognizing the maturity level of knowledge management in an organization, one can codify different knowledge management strategies and distinguish a better conformity among them for the organization. Limited and disorganized studies have been done regarding adopting the strategy for the organization form KM perspective. Despite all that has been done regarding knowledge management strategy, few studies have explored maturity level through an expert fuzzy system.

Fuzzy logic has been recognized as one of the computational tools which is used for modeling decision support systems (Samuel et al, 2013). Therefore, a fuzzy logic derived from decision support system to choose the knowledge management strategy based on the maturity level of the organization is designed. In this system of fuzzy inference, levels of maturity of knowledge management, tacit knowledge, and explicit knowledge are as input, and the output is Bloodgood knowledge management strategy type. Also, after recognizing the maturity level of knowledge management in the organization under study and inserting it into the expert fuzzy system, knowledge management strategy which suits the organization has been recommended. To evaluate the maturity level of the organization under study, APO framework has been used for implementation. This is a prescriptive framework that introduces the different steps for implementation of knowledge management. This framework has been designed for Asian countries and is more adaptable to these countries considering the culture and can be implemented in many organizations. The framework that has been used to evaluate the maturity level has offered the standard questionnaire as the means of evaluation. Also, by referring to Bloodgood in this study, its practicality in comparison with the other models, and considering the experts' point of view, this model was adopted as the basis.

This research undertakes to provide replies for following question:

- How to determine and select knowledge management strategies in an organization?

Literature Review

In this research, we explained the relevant literature about both km strategy and km maturity model regarding to research question.

Knowledge management

Nowadays companies need to manage knowledge because they want to develop plans in the organization to achieve competitive advantage (Canzano and Grimaldi, 2012).
As a matter of fact, knowledge management focuses on systematic analysis, programming, accumulation, creation, development, storage, and utilizing the knowledge of the organization and tries to change human resources into a structural capital to help implement the main goals. Also, knowledge management, as a cross-functional activity, is part of the meritocracy of strategic management in an organization (Akhavan et al, 2016). Knowledge management means in the world are known as strategic resources and have an essential role in suggesting strategies and technics in the organization (Talisayon, 2013). Davenport believes that knowledge management is a set of processes for understanding and utilizing the strategic resource of knowledge in the organization and is considered a structured approach sets methods for recognizing, evaluating, organizing, storing, and utilizing knowledge to meet the needs and goals of the organization (Davenport, 1995)
Strategic planning of knowledge management is necessary for successful designing and implementing of knowledge management and its system, and it is defined as creating the strategy for knowledge management, the process of creating a perspective for organizational knowledge, designing the architecture of knowledge management, and organizing a set of activities and resources for its implementation (Nahapiet and Ghoshal, 1998). Knowledge management in strategic management field evaluates the connection between competitive strategy and knowledge management and how to codify the strategy based on knowledge (Shih & Chiang, 2005).

Knowledge management strategy

The strategy of the organization is the most important setting for investment and utilizing knowledge management. In other words, the endeavors for knowledge management cannot be taken away from the strategic programing. Knowledge management strategy specifies the path to meet the purposes of the organization whose main purpose is actualizing knowledge management in the organization. Not recognizing the connection between knowledge management and the strategy of the organization and also unifying these two are among the most important reasons for the failure of knowledge management projects.

One of the important factors to create knowledge management strategies is focusing on knowledge management (Hansen et al, 1999, and Zack, 1999). The nature of the organization, type of the products and services, and nature of knowledge that the organization deals with are among the most important reasons of choosing the proper strategy for knowledge management in the organizations (Philsoophian et al, 2016). In order to choose the suitable knowledge strategy, organizations should pay more attention to the features of the job (Singh and Zolo, 1998). Organizations should know how to manage their knowledge through knowledge management strategies (Bloodgood and Salisbury, 2001). One of the important factors in knowledge management strategy is seeing the balance between the discoveries and utilization of knowledge; in other words, the balance between creation, discovery or obtaining of knowledge, using it again, and focusing on efficiency of knowledge resources management (March, 1991). An

organization can understand what knowledge should be acquired or developed by strategic evaluation of the resources and its knowledge based activities (Zack, 1999).

Some scholars focused on KMS. Bierly and Chakrabarti (1996) identifies category of knowledge management strategies Include explorers, exploiters, loners and innovators. They consider some dimensions such as internal versus external learning, fast versus low learning, and radical versus incremental learning. Earl (2001) introduced KM strategy with cognitive approach and focused on the system perspective such as technology, maps and processes. Some studies about KMS only consider the way in which knowledge is codification or personalization. (Hansen, et al, 1999; Schulz and Jobe, 2001). Choe (2011) exhibited a KM strategy as integrated approach, combining both personalization and codification strategies as mixed KM strategy "The problem with all of these studies is that they only analyze KMS on the basis of some dimensions, meaning that they are incomplete" (Gómez and Manzanares, 2004), specially that they don't consider the maturity level of organization for selection an appropriate strategy. In this study we focus on the Bloodgood's knowledge management strategy regarding to maturity level.

Bloodgood's knowledge management strategy

From Bloodgood's point of view (2001), three general strategies for KMS are:

- Creation strategy or producing knowledge,
- Strategy of transferring knowledge, and
- Strategy of protecting knowledge.

