

Providing a Triangular Model for Gap Analysis

Case Study: Iran Khodro Company

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Abstract

The investigation of current situation of an organization is one of the most important steps for implementation of knowledge management (KM). Also, gap analysis is among techniques proposed for evaluation of present state of the organization. This paper is an attempt to provide a new framework for gap analysis within implementation phase of KM project. In this way, we first introduce effects of three important factors of Organizational Culture (OC), Information Technology (IT), and KM mechanisms (human based tools) on gap analysis. Therefore, the status of each of these gaps will be investigated in Iran Khodro Company (IKCO) by using statistical methods and data mining techniques. Then, the triangular model of gap analysis is provided considering new researches in this area and also the findings of investigation of gap analysis in aforementioned company. Finally, a framework is proposed for planning and establishment of KM project in organizations.

Keywords: Gap analysis, knowledge management, data mining, knowledge management implementation

1. Introduction

Nowadays, more attentions have been paid to individuals' interaction, knowledge of creative human resources, and knowledge oriented workforces than tangible capitals. Therefore, smart managers try to make better use of technologies and mechanisms for management of intellectual capitals and knowledge assets. This is for encountering with innovation in products and services, increasing cooperation, increasing customers and etc. Nowadays, achieving stable competitive advantages is possible only in case the companies take step towards development, transfer and sharing of knowledge [6]. KM consists of processes including identification, acquisition, production, organization and sharing of tacit and explicit knowledge of an organization. Its infrastructures include culture,

physical environment, IT infrastructures and structure of the organization. So far, companies have accelerated achieving competitive advantage by utilizing IT and have been able to use it as a tool for KM. We believe that IT tools are not enough for moving towards a knowledge-based enterprise and implementation of an efficient knowledge management system (KMS). Because, these tools cannot carry out special KM processes about tacit knowledge transfer of individuals. Note that, facing toward systems like Enterprise Resource Planning, Customer Relationship Management and other information- based systems cannot be enough, by themselves, for achieving competitive advantage. Therefore, in addition to IT-based tools, special attention to culture development and utilizing human-based solutions, are necessary for implementation and acceleration of KM processes. Therefore, a set of three factors of culture, IT and KM mechanisms can cause development of organizational competitive advantage. On the other hand, endeavor for implementation of KMSs for more and more utilization of this competitive source is ever-increasing. While, in many cases, the implemented system and sometimes the resultant output are very different from what was meant initially by implementing the system and the achieved goals are very different from the defined goals in strategy of KM [1]. Therefore, it is necessary to identify probable gaps before any implementation and consider solutions for removing each of gaps during implementation in order to implement the KMS with the least distance from desired state and achieve the predefined goals.

In this research, we first touch KM and the major factors thereto. In second part, we deal with a review of the six gap model for implementing KMS provided by Lin and Tseng and identify these gaps and enumerate the reasons for their creation. Then, we provide the new triangular gap analysis model relying on the state-of-the

art researches carried out in this area. Considering the three major roles of KM, we investigate the gap between current and desired state in the organization and finally, we provide a framework for projecting and planning KM. For a more precision investigation in this model, using data mining techniques are proposed.

2. Culture, Human and Technology

For implementation of KM in an organization, two aspects should be emphasized: basis of KM and KM solutions. As may be observed in figure 1, KM solutions include processes and systems of KM. For having successful KM processes in the organization, appropriate technologies and mechanisms should exist.

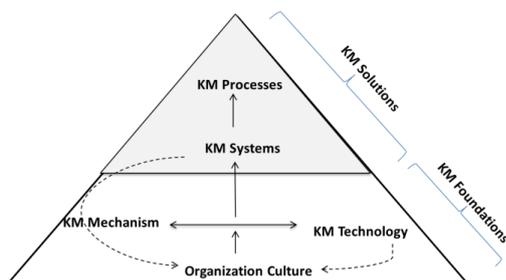


Fig.1 A scheme of bases and solutions to KM. [6]

2.1 knowledge management and Information Technology

The companies have accelerated achieving competitive advantage by application of KM and they have utilized it as a tool for KM. Some already believed that KM is part of information management. In addition to management of storage and access to documents, IT provides the possibility of knowledge creation, knowledge integration and in general KM by providing appropriate organizational architecture. Of course, in recent years, many of researchers have come to the belief that knowledge is not exclusively an outcome of IT and KM processes cannot be implemented just through its solutions, because we will come across problems for exchange of tacit knowledge.

2.2 knowledge management and Organizational Culture

As it was mentioned, KM gets its importance from the importance it attaches to the most valuable capital of human, namely intellectual capital. But what is vital for effective implementation of KM in the organization is an OC which is receptive to it. Success in KM area is closely dependent on OC. So that KM has turned to culture management to some extent. Some barriers that develop due to lack of appropriate OC are fear of innovation and knowledge sharing. Therefore, a solution should be found that organization improve its culture and its reward system so that the staff are encouraged to

share their experience and knowledge as far as the organization collects knowledge as an asset. In general, by OC is meant a system of common sense that the members to an organization have towards it and the same feature makes it distinct from other organizations. Chris R Jeris regards OC a live system and defines it in the frame of behavior individuals' show in practice, the way they think and fell and the way they behave with each other actually.

