Full Length Research Paper

A problem solving method for customer knowledge management maturity (CKMM): Case study in some Iranian oil companies

Abbas Afrazeh

Department of Industrial Engineering, Amirkabir University of Technology, Hafez Ave. 424, 15914 Tehran, Iran.
E-mail: afrazeh@aut.ac.ir. Tel: +98 21 66413034. Fax: +98 21 66413025.

This paper is introduces a hybrid problem solving algorithm developed for presenting and promoting the customer knowledge management (CKM). It is called customer knowledge management maturity (CKMM) . The algorithm includes three main phases: at the first phase, the existing status of the CKM as well as its maturity level will be determined with consideration of the just in time (JIT) factor. Recognition of the problems pertaining to knowledge management process (KMP) and JIT are also addressed in this phase. In the second phase, the causes that have led to existing situation with regard to the three aspects namely human, technology and process will be determined. The third phase of the algorithm includes the causes and conditions and proper strategies that are required for CKM promotion and development. In order to show how the afore-mentioned algorithm can be applied, a case study was conducted in three Iranian oil companies. The primary results of the research are discussed in the last part of the paper.

Key words: Knowledge management (KM), customer knowledge management (CKM), customer knowledge management maturity (CKMM), knowledge management process (KMP), customer knowledge management process (CKMP), problem solving algorithm, Iranian oil companies.

INTRODUCTION

In the last decades of the 20th century, more attention was paid to customers as the key/critical issue in the organizations and customer-oriented approaches have appeared in the science of management. Gradually, the issue has taken some special aspects creating a particular field of study called customer relationship management (CRM). Nowadays, some initiatives have been started in order to get more information about the customers and their satisfaction. These efforts were mainly meant to use all of the preparations and back grounds which are furnished by the knowledge management (KM) disciplines on the issues related to customers. Consequently, this has led to the esta-blishment of a new field of study entitled as CKM. Some features of these three approaches are listed in Table 1.

The presented models on customer knowledge management (CKM) try to integrate two concepts of consumer relationship management and knowledge management in order to use the advantages of both of them. With regard to novelty of knowledge management (KM) discussions and its integration with other customer relationship management (CRM) related issues, a variety of fields on CKM could be defined and discussed as research topics. Basically, the management studies on the different subjects in organizations are seeking to find answers for the following three major questions (Hinterhuber, 2002): a) What are they? Identity. b) Why they are in this form? Reason. c) How could the existing situation be improved? Maturity.

The main underlying philosophy of this idea is maintaining a continuous development trend as well as a procedural approach toward CKM.

In the above mentioned process, the phase 2 -1 is an introductory measure to find an appropriate growth and development solutions and strategies in the organization. Procedural approach leads to an integrated point of view about the three aforesaid phases. In order to study the different organizational issues including CKM and according

Table 1. CKM versus knowledge management and customer relationship management (Gibbert, 2002).

Parameter	KM	CRM	CKM
Knowledge sought in	Employee, team, company, Network of companies.	Customer database.	Customer experience, creativity, and (dis)satisfaction with products/services.
Axioms	'If only we knew what we know.	'Retention is cheaper than acquisition. '	'If only we knew what our customers' know.'
Rationale	Unlock and integrate employees' knowledge about customers, sales processes and R&D.	Mining knowledge about customer in company's databases.	Gaining knowledge directly from the customer, as well as sharing and the expanding this knowledge.
Objectives	Efficiency gains, cost saving, and avoidance of re-inventing the wheel.	Customer base nurturing, maintaining company's customer base.	Collaboration with customers for joint value creation.
Metrics	Performance against budget.	Performance in terms of customer satisfaction and loyalty.	Performance against competitors in innovation and growth contribution to customer success.
Benefits	Customer satisfaction.	Customer retention.	Customer success, innovation, organizational learning.
Recipient of Incentives	Employee	Customer.	Customer.
Role of customer	Passive, recipient of product.	Captive, tied to product/ service by loyalty schemes.	Active, partner in value-creation process.
Corporate role	Encourage employees to share their knowledge with their co colleagues.	Build lasting relationships with customers	Emancipate customers from passive recipients of products to active co-creators of value.

according to the above mentioned process, a three phased algorithm with the following features can be developed (Afrazeh, 2005): 1) Determining and defining the problem (study the current condition); 2) Identifying the factors that resulted in the current condition; 3) Offering solutions and strategies to improve the current condition.

In this paper, within the frameworks of the mentioned algorithm, the key issues relating to the KM and relationship management were integrated in a way that the following goals can be materialized: 1) Determination of the existing CKM status; 2) Identification of the factors that created the current status of CKM, while consideration of the condition and causes; 3) Offering a proper solution for transition from the current phase to a better phase and removing the gap which is observable between the existing and optimal conditions.