Organizations that adopt the first strategy focus on innovation and creativity and follow creating new knowledge to develop new products and services. This strategy can be adopted when the organization is replete with both tacit and explicit knowledge.

But Bloodgood suggests the knowledge transfer strategy for the organizations that have more explicit knowledge in comparison with tacit knowledge. In this strategy, organizations emphasize the fastest and most complete level of spreading the extant knowledge and utilizing it. On the contrary, if the organization has more tacit knowledge, his recommendation is the third strategy or protecting knowledge. In the organizations that make use of this strategy, knowledge is maintained in its main and productive condition; to put it simply, they do not lose the present knowledge and do not let it change. They emphasize codifying the knowledge in a way that it is prevented from being spread and used by the rivals. These organizations also make use of security and legal indexes to implement this strategy.

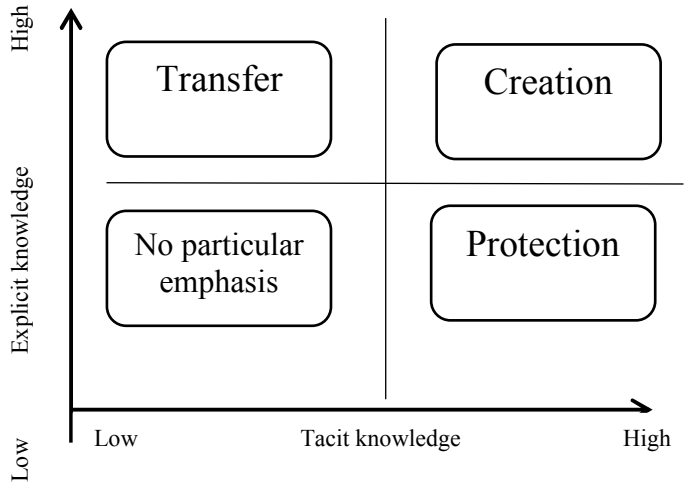

Figure 1. Knowledge management strategy (Bloodgood, 2001)

Knowledge management maturity

Maturity of knowledge management is a level of the organization's capabilities that affects the knowledge management processes on different scales; every organization is at a certain level of maturity considering its present condition.

Maturity models, in effect, describe the condition or nature of something in the passage of time. Models of knowledge maturity management have limited levels in which each level has its own requirements. The levels or prioritized in way that from the beginning to the end, the last level is the most propitious level of knowledge maturity management, and none of the levels can be neglected. For the growth of the organization, more complex dimensions of knowledge, various benchmarks, and more professional indexes for evaluating and managing the knowledge of the organization should be considered. Hence, there is the need for knowledge based processes to manage these complexities (Khatibian et al, 2010). One of the barriers on the way of knowledge management is implementing it considering the knowledge management maturity level of the organization; to obviate these problems, the maturity of knowledge management is a method for evaluating the knowledge management and recognizing its different levels. To evaluate the progress of knowledge management of the organization, numerous studies have been done to better recognize the barriers of knowledge and developing knowledge management maturity models (Lin et al, 2012).

Asian Productivity Organization (APO) Framework

This framework was developed in September of 2007,by National experts of knowledge management from different countries including the People Republic of China, India, Japan, Malaysia, The Philippines, Singapore, Thailand, and Vietnam cooperated with the secretariat of

Asian Productivity Organization in creating this framework. Every one of the frameworks of The American Center of Productivity and quality, the European Union of Quality Management, and the Australian framework were studied and compared in the process of creation. The framework was tested in different areas, and it was ameliorated many times before the final approval. The framework of knowledge management in APO offers a common understanding of knowledge management among the countries which are the members of the organization and emphasizes the importance of knowledge management in achieving success. The mentioned model is designed based on the practical management experience in some Asian countries and includes the best extant practices in America and Australia as well as Europe. This model is a simple and understandable framework which comprises all suitable factors for the implementation of knowledge management and can be used as reference base for all organizations.
The starting point of the model is understanding the perspective and the mission of the organization; understanding these factors, helps recognize the advantages of core competencies, which is necessary to achieve the commercial goals, designing the knowledge management plan, the road map, and defining the activities for the organization.

In the abovementioned framework there are three levels named accelerators, knowledge process, and results. Accelerators include drivers and enablers. Leadership is a driver which leads the innovative plans for knowledge management in the organization. Process, people, and technology enable the organization to accelerate the innovative plans of knowledge management and implement them, and are in the group of enablers.

The second layer includes the processes of recognition, creation, storage, sharing, and utilizing the knowledge that starts with recognizing the needs of the organization and what the organization knows Akhavan et al, 2015); by continuing this process, the knowledge gaps turn into knowledge assets through knowledge processes (Jafari et al, 2013). The third layer magnifies the results of knowledge management. Knowledge processes bring about learning and innovation in the organization; people, teams, and the organization becomes more capable, and all of these lead to the increase of capacity and social ability which, proportionally, increase the quality of services and products, productivity, profitability, and growth; thus, it helps develop economic and social development.