2.3 knowledge management and its Mechanisms

KM mechanisms are human based solutions which are used with IT for implementation of KM. Mechanisms are regarded as a combination of organizational, social, structural and even sometimes IT arrangements which are applied for facilitation and promotion of major processes of KM. Different mechanisms fall in two groups of short term and long term. Some of these mechanisms like brainstorming sessions, occupational circulation, on-job training and exit interview are generally used in enterprises [6].

3. Gap Analysis

Gap analysis deals with analysis of the difference between current statues (as is) and the desired state (to be) in the future [10]. It is possible to found the real level of knowledge in the organization by analysis and comparison of current gaps at organization and comparing it with provided standards in this area [12].

4. A history of Gap analysis

In most researches, knowledge gap refers to the difference between the present state of the organization and the desired state of it for implementation of KM. It may be said that the first knowledge gap was discussed by Lavrich and Pears in 1984, which dealt with two types of knowledge gap for determining distance of social classes. Then, Zack (2002) discussed the gap between what an organization should do for competitiveness and what actually is implemented in real world and called it strategic gap. Relying on traditional approach of strategic management, Zack investigates the strengths, weaknesses, opportunities and threats in gaps. Strong and Weak points determine the current capabilities of the organization or the present state. While, opportunities and threats is representative of the way ahead and the things it should achieve. The strategy also shows how an organization should make a balance between these two. In addition, another potential gap called knowledge gap is developed beside strategic gap which relates to what the organization should know for implementing its strategies and what it really knows. The role of strategy in this knowledge gap is assisting the organization for bridging the gap relying on KM innovations and solutions. What is obvious is the alignment of knowledge gap and strategy gap, since

knowledge gap stems directly from strategy gap. Also, Hall and Adriane investigated the knowledge gap in innovative enterprises in the same year. Then, knowledge gap was investigated more seriously by researchers. Relying on concepts of PZB, Tseng and Lin provided a model called KM gap in 2005. Initially, it consisted of 5 gaps due to managerial gaps in implementing KMS. These gaps were developed due to weaknesses in current managerial activities and incapability of the staff in planning, implementation and support of activities of KMS. Figure 2 indicates KM gaps in the model provided by Tseng and Lin [9].

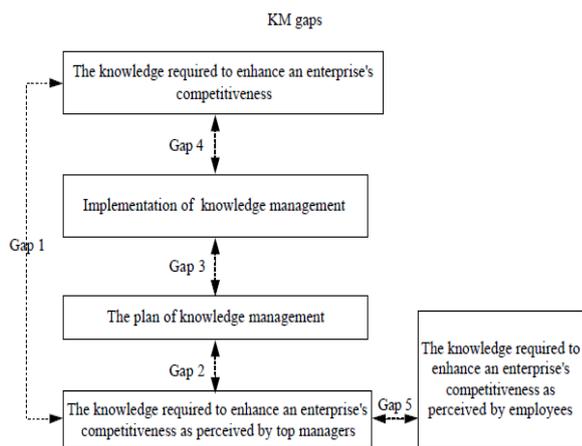


Fig.2 the 5 gap framework provided by Tseng and Lin in 2005[18].

Tseng also investigated important indicators in evaluation of organization performance and the effects of KM activities on them. They then investigated the effects of KM gap or lack of it on the activities of KM and finally on organization efficiency [1]. Considering Holzapple's conceptual model of knowledge chain value and Nonaka knowledge cycle, Tseng investigated his framework from another aspect in the same year and added another gap to it [19]. As is shown in figure 3, these 6 gaps were investigated in terms of 4 different aspects of strategy, implementation, planning and perception [9, 16].

As per strategic aspects, the organizations should investigate their internal and external environments continuously for increasing their competitiveness. Failure to do so may result in first gap. As per perception aspect, the manger may have not the capability to determine the knowledge that the organization really needs which may result in development of second gap.

In addition, it is possible that there may be some differences in their perception of the knowledge needed by the enterprise due to differences in the role, place and professional knowledge of mangers and staff. Also, there may be a gap between the knowledge needed for increase of competitiveness of enterprise and the knowledge needed on the basis of staff perception at

time of implementation and administration of KMSs which is suggestive of gap 5. In terms of planning, if senior managers cannot consider the knowledge acquired from the environment at implementation of KMSs, gap 2 develops. If the staff is not able to understand the KM plans at the face of it, gap 3 develops. In terms of implementation, if implementation of KMSs is not coordinated with the programs planned for it, gap 3 develops. In addition, at the time of implementation, the staff should have a correct perception of the knowledge needed for increase of enterprise competitiveness. Otherwise, gap 4 develops [9, 16]. The description of these gaps may be observed in table 1.

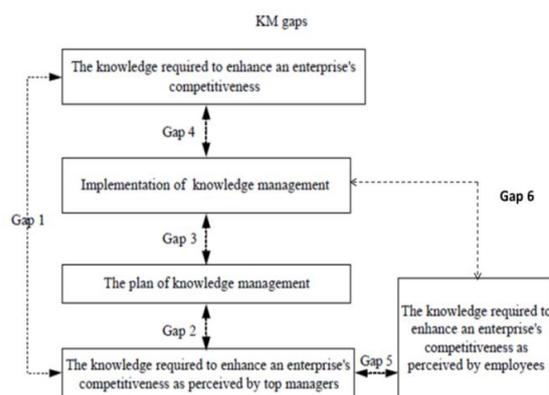


Fig.3 The 6 gap framework of KM provided by Tseng and Lin in 2005[9].