THEORETICAL BACKGROUND

For designing the intended algorithm, the concepts of knowledge management (KM) and customer relationship management (CRM) were used and accordingly the main issues, regarding the problem solving algorithm are as follows:

Knowledge management process

For determination of the components of the customer knowledge management (CKM) process, application of knowledge management process (KMP) models are required. Accordingly in our proposed algorithm, the issues which have received more attention and emphasis from different authors and institution within the existing
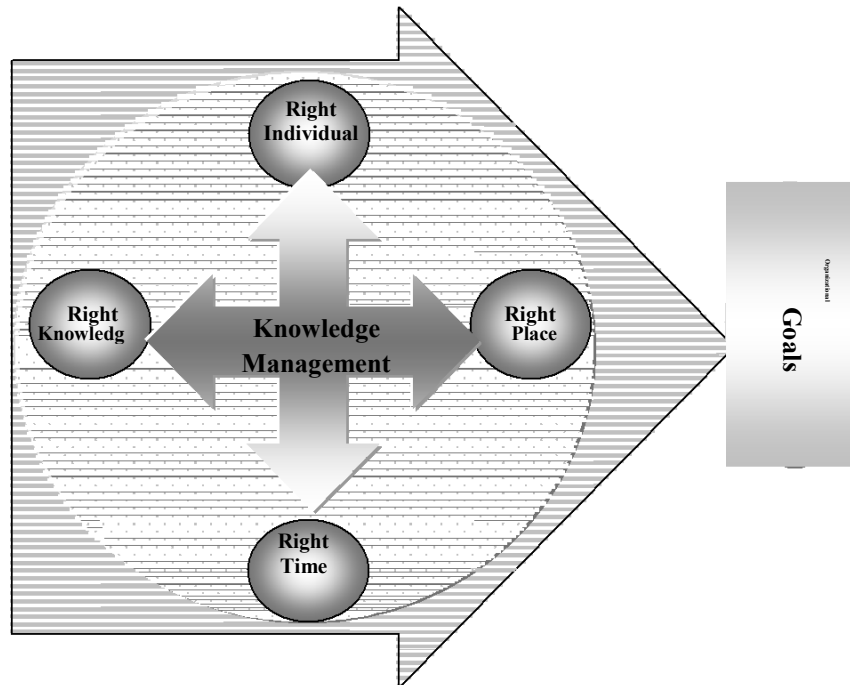
Figure 1. JIT aspects of knowledge management in the KMP.

literature were selected as the fundamentals of the KM process.

The selected concepts in KM are used in the study proposed algorithm as well. The conceptual components including these main items[1]: identifying, capturing, saving, sharing, creating, applying and evaluating.

Just in time in knowledge management process (KMP)

In order to maintain the effectiveness of the knowledge management process (KMP), being just in time is a key and a very important element (Jong, 2003; Huy, 2002) and consequently it was frequently referred and emphasized in KM studies within the framework of four aspects: (right) knowledge, (right) time, (right) place and (right) person (Figure 1). The just in time (JIT) was also applied to the KMP in the proposed problem solving algorithm of this paper.

Determination of the knowledge management process (KMP) level in the enterprises

For showing the current status of the knowledge management (KM) in the enterprises and to determine

---

[1]These points have been used by authors and institution such as: Probst (2002), Liebuwitz (1999), Beckman (1999), American Productivity and Quality Center (APQC, 1996)), etc.

the optimal level of it, and considering the presence/ absence of the influential factors on knowledge management process (KMP), it is necessary to use a suitable method for determining and presenting of the maturity level of KM.

Considering the models offered by different people and institutions like Frost, (2001), Kim (2001), Lopez (2001) (APQC) and Langen (2001), the study can conclude that the organizations regarding their knowledge maturity levels can be classified in five different levels ranging from primitive to the most developed organizations. Based on the effective indicators on the CKM and by means of Likert scales, five maturity levels (between the existing and optimal conditions) for the organization were selected. The study scale measures and depicts the knowledge level in a scale ranging from weak to excellent. This grouping method will be used also for showing the existing status in the first phase of Algorithm. Based on this grouping, a proper solution for attaining to an optimal level of maturity will be offered as well.

Aspects of knowledge management

Three main issues that should be considered in implementing knowledge management are: human, process or organization and technology (Pawlowsky, 2001). For implementing customer knowledge management (CKM) in an organization, due attention should be paid to these aspects. The aspects are considered in the second and third phases of the proposed algorithm to identify the

causes and to suggest solutions. This is done due to the fact that the factors related to every phase of customer knowledge management process (CKMP) and with considering the three aspects of human organization and technology can be collected in a table like Table 2. They can be used by considering those cases that are related to determination of causes and solutions.