The framework of APO's knowledge management helps the organizations start the implementation of knowledge management while considering all the necessary factors and can achieve successful and efficacious knowledge management. This framework assures that no aspect that causes the decrease of variety and complexity in knowledge management in its controllability is neglected (Talisayon, 2013).

Methodology

The method that has been used in this study, from the purpose point of view, is practical and based on the nature of the research, and the method that has been utilized is survey. In order to glean the information, a survey has been done among the experts using a questionnaire

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12 scholars in the field of knowledge management have taken part in this study who were proficient at strategic subjects to devise the expert fuzzy system. They have been asked to specify member functions for each input and output variable. Then the rules for fuzzy inference system have been codified based on the inputs of "the maturity level of knowledge management, tacit knowledge, and explicit knowledge" and the outputs of Bloodgood's knowledge management strategy model which are "production, transfer, and protecting the knowledge".
To test the fuzzy system that was designed, it was implemented in an industrial organization to evaluate the level of knowledge management maturity; standard means of evaluation for the level of knowledge management maturity of APO were utilized. The experts in the organizations have been asked to specify the conformity of their organization with each one of the items on the five-part scale of Likert. After the data was gathered, the average score for each question was evaluated and from the sum of the scores for each benchmark, the score for each benchmark was calculated. The score of the organization under study in terms of knowledge management maturity benchmarks has been depicted in the table 3. The statistical people in this phase of the study are 7 experts in this industrial organization who have adequate experience in the field of knowledge management.
Then by inserting the maturity level of the organization under study as the input into the expert fuzzy system, the appropriate KMS in accordance with the output of the system was recommended.

Considering the fact that we have applied a case study in this research, it is necessary to explain about it. Case study Focuses on a contemporary phenomenon within its real life context. It is ssuitable for studying social phenomena. When the approach is applied correctly, it becomes a valuable method for science research to develop theory, evaluate programs, and develop interventions. Iinvestigator select case study method when to make answer questions like "how" or "why", has a little possibility to control the events and contemporary phenomenon in a real life context. "Research design links the data to be collected and conclusions to be drawn to the initial questions of the study. It provides a conceptual framework and an action plan for getting from questions to set of conclusions" (Yin, 2013).

Expert fuzzy system

People's arguments can manage incorrect, obscure, and vague concepts in a proper way (Alan, 2010). Humans usually cannot express their arguments and understanding precisely, and they assess the experiences using statistical theories or probability. Fuzzy system is a formal method to show and run uncertainties pertaining to knowledge and humans' understanding and provides practical solutions to the problems that comprise several variables (Samuel et al, 2013)

Fuzzy system is a popular computing technic based on the theories of fuzzy sets, If-then fuzzy rules, and fuzzy arguments. By using the mentioned framework, argumentative traits and humans' decisions can be formulized using some simple and intuitive IF (progressive) and Then (retrogressive) rules

Fuzzy systems use fuzzy logic for processing. To get the inputs and doing the inference in these systems, a set of membership functions and fuzzy rules are used instead of absolute logical rules or 0 and 1 (Wu & Lee, 2007).
The main components associated with the model are: Fuzzification; Fuzzy rule base; Fuzzy inference system; and Defuzzification. The following paragraphs briefly discuss each of them.

Fuzzification

For every input variable in this phase, we consider membership functions so that absolute inputs turn into fuzzy inputs and are placed in fuzzy inference system.
Membership functions were acquired in a session in which all the experts were present. The inputs of the system that included the maturity level of knowledge management are divided, considering the APO model, on scale of 1 to 5, and two variables of tacit knowledge and explicit knowledge in the format of 5-part membership functions (very low, low, average, much, very much).
To represent input variables (KM maturity level, Tacit knowledge, Explicit knowledge) graphically, trapezoidal membership functions (Figure 2and 3) are used.

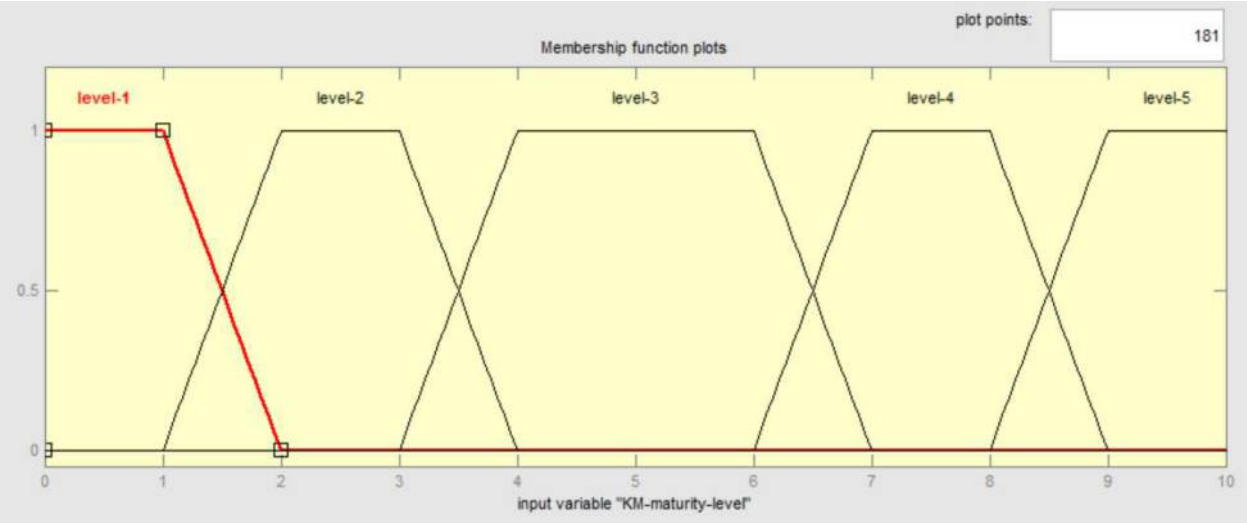

Figure 2. Fuzzy membership function for linguistic variables (KM maturity level)