Tseng et Al (2008) investigated the effects of IT in improvement of status of gaps of implementation of KM on the basis of Tseng and Lin 5 gap framework. The reasons for appearance of KM gaps in some practical examples are also dealt with in this research. Finally, the effects of IT and tools based on it are analyzed for improvement of the status of these gaps in this research [20]. One year later, in continuation of his research; in addition to IT, he also investigated the place of OC and the factors affected by it in improvement and bridging the KM gaps [21]. The findings of this research reveal that though IT is an essential factor for KM implementation, it cannot fully include factors affecting the implementation of an efficient and successful KMS. The organizations should also deal with other important factors, like, issues related to human resource and OC which play effective roles in the success of this system [18, 21]. Figure 4 shows the conceptual framework provided by Tseng.

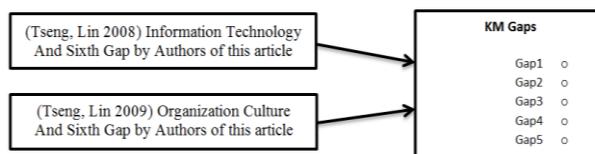


Fig.4 the conceptual model provided on the basis of IT and OC

5. Research Method

Questionnaire is a widely used tool and a direct method for acquiring research data in survey research. Therefore, considering the current literature regarding KM gaps, this method was selected. At present research, the statistical society consists of the managers, supervisors, experts and sales and marketing staff of Iran Khodro Company. Convenience sampling has been used in this research, since selection of the sample members have been performed on the basis of availability [2].

Table1: Description of every gap [18,19]

Gap1	The gap between the knowledge needed for promotion of competitive status of the organization in view of senior managers and the real knowledge needed for increasing competitive situation.
Gap2	The gap between the knowledge needed for promotion of enterprise competitive situation in view of senior management and planning KMS.
Gap3	The gap between the plan provided by the senior managers for implementation of KM and the progress of KM implementation plan.
Gap4	The gap between knowledge received after implementation of the KMS and the knowledge needed for promotion of competitive situation of the enterprise.
Gap5	The gap between the knowledge needed for promotion of competitive situation of the enterprise in view of senior managers and in view of other staff
Gap6	The gap between the knowledge needed for promotion of the competitive situation of the enterprise in view of the staff and the real knowledge received after implementation of KMS.

For investigating effects of OC, IT and KM mechanisms, we distributed independent questionnaires in 3 steps and in two parts among the target group. 6 questions on the personal information of individuals were asked in the first part of the questionnaires, and the second part of questionnaires, asked independent questions. In fact, the first questionnaire consisted of 22 questions on investigating and analyzing OC in the enterprise and the second questionnaire consisted of 30 questions on analyzing gaps of KM mechanisms. Likert Scale is used for rating questionnaire data, which includes 5 status of too little, little; average, very and very much. The choice selected by the respondents on the company reveals the perception of the respondents of the current situation of the company considering the

mentioned factors. For testing the reliability of the questionnaires, Cornbrash’s alpha was calculated by SPSS. Cronbach's alpha for the questionnaires is valued at .92%, .77% and .78%, respectively. The frequency percentage of the respondents in the mentioned questionnaires is as table 2.

6. Research Conceptual framework

As it was mentioned before, Tseng and Lin were among the first to raise and investigate the issue of KM gaps and the factors affecting it. On the other hand, as per what is shown in Figure 5, technology (IT), culture (as the main element of the infrastructures) and KM mechanisms are regarded as foundation of KM implementation. Considering these factors, this research is an attempt to consider model provided by Tseng and Lin as the basic model and provide a new triangular model of gap analysis [8].

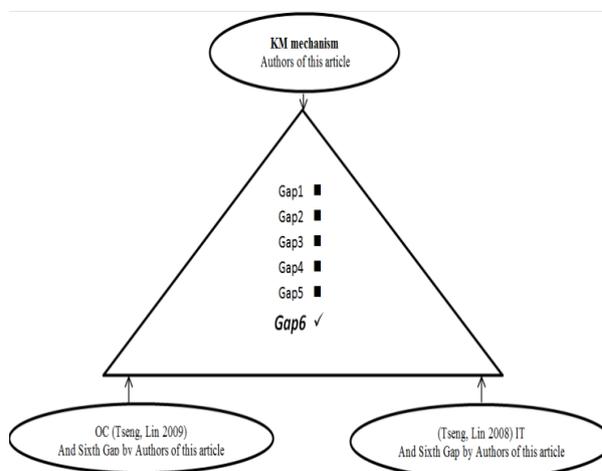


Fig.5 the theoretical framework of this research IT

In addition to taking into account the role of IT and OC in the sixth gap, the triangular model of gap analysis investigates the role of KM mechanisms in every of 6 gaps and then, it proposes an applied framework for projecting and planning KM .