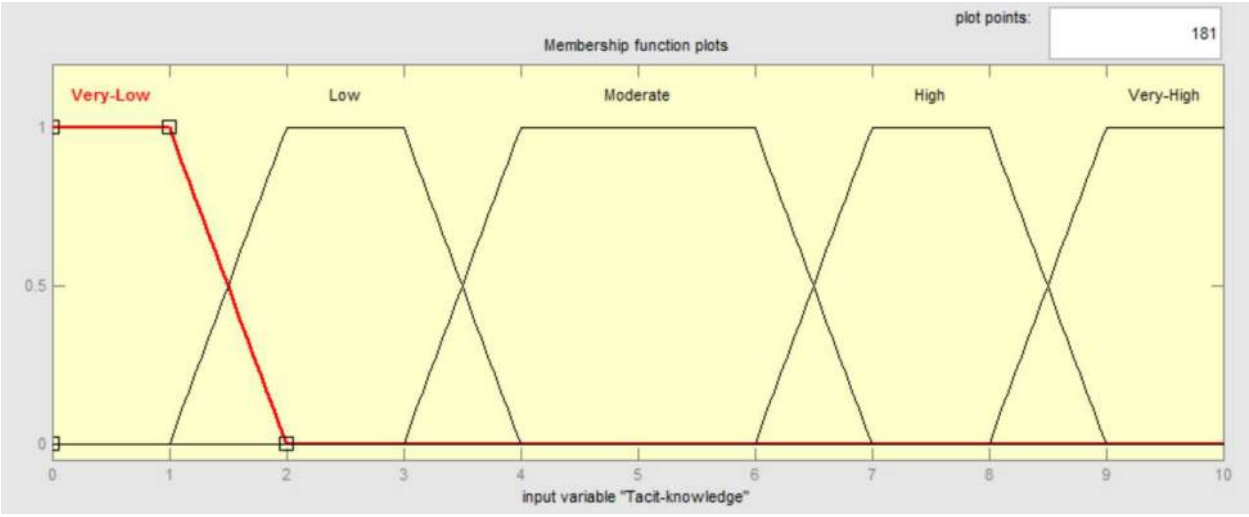

Figure 3. Fuzzy membership function for linguistic variables (Tacit knowledge, Explicit knowledge)

For the outputs of the model or knowledge management strategies of BloodGood (production, transfer, and protection of knowledge) 3-part membership function has been defined.

To represent output variable, (KM strategies) triangular membership functions (Figure 4) are used.

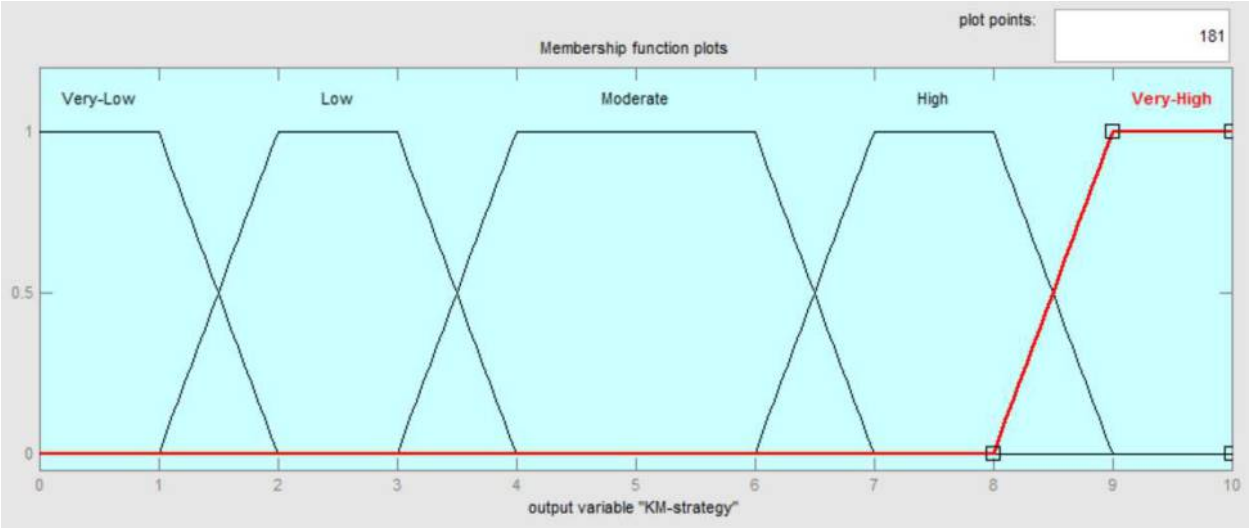

Figure 4. Fuzzy membership function for linguistic variables, (KM strategies)

Fuzzy rule base

In this phase, the fuzzy inputs are attracted to creating factors of the present fuzzy rules in the rules database. Rules database is a set of "IF-THEN" fuzzy rules that are the core of the fuzzy inference system. Expert knowledge has been used in this study to specify fuzzy rules. After

specifying the format of membership functions with the help of experts, inference rules have been codified for every one of the inference engines. Inference rules have been mentioned in figure5.

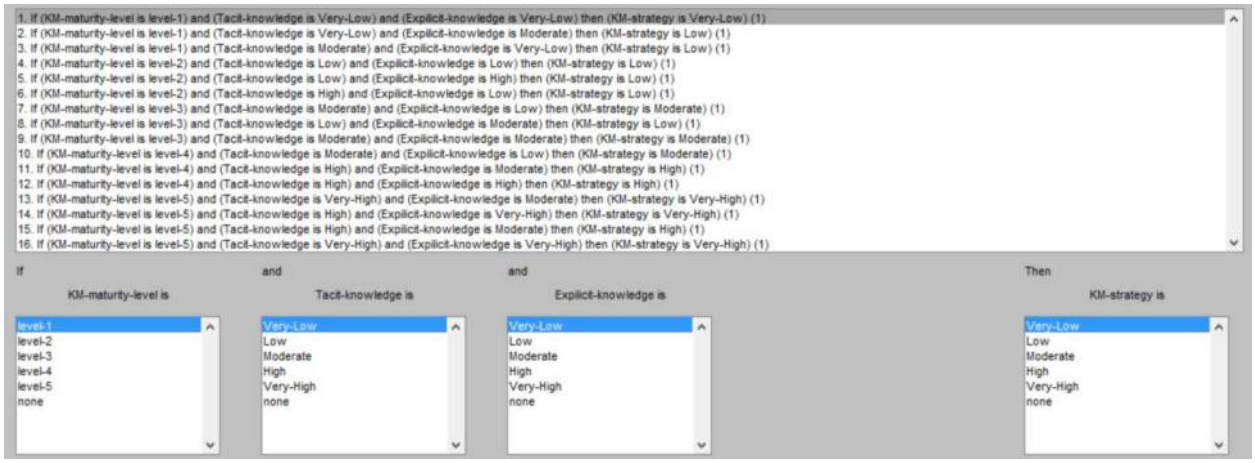

Figure 5. Format of rules framed on fuzzy inference system

Fuzzy inference system (FIS)

Fuzzy inference engine changes the input into output using a series of operations. The performance of fuzzy inference engine is similar to human's argument process in a way that by applying it to inputs and rules, the output is specified; it is what humans do in many of their judgments. Membership functions of all creating factors of the rule are combined with a fuzzy set. The input is a list of membership functions, and the input is a single amount which is present in the output fuzzy set.

In the study the Mamdani's fuzzy inference method is used because it is typically used in modeling human expert knowledge. All the parameters adopted in mamdani model to generate FIS system are presented in Table1 (Tsoukalas and Uhrig, 1997; Terano et al, 1987).

Table1. Listing of information on FIS

System	Input 1	Input2	Input3	Output
Type =mamdani	Name = KM maturity level	Name= Tacit knowledge	Name= Expilicit knowledge	Name= KM strategy (Creation, Transfer, Protection)
Version : 2	Range : [0 10]	Range : [0 10]	Range : [0 10]	Range: [0 10]
Num Inputs : 3	NumMFs[1] : 5	NumMFs : 5	NumMFs : 5	NumMFs: 5
Num Outputs: 1	MF1 = level 1, [0,0,1,2]	MF1 =Very Low, [0,0,1,2]	MF1 =Very Low, [0,0,1,2]	MF1 =Very Low, [0,0,1,2]

[1] Membership Function

NumRules: 16	MF2 = level 2, [1,2,3,4]	MF2 = Low, [1,2,3,4]	MF2 = Low, [1,2,3,4]	MF2 = Low, [1,2,3,4]
	MF3 = level 3, [3,4,6,7]	MF3 = Moderate, [3,4,6,7]	MF3 = Moderate, [3,4,6,7]	MF3 = Moderate, [3,4,6,7]
	MF4 =level 4, [6,7,8,9]	MF4 = High, [6,7,8,9]	MF4 = High, [6,7,8,9]	MF4 = High, [6,7,8,9]
	MF5= level 5, [8,9,10,10]	MF5= Very High, [8,9,10,10]	MF5= Very High, [8,9,10,10]	MF5= Very High, [8,9,10,10]

Defuzzification

The last step in the process of fuzzy inference is non-fuzzy. Non-fuzzy process turns the output into an absolute number. This being fuzzy helps us better evaluate the rules, but since the absolute amounts are easily interpreted and help practical decision making, the outputs of a fuzzy system should be turned into absolute amounts. So the input of a fuzzy process is a fuzzy set (the result of combining output fuzzy sets) and the output is a number.