Table 2: Frequency of respondents in each of three Questionnaire

		First Questionnaire	Second Questionnaire	Third Questionnaire
Gender	Male	69%	68%	60.6%
	Female	31%	32%	39.9%
Occupation	Deputyship	1%	0%	0%
	Manager	3.9%	1.3%	5.6%
	Chair	6.8%	14.7%	7%
	Director	12.6%	4%	11.3%
	Expert	61.2%	75%	66.2%
	Staff	14.6%	5%	9.9%
Education	Associate	20.4%	5%	9.9%
	Bachelor	54.4%	70.3%	63.4%
	Master	23.3%	22%	23.9%
	PhD	1.9%	2.7%	2.8%
Total Number		103	75	71

The first gap, which is the distance between the knowledge needed for promotion of competitive situation of the company in view of senior managers and the real knowledge needed for promotion of competitive situation of the organization is created due to the following reasons: Senior managers play important roles in implementing KM activities by KM implementation, review of the internal and external environments of the organizations for identifying strengths, weaknesses, opportunities and threats. Also, the organization would be able to identify its strengths and weaknesses in terms of KM and adopt appropriate strategy by analysis of current situation and features [5]. In addition, every organization has its own knowledge area and as such it faces problems which it can solve through its own special solutions. In such a situation, the key role of senior management is identifying and key knowledge for acquisition of competitive advantage and surviving in competitive market [11]. Since a competitive market is not stable and it changes permanently, the only factor which may assist the organization with tracking these changes and reacting appropriately against them is knowledge creation and storage. Considering the fact that the environment and features of KM are highly variable, it is possible that the expectations of senior managers of competitive advantage be very optimistic or pessimistic, considering KM for setting appropriate goals for KMSs [21].

The second gap, which is the distance between knowledge needed for promotion of competitive situation of the organization in view of senior management and design of KMS, is created due to the following reasons: If the senior managers understand the place of the organization in internal and external environment, they can plan more appropriately from KM implementation. Though senior managers have understood the necessity for the operation of knowledge acquisition, they cannot acquire their necessary knowledge due to their failure in correct and efficient need description [5]. In other words, the managers cannot identify the knowledge required by the organization for continuous implementation of KM implementation plan, which leads to creation of the second gap; the major reason of it is the non-conformity between perception of senior managers and the plan approved for KM implementation [21].

The third gap, which refers to the distance between the plan provided by senior managers for KM implementation and progress of implementation of KMS, is created due to the following reasons: Since there are different definitions for basic knowledge, the value and procedures for defining KMSs faces different barriers. As such, every organization should provide a logical master plan for the whole of the organization. Nevertheless, there may be some misunderstandings due to lack of full understanding of KMS and its nature by the staff and also the misconception that using this

system and sharing their own knowledge may bear negative effects on their personal place and values. Reluctance of the staff for sharing knowledge or their failure in developing a correct understanding of KMSs, leads to creation of gap between internal and external processes of the organization at the time of implementation [21].

The fourth gap, which is the distance between the received knowledge after KM implementation and the knowledge needed for promotion of competitive position of the organization is created due to the following reasons: Effective implementation of KM strategies include definition and explanation of the knowledge required to be acquired and what motivating methods should be used for this purpose. In addition, there is the need for development of a comprehensive evaluation system for determining whether the organization can develop its competitive advantage after implementation of KM processes or not. KM includes evaluation of knowledge resources and processors. This process includes identification and understanding of resources and processors which create value added, evaluation and comparison of trends of KM implementation and evaluation of the effects of its implementation on organization performance. It is through this way that it is possible to correctly understand the present state of the organization. The organizations often fail in evaluation of the results of KM for determining whether their expectations are met or not. Therefore, the method of knowledge evaluation is always a disputable issue for organizations. Despite of different measurement ways, measurement of knowledge assets by using current financial systems is not easily possible due to the tacit and dynamic nature of knowledge [16].

The fifth gap, which refers to the distance between the knowledge needed for promotion of competitive advantage of the organization in view of the senior managers and the view of the staff, is created due to the following reasons: Creating new knowledge is a common responsibility of every section or expert group in knowledge based companies. Executive managers and directors should participate in this process. However, a gap may be created between the perception of senior managers and staff due to differences in their occupational position, role and professional knowledge in the organization. Different managerial levels consist of: executive managers involved in routine and operational problems that are at the lowest levels of managerial hierarchy. Middle managers who act as an intermediary between executive managers and senior managers and senior managers who are responsible for drawing up policies and general policies of the organization. Therefore, perception of the staff of the required knowledge is different and depends on their role and occupational place. As a result, the coordination among perception of all staff in differ occupational

places for goals and plans approved by all of them for KMSs is one of key issues in KM implementation [21].

Sixth gap which refers to the distance between knowledge needed for promotion of competitive position of the organization in view of the staff and the real knowledge received after KM implementation is created due to the following reasons: The staff spends lots of time on promotion of their knowledge level for improvement of their performance in the organization. Therefore, the organization should pave the ground and encourage the staff from knowledge sharing and creation. If the staffs are not encouraged to do so, they shall have no participation in the KM implementation. As a result, the process of acquiring required knowledge of the organization faces problems. Executive managers are involved in the details of daily activities and they work high amounts of data. Therefore, they face with the problem of making information into useful knowledge and in this way lots of concepts are lost. Of course, even if we assume that meaningful concepts are developed, their sharing with other colleagues are not easily possible. Ordinarily, the staff defines knowledge on the basis of their perception and occupational positions. Therefore, the knowledge concepts permanently changes during publication process. In addition, knowledge workers are reluctant in sharing their intellectual assets, because this is a cause for competition among them. Since knowledge power stems from knowledge for knowledge workers, strong motivating systems are needed for encouraging them to share knowledge. Otherwise, competition alone remains and knowledge sharing for achieving to organizational competitive advantage would be ignored. As such, the sixth gap creates in the organization [20].