There are many defuzzification methods available in literature but most commonly used are Chen's ranking (1995) andYager's centroidal (1980) methods. The criteria used to select suitable defuzzification method are disambiguity, plausibility (lie approximately in the middle of the area), and computational simplicity (Ross, 1995). In the study, Yager's centroidal method is used for defuzzification which is given by under equation:

$$\text{Defuzzified value} = \frac{\int_y \mu_{B'}(y) y.dy}{\int_y \mu_{B'}(y) dy}$$

In the fuzzy system, for comparison and better depiction of the connections between the inputs and seeing the output of the program, Surface graph can be used. For example, in figure 6 the output of the program is based on two inputs of level of knowledge management maturity and tacit knowledge are shown to choose the knowledge production strategy; as it can be seen, as each one of these inputs increases, the choice of knowledge production strategy increases. In other words, the higher the level of knowledge management maturity is, and the level of tacit knowledge in the organization is higher, the more knowledge production strategies will be in order in the organization.

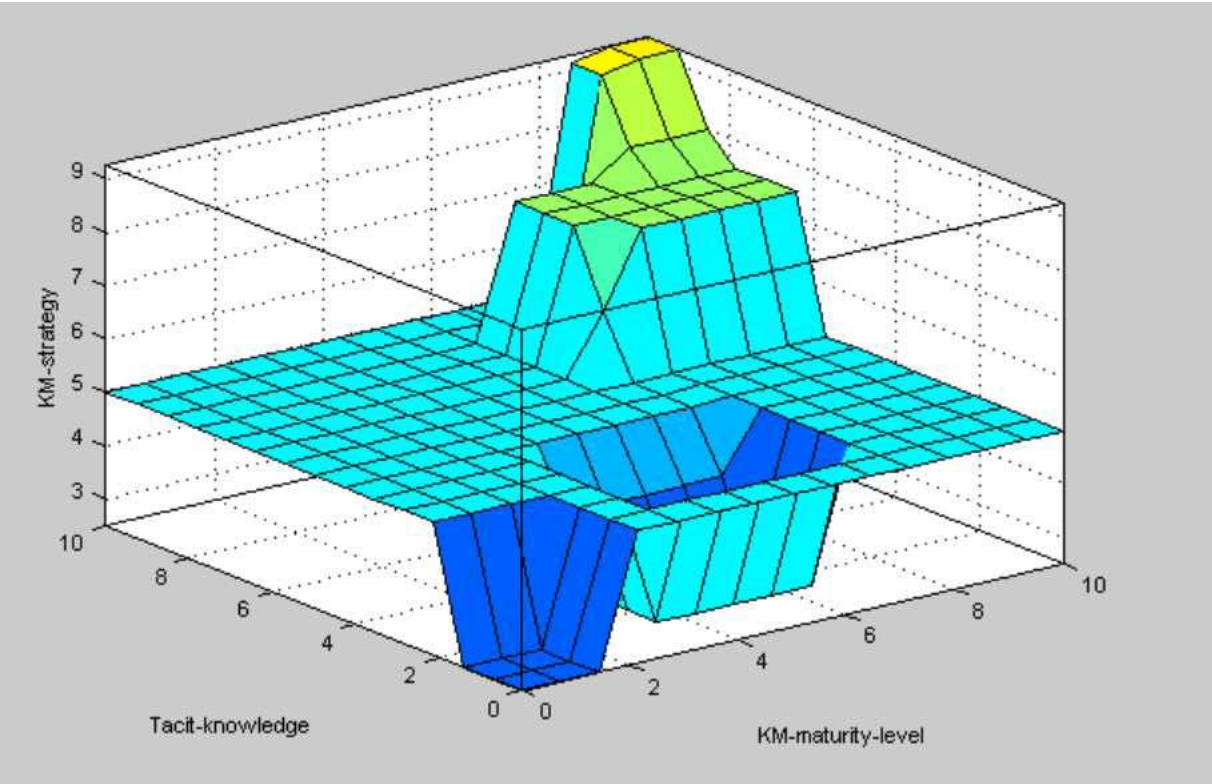

Figure 6. Control surface plots

Testing the behavior of rules

Turning the conceptual model in this study into a software program (based on the design of fuzzy inference system) is possible to be accompanied with errors. If this error is in an acceptable range, the model will be credible; otherwise, the model should be corrected.

In this part, the main goal is testing the behavior of rules. In this method, we consider the input as a variable while the other variables have absolute value. This shows whether the system shows acceptable and logical behavior or not

The outputs have been evaluated by using Matlab program. It has also been evaluated and analyzed by expert people, using the special study literature, alongside the researcher. The analyses confirm that authenticity of the outputs.

For example, we like to know if we change tacit and explicit knowledge variables in the organization, KMS happens in the same way that logic suggests or not. Considering the remarks made by expert, if tacit knowledge is high in the organization, "knowledge production" method is selected as knowledge management strategy.