7. Usage of the triangular model in IKCO

The provided model deals with the investigation of KM gaps in the company in terms of OC, IT and KM mechanisms. Therefore, considering what was mentioned before, the status of each gap should be investigated for improving KM implementation in IKCO in order to specify which gap exists and which one has more priority for bridging the gap. Therefore, independent questionnaires were distributed in 3 stages to 450 of the company staff for analysis of OC gap, IT

gap and KM mechanisms gap. At each stage, more than 70 questionnaires were responded and returned. After investigating the reliability of each test, the data was investigated using Friedman statistical test. The results of rating and mean of every gap may be observed in table 3. As may be observed in this table, the higher the mean, the higher would be the rating, and the lower the gap, the higher it is in priority than other gaps. As it may be observed, in investigation of KM mechanisms and IT, the fifth and sixth gaps are in priority than the other 4 gaps. Also, in investigation of OC gap, the sixth and fourth gaps are of higher priority, respectively. The other issue to be pointed out is the fact that the status of KM mechanisms has been evaluated almost average in all of six gaps, and in the investigation of IT the first four gaps are in average status and fifth and sixth gaps are in rather poor status. Finally, the means in investigation of OC reveal that all six gaps are in rather poor status, among them the status of fourth and sixth are worse than other gaps. Therefore, it may be concluded that for optimization of its KM, the company should pay special attention to problems regarding OC and specially problems creating fourth and sixth gaps, and then bridge the gaps and synchronize them with goals and processes of KM on the basis of the lowest rate and mean.

In the continuation, for identifying the present state of each company for KM, we draw the distance between mean of present state and the desired state in a diagram. Using this diagram, it is possible to find which gap is to be optimized and invested on, first. The diagram of IKCO status for all under investigation gaps may be observed in figure 8.

Table 3: The results of rating and mean of every gap in the questionnaires

OC gaps			KM mechanism's Gaps			IT's Gaps		
mean	Ranking	Gap's order	mean	Ranking	Gap's order	mean	Ranking	Gap's order
2.90	4.23	Gap1	3.8	4.9	Gap3	3.8	5.5	Gap1
2.87	3.96	Gap5	3.6	4.1	Gap1	3.4	4.2	Gap4
2.85	3.90	Gap2	3.6	4.1	Gap2	3.2	3.5	Gap2
2.62	3.16	Gap3	3.4	3.5	Gap4	3.2	3.2	Gap3
2.60	2.98	Gap4	3.0	2.5	Gap6	2.9	2.6	Gap6
2.55	2.77	Gap6	3.0	2.0	Gap5	2.7	2.1	Gap5

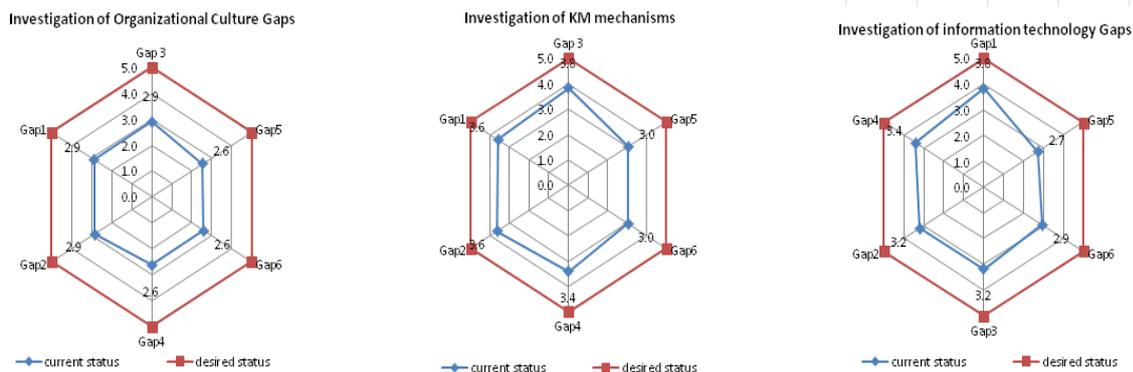


Fig.6 Investigation of the present state of the IT, KM processes and OC gaps

7.1 The Role of Data mining in improvement of Gap Analysis

In this research, we believe that we have been able to provide comprehensive feature for improvement of better KM implementation, using triangular model of gap analysis. This mode brings a multi-faceted investigation due to taking into account the roles of three important factors of OC, IT and KM mechanisms. The findings of this model will assist the company to know where it is located for every of these factors. But to achieve more precise results, we propose using data mining techniques[8]. The goal of data mining is heuristic gap analysis of the data, detecting models, rules and algorithms, predictive modeling and search of deviations [14]. For instance, as it was observed in gap analysis of KM mechanisms in Iran Khodro Company, the mean result for gap analysis of gap fifth is valued at 3 or the average. A more precise investigation by using data mining techniques, it is found that managers and some of the chairs, generally, use some mechanisms more than the staff and employees. In the continuation, we would mention the method of using data mining for in investigation of gap analysis findings as a practical instance and due to high amount of data in investigation of the fifth gap; we would mention the method of using data mining techniques in analysis of KM mechanisms.

7.1.1 Clustering

Clustering has been referred to as an algorithmic and conceptual rich frame for data analysis and interpretation which is to find the organization and detect the structure of the set of collected data. Often, clustering is regarded as synonymous to unguided learning. In clustering, without any prior classes, the heterogynous set of data is divided into some homogenous clusters. In this method, the data are merely grouped on the basis of investigation of the existing similarities or differences, like distance among the data points, and the final clusters should enjoy two features: (1) high homogeneity in every cluster and (2) heterogeneity among different clusters [3, 7, 13 and 15].

So far, diverse clustering algorithms have been introduced which bring different results. K-means is among segmentation based methods which uses variance minimum criterion for data organization. This algorithm constitutes one of the simplest unsupervised learning algorithms, which needs a pre-specified number of (K) for data grouping. Therefore, the main idea of this algorithm is the definition of a central K for every cluster. In this research, K is valued at 2 (on the basis of agreements or disagreements) [7, 15, and 17]. In investigation of the questionnaire data regarding the questions of fifth gap, we came to the conclusion that most people agree to somewhat on questions 1-4, but the results were different regarding questions 5, 6 and 7. (The questions are shown in Appendix 1)The results of administering k-means algorithm may be observed in figure 7. The features of the clusters which are considered as a class consist of:

First class including 44 that: More than 63% of these clusters believe that group activities in the company are poorly supported and 77% out of this 44 have considered KM processes to be necessary just for the managers and only 72% of this cluster believe that there is no possibility for collective and self-motivated learning in the company.

Second Class which consists of 27 believes that: group activities in the company are supported rather desirably and 77% of them consider the KM processes to be necessary for all (not just the managers) and about 92% believe that there is the possibility of collective and self-motivated learning in the company.

Considering the above classes which are the results of administering k-means algorithm on responses of questions on fifth gap, as is shown in attachment 1, the difference between these two groups is tangible and noteworthy.

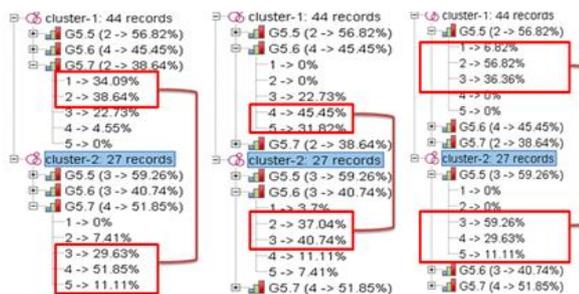


Fig.7 the results of k-means algorithm on fifth gap

7.1.2 Association Rules

Extracting Association Rules is one of unguided and important methods in data mining. It is possible to find interesting relations and dependencies in data set using this technique. Often, exploration of interesting and useful rules provides an information resource which assists with taking better decisions and practicing better clusters [3, 7, 4, and 13]. By administering Association Rules algorithm on the data, in way that particulars of the individuals are considered as algorithm input and type of class as target of the algorithm, 96 rules may be extracted. Though the number of input data is very low for extracting appropriate rules, it is possible to find good rules among them. For instance, the managers and directors together are located in class 1. Interestingly, individuals with 15+ work records or 50+ in age are also located in this class. So, the experts or younger people mostly fall in second class. However, it is not possible to consider the rules as criteria with this low numbers and low dispersion, according to the results it may be claimed that in case this procedure is administered in the whole company, the data would be more reliable and significant. Any way, it may be claimed that by application of data mining techniques after gap analysis, it is possible to have a deeper understanding of the structure and rules underlying the data to be able to behave more precisely for promotion and application of different mechanism (presented in the sample). This method brings about performance improvement and also causes cost decrease in KM implementation in the company.

8. Projecting and planning of knowledge management

So far different models and methods have been provided for Projecting and planning knowledge management. This paper is an attempt to provide a model by combining our triangular gap analysis and data mining techniques for organizations to be able to investigate their present state more Precision and comprehensive. It is obvious that the mere understanding of the gap between the present state and desired state, even with the precise added to it by data mining, is not enough for implementation of KM in the organization. Therefore, as

is shown in figure 8, it is necessary to adapt the results of combining triangular model of gap analysis and data mining with strategic components or directive components. Consist of mission, vision and Guidelines of the company. In this way, it is possible to specify the required strategic goals for bridging the current gaps (KM mechanisms, OC and IT). The very existence of these goals makes the management of new knowledge more operational and also provides the possibility of measuring mission performance of knowledge in the organization. The set of explained strategic components makes more transparent the space for need to new knowledge and provides the possibility of explaining knowledge strategy. Knowledge strategy describes the general approach of the organization in the new required knowledge for meeting the strategic needs arising out of the future strategic movement of the organization. As the name indicates, knowledge strategy is concentrated on the contents of new knowledge and the general approach of directing it to the organization. After explaining the organization strategy, this framework needs specifying more details for measuring KM performance in the organization which includes items like qualitative purposes, measurement indicators and quantitative goals. Finally, it is possible to move for implementation of these strategies in the organization by having appropriate strategy and understating the gaps and the related details and also it is possible to design appropriate measures and plans. We believe that applying data mining and triangular model of gap analysis can be an appropriate way for effective and efficient implementation of knowledge management.