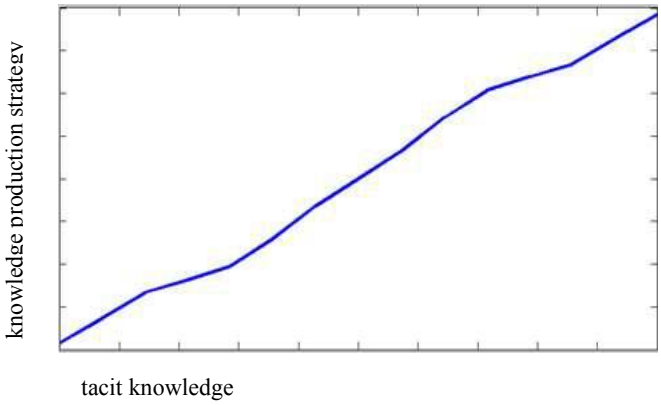

Figure 7. The test of the credibility of model behavior

As it can be seen, as tacit knowledge Level increases in the organization, strategy of knowledge management moves towards knowledge production strategy.

Case study

The organization under study is in Tehran city. It is one which is active in research and development of software structures.

Evaluating the knowledge management maturity level in this organization under study

The questions in this questionnaire are in 7 main areas including:

- Leadership
- Processes
- People
- Technology
- Knowledge process
- Learning& Innovation
- Knowledge management outcome

In each area 6 questions are asked, and the questionnaire has an overall number of 42 questions. Each respondent gives a score on scale of 1 to 5 to each question.

Since standard means have been utilized, the validity of the questionnaire is approved of. The stability of the questionnaire has also been tested through Cronbach's alpha. The number that has been obtained for the questions related to each benchmark is mentioned in table2 the results aver that the means of study have a high level of stability.

Table 2. Cronbach's alpha

areas	Cronbach's alpha
Leadership	0.834

Processes	0.825
People	0.859
Technology	0.864
Knowledge process	0.797
Learning& Innovation	0.879
Knowledge management outcome	0.780

To specify the condition of the organization in each benchmark, the average score for each question is calculated; then, the sum of scores related to each benchmark is calculated. Noting the point that the lowest score for each question is 1, and the highest score is 5; as a result, the lowest score for each benchmark is 6, and the highest score is 30. After gathering information from the expert in the organization under study, the average score for each question was calculated, and out of the sum of scores for each benchmark, its score was calculated. The score of mentioned organization based on the benchmarks of evaluating the knowledge management maturity is mentioned in table3.

Table 3. Score of factors and indicators in the organization under study

Row	key area	score
1	Leadership	28
2	Processes	18
3	People	15
4	Technology	30
5	Knowledge process	24
6	Learning& Innovation	26
7	Knowledge management outcome	20
The sum of scores of all criteria		161

In comparison with the levels of knowledge management maturity that have been prepared based on APO guidelines and are mentioned in table4, the industrial organization under study has attained the score of 161 which shows it is on “KM Refinement ”

Table 4. Interval Point KM Readiness (source: APO).

Interval Point	KM Readiness	Remark
42-83	KM Reaction	Did not realize what KM was and its importance in improving the productivity

		and competitiveness
84-125	KM Initiation	Just beginning to recognize the need for KM
126-146	KM Introduction (Expansion)	KM practices in some areas
147-188	KM Refinement	Implementation of KM is continuously evaluated and improved
189-210	KM Maturity	KM is the mainstream (mainstream) in institutions

The score condition of the industrial organization based on the benchmarks of evaluating the maturity level of knowledge management is shown on the figure 8.