9. Conclusion

In this research, after reviewing factors affecting on establishment of KM in the organization, factors of OC, IT and KM mechanisms were considered as effective factors for successful implementation of knowledge management. Investigation of present state of the organization is also regarded as one of important stages for establishment of knowledge management. Therefore, after investigation of different resources on gaps of KM implementation, we selected the model provided by Tseng and Lin, consisting of 6 gaps, as the base of my model and in the continuation; we provided a triangular model of gap analysis. We believe that the triangular model of gap analysis enjoys comprehensiveness for gap analysis or the study of distance between the present states of the organization with the desired state. By investigation of this model in Iran Khodro Company, we arrived at the conclusion that in addition to preciseness, the results of this gap need more comprehensiveness to be able to act with more precision for bridging her present gaps. Therefore, we applied data mining techniques to both identify the structure of data of the questionnaires and also analyses the rules and dependencies between individual characteristics of the respondents and their responses by using unguided

algorithms of rules and dependencies. We found that applying triangular model of gap analysis and combining it with data mining techniques can provide more comprehensiveness in addition to the important feature of precision and presented the results as a framework for Projecting KM in the company to put together the strategic components or directive components with the results of the above combination and to make necessary plans and actions for implementation of KM in the organization.

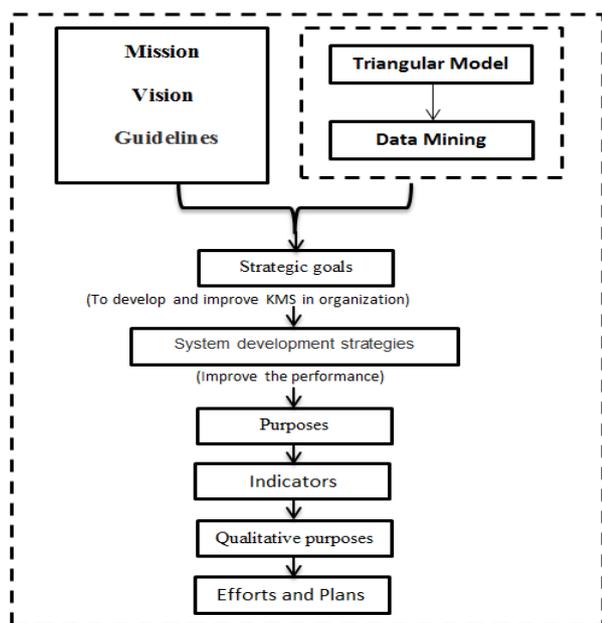


Fig.8 our framework for Planning and projecting KM

400 questionnaires of gap analysis of KM mechanisms, gap analysis of IT and gap analysis of KM mechanisms were distributed among the staff of marketing and sales department of Iran Khodro in 3 stages. About 250 questionnaires were returned. Their statistical and analytical investigations revealed interesting that we mention an instance while considering the confidentiality of information. For instance, gap analysis of the fifth gap by using the triangular model of gap analysis revealed an average state, while applying data mining techniques revealed that managers and some chairs with master or more education or individuals with low work records believed that using KM mechanisms are necessary for all staff of the company and also they have developed a self-learning spirit among this personnel.

Finally, by considering the findings out of the provided framework, it may be claimed that it assists with utilizing KM solutions in the company with more precisions which in turn will cause performance improvement and cost reduce in KM implementation in this company.