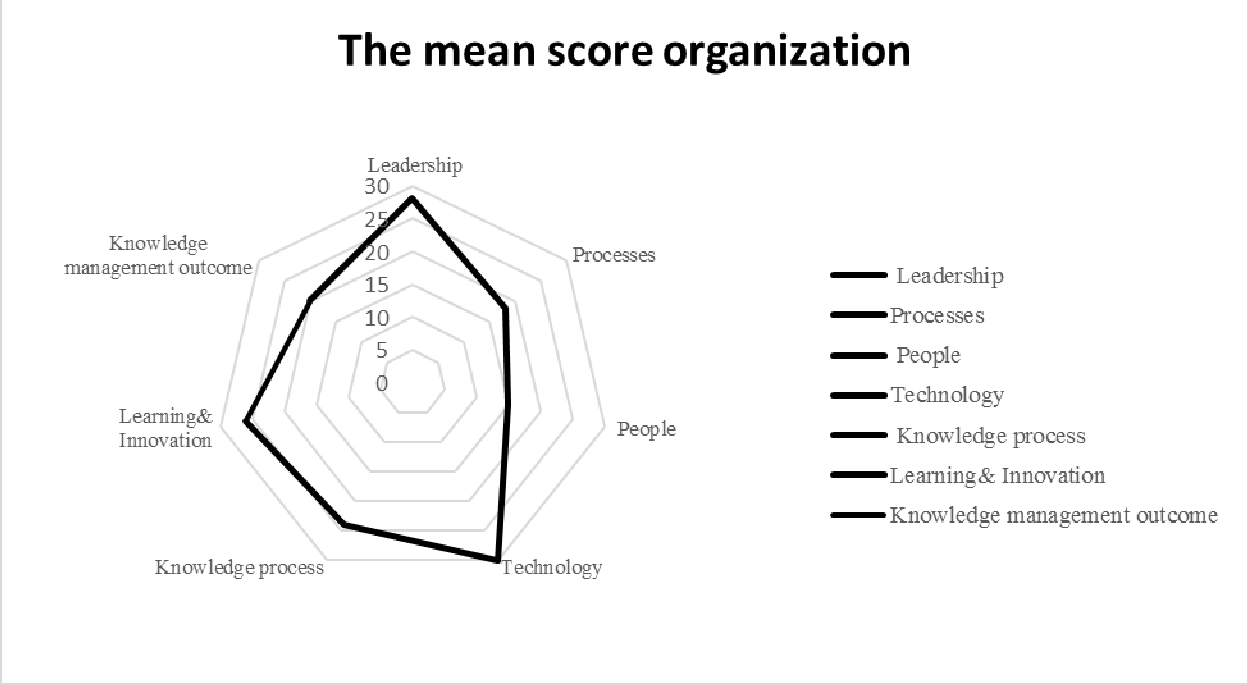

Figure 8. Final results based on 7 audit criteria matrix workshops

By looking at the figure 8, it is clear that the organization has achieved a proper score in knowledge management, innovation and learning, and technology has gained a pretty appropriate score; whereas, in organizational processes, people, knowledge processes, and the outputs of knowledge management it has obtained a lower score. Consequently, the organization is on level 4 of knowledge management maturity.

Discussion

Considering the fact that the organization is on a low level of knowledge management maturity, based on the fuzzy system that has been designed in this research, the strategy is knowledge production so that movement towards higher levels of knowledge management maturity is facilitated alongside elevating the knowledge level. Therefore, to improve and elevate the maturity level of knowledge management in the organization, these strategies have been recommended considering the experts' point of view:

- Making use of new mechanisms constantly in order to produce knowledge (Mintzberg et al, 1998)
- Purchasing knowledge; hiring the person or people that have the required knowledge (Davenport et al, 1996)
- Completing analytic means to increase the exchange of the knowledge of the day (Edvnison, 1997)
- Creating a conversation database
- Changing the present culture towards the culture of knowledge production (Robbins, 2003)
- Creating knowledge centers and libraries as research and development units (Laudon & Laudon, 2004)
- Conscious coexistence and interaction of colleagues with attitudes, theories, and different skills to create new solutions (Barton, 1995)(Kaufman, 1996)
- Creating the proper information about the value of favorable knowledge and the propensity to invest in the process of its production (Davenport et al, 1996)(Crossen et al, 1997)
- Specifying the key knowledge workers and forming a team (Davenport et al, 1996)(Crossen et al, 1997)
- Emphasizing the creative, hidden, complex, and multiple talents and looking positive at the differences (Davenport et al, 1996)(Crossen et al, 1997)
- Encouraging the people who create knowledge (Davenport et al, 1996) (Crossen et al, 1997)
- Creating networks as motivators (Edvnison, 1997)
- Moving the organizational culture towards cooperation, being open to criticism, and creating trust among employees and organization to learn and share knowledge (Lee & Choi, 2003)
- Creating a flexible and dynamic structure to make connections and interactions between people and groups (Cavaleri et al, 2005)(Claver-Cortes et al, 2007)
- Creating and developing cooperation groups and social networks (Laudon et al,2002)(Garavan et al, 2007)(Seufert et al,1999)

- Recognizing a practical method to encourage the employees to share knowledge; it should be considered as one of the features of a successful knowledge network(Hammad, 2006)
- Making use of novel information technologies in order to organize the present knowledge and produce new knowledge(Galliers & Leidner,2003)

The model of this research can be used to choose the knowledge management strategy and to apply it in managerial decisions; its result will be decreasing the possibility of failure in knowledge management projects, preventing the resources of the organization from going to waste, and finally successful implementation of knowledge management plans in the organization. According to the results, the maturity level of knowledge management in the organization under study (using APO model) is 4; thus, considering BloodGood and the expert fuzzy system output, the strategy of "knowledge production" is recommended. Actually by recommending knowledge production strategy, the knowledge level of the organization will increase in terms of tacit and explicit knowledge; commensurately, the movement towards higher levels maturity in knowledge management is facilitated and expedited. Taking the knowledge condition in this organization, the relevant knowledge management strategies are recommended in order to increase the maturity of knowledge management in the organization.

Conclusion

One of the concepts that is widely discussed in knowledge management is the related strategies. Organizations can selectthe proper KMS, and organize their resources and abilities to access the management goals of the organization. Maturity models describe the development of knowledge management during the time, so one of the effective factors in choosing the knowledge management strategy is recognizing the maturity level of knowledge management in the organization.

In this study, and expert fuzzy system was designed to help selection of KMS, and to evaluate the function of the expert fuzzy system The maturity level of knowledge management in an industrial organization was evaluated and was used as the input of the system.

The system that has been presented in this study is one of the first that have been designed with the purpose of choosing KMS by specifying the maturity level of knowledge management and the level of tacit knowledge and explicit knowledge.

The results of making use of fuzzy inference systems show how organizations can choose their knowledge management strategies or reform them through a fuzzy inference system.

Since this model has been tested only in one organization, it is recommended that researchers run this selective system and evaluate the results in different organizations. The reasons for failure and success in this model can be evaluated after executing it in different organizations.

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