Appendix 1

	Questionnaire of KM mechanisms	Questionnaire of IT	Questionnaire of OC
I detG	It is possible to solve key issues of the company by social and organizational tools or through a human based structure	It is possible to solve key problem of the company by IT.	Are cultures manners clear to you?
	KM mechanisms are effective for facilitating knowledge processes in the company	In your opinion, to what extent there is enough perception and understanding of IT in the company	Can you feel OC environment in your company?
	In your opinion, to what degree enough perception and understanding of KM mechanisms prevail in the company?	IT cannot easily assist the company with value added knowledge	Do you think that the company is sensitive (susceptible) to changes in external environment?
	KM mechanisms cannot assist the company with value added knowledge by creating knowledge	IT can assist the managers to have a deeper understanding of the current problem of the company	
	KM mechanisms cannot easily assist the company with value added knowledge by knowledge sharing	IT can assist the company with identification and application of key knowledge.	
	KM mechanisms can assist the managers to have a more deeper understanding of the current problems of the company	IT cannot improve decision taking processes for the managers.	
	KM mechanisms can assist the company with identification and application of key knowledge	Appropriate identification and application of IT tools can improve the effectiveness of KMS	
	KM mechanisms cannot improve decision taking processes for managers	In your opinion, to what extent smart tools (competitive intelligence, business intelligence) or customer relations system can assist the managers with achieving competitive advantage and taking strategic decisions?	
	Appropriate identification and application of KM mechanisms can improve the degree of effectiveness of KMS.		
	In your opinion, can mechanisms like knowledge map, registration of the best practices and registration of the instructions assist the managers with achieving competitive advantage and taking strategic decisions?		
Gap2	There is a place, obviously, for KM mechanisms in implementation of KM in the company.	In your opinion, are the goals for implementation of KM in the company explained clearly?	
	Mechanisms like knowledge map, registration of the best practices and registration of the instructions can assist KM mechanisms in the company	Storage systems of the company can be used in KM plan on an integrated basis.	
	KM mechanisms can facilitate knowledge sharing and optimal use of tacit and explicit knowledge resources and organizational creativity.	Continuous updating of knowledge can easily lead to knowledge sharing and optimal use of knowledge resource and organizational creativity.	
	KM mechanisms are effective in improving organizational memory.	Information categorization is available in the company as a systematic process.	
	Using KM mechanisms like exit interview can be effective in capturing tacit knowledge of individuals		In your opinion, is it possible to acquire knowledge from external environments in addition to acquire it from in house staff?
	KM mechanisms make it possible to acquire knowledge not only form in house staff but also for m external environments		Is there any full mechanism in the company that assists with all decision making processes?
	There are lots of opportunities for group discussions, specially unofficial ones, leading to promotion and exchange of tacit knowledge of the staff		
Gap 3	Registration of knowledge carriers in knowledge map is one way for identification and access to professional which is effective for better fulfillment of tasks.	In your view, do the IT tools available in the company allow you to directly access to the information?	
	In your opinion, can mechanisms like different meetings or knowledge café in the company encourage the staff to knowledge sharing?	In your view, can the IT tools available in the company encourage the staff to share knowledge with each other?	
	KM mechanisms can play the role of tools for exchange of tacit knowledge.	The IT tools available in the company can assist with control and monitoring of KM plan.	
	KM mechanisms can play the role of tools for converting tacit knowledge to explicit knowledge	IT can play role as a tool for making tacit knowledge explicit knowledge.	
	Existence of repository of lessons learned and also best practices are effective for facilitation of KM processes.		In your opinion, the values of staff are able to promote KM activities.
	Virtual space (internet, intranet etc.) has facilitated interaction of technology and intellectual capital.		Does the company hold special ceremonies for promotion of KM?
Gap 4	In your opinion, are current systems based on knowledge-management mechanisms available in the company y able of supporting KM implementation?		Are you satisfied with reward system for KM activities of the company?

	In your opinion, does the company utilize evaluation systems for measuring effectiveness of processes?		Is customer KM included in the strategic plan of the company?
	Certainly, an efficient KMS includes an appropriate knowledge map, repository of lessons learned and also repository of best practices.	In your opinion, do the IT based systems available in the company are able to support kl implementation.	
	In your view can, promotion of human based tools (based on KM mechanisms) is effective factors in implementation of KM processes.	In your view, the company utilizes evaluation systems for measuring effectiveness of the processes.	If one of your colleagues applies KM and arrives at satisfactory results out of it, does this encourage you to utilize KM?
	In your opinion, systems based on KM mechanisms available in the company are able to support KM implementation.	Certainly, an efficient KMS holds appropriate knowledge map, decision support software and work flow.	Does the company pay attention to individuals who deal with KM activities?
Gap 5	Despite lack of special information systems in the company, the company supports the possibility of communications and interactions in your department by promotion of human based tools (KM mechanisms).	In your view, facilitation of IT based systems can be an effective factor in implementation of KM processes.	
	Knowledge repository (lessons learned, best practices etc.) can reduce the probability of repetitive errors and parallel activities in the company.		
	There is no place for registration of lessons learned and best practices of projects in the information system of the company for others to access to.	Information systems of the company are able to share results out of projects for access of others.	
	To what extent, the activities of individuals taking part in KM processes of the company are evaluated?	Information systems of the company are able to support communications and interactions within your department.	To what extent, the current cultural environment of the organization allows every department to share knowledge more effectively
	In your view, the company supports the team works of the staff	Information system is able to reduce the probability of repetitive errors and parallel activities.	To what extent, the current OC assists with facilitation of knowledge exchange among departments.
	Using of KM processes leading to knowledge creation is only necessary for company ma agers.	To what extent, evaluation and measurement tools are utilized for supporting individuals active in KM activities.	
	There is the possibility of group learning in the company, so that self-motivated and unofficial learning groups can promote their activities through on-job negotiations and learning meetings.	In your view, the current IT systems provide the possibility of supporting team working of the staff.	
		The current evaluation system of the company is effective for contribution and encouragement of the staff for implementation of KMS.	
Gap 6	To what extent, do the KM mechanisms assist with knowledge exchanges among different departments of the company?	There is a knowledge documentation system (lessons learned, best practices etc.) which deals with cooperation, decision support and information security.	To what extent, are communities-of-Practice utilized for facilitation of knowledge sharing by the staff.
	To what extent, can tools based on KM mechanisms effectively increase support of senior managers of the company for knowledge sharing activities of the staff.	To what extent, IT based systems are utilized for facilitation of knowledge exchanges among departments.	In your view, to what extent, is the evaluation performance system effective for contribution and encouragement of staff for implementation of KMS?
	Systems like performance evaluation and suggestions system can play role in increasing staff motivation for participating in KM and knowledge sharing activities.		
	Communities-of –Practice have been used to a great extent by the staff for facilitation of knowledge sharing.	To what extent, can IT tools be effective in increasing the support of senior managers of the company form the staff for knowledge sharing?	
		Systems like performance evaluation and suggestions can play role in increasing staff motivation for taking part in KM and sharing activities.	

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