Required knowledge

In order to execute the customer knowledge management (CKM) Process, the required knowledge should be determined at first. The required information/knowledge are (Murillo, 2002; Stefanou, 2003; Afrazeh and Bartsch, 2007):

1. Knowledge about the products and articles (including quality and production method),
2. Knowledge about the services (such as distribution and after sales services),
3. General knowledge and recognition (including history, background of staffs and managers, products and customers, etc.).
With regard to the organization's problems and the competitors and customers, the people should be well informed. With regard to the study on current situation of CKM, the accessibility and existence of the knowledge should be measured.

The role of people

Persons who have stronger influence on the customer knowledge management (CKM) process should be identified and their knowledge regarding the issues listed above should be measured and evaluated as well.

The most important groups of these people are (Gibbert, 2002; Stefanou, 2003):

1. Co-workers of marketing and sales departments;
2. Co-workers in the after sales departments;
3. Managers;
4. Customers, etc.

The main items that run in customer knowledge management (CKM) are shown in Figure 2.

THE CKMM PROBLEM SOLVING ALGORITHM

The linking method and application of the issues that were given in the background and theoretical parts is discussed. The basic structure of the proposed algorithm proposed algorithm has three main phases (Figure 3). Within the framework of this algorithm, customer knowledge management (CKM) related factors are arranged in this way:

1) In the first phase, the existing status of the CKM will be examined for the existences of the items are:

a. Status of the every stage of the process including identification, capture, creating, sharing, using, saving and evaluation,
b. The status of every stage of the process from the JIT, place, time, knowledge and person,
c. The level of knowledge that is related to customer,
d. Considering the role of different people in the CKM process,
e. By means of the measurement systems, the Customer Knowledge Maturity level is shown in five degrees: very weak, weak, intermediate, good and excellent.
2) In the second phase the causes and the level of impacts of different factors that have caused the existing situation with considering the KMP , JIT and the role of people will be studied along with the other three factors namely human , process and technology.

This will be done according to the theoretical discussions like what was mentioned in the Table 1.

In the third phase, the required solutions for promotion of KM from current situation to the optimal one will be provided according to the findings which resulted from conducting the first and the second phases. The collected point of views and comments of engaged people, theoretical arguments and the framework of the three factors of human, process and technology will be considered as well. In this way the next accessible level in the system of customer knowledge management (CKM) measurement could be attained. The method of offering solution in each stage was based on the fact that the subjects of KMP which are in rather poor condition should be promoted before the others. This is necessary because the balance in management can be maintained in this way. After establishing a balance among different stages of the KMP, promotion to the next stage of development will be accomplished. In Figure 4 a graphical example of this method is presented.

In CKM studies, the selected approach for measuring CKM status shows the level of KM maturity in the organization. As a result some proper solutions could be determined through the determination of current status of CKM and identifying its causes. In other words, this approach relies on the stages of KM implementing in the organization.

The approach was selected because still many organizations have not initiated any activity regarding KM in general and CKM in particular. As a result determination of different levels of KM implementation and adoption of necessary measures for passing from one level to the next one is a key and critical issue for many organizations. The common feature in the majority of models and methods of KM implementation is to see it as a gradual process and to divide it to several stages. All of the proposed processes include a primitive or starting point and a developed status (Afrazeh, 2005).

The proposed models are applied for defining the

Table 2. Different modules and levels of knowledge management (Pawlowsky, 2001).

Problem and module	Related to structure/processes	Human	Technical and instrumental
Identification	Presentation of work processes, internal and external sensors and factors of success and qualification	Understanding of the qualification informal networks of roles and tasks	Extracting the information on the important work processes, scanning tools data warehouses, scenarios electronic newsletters for customers
Knowledge generation	Organizational structure Group work Organizing Hypertexts network structure, links	Preparation for innovation, tooling for ideas and creativity, Catching the opportunities for cooperation	Computer support for cooperative work systems, virtual platforms for ideas and communications
Knowledge diffusion	Communication structures Usage of the efficiency potentialities , reporting, establishing places for knowledge diffusion	Creating trust environment and sharing culture, creating tools for knowledge transfer, preparation for transfer of invisible knowledge	Communication infra structures, Media and channels, Tel. fax, intranet, post group tools voicemail
Integration	Document management, saving Daily and continuous saving of work logs, technical profiling, consulting	Consolidation of shared work ideas, predisposition for new thing, plans for subject-matter knowledge	Selection Saving, up-dating, refining, editing, preparation and creating required software and hardware
Action	Potential educational capacity in the work place, creating a ring between action and its result, feedback	To perceive personal and structural barriers, Transfer, Fault tolerance, Motivators for creating saving and changing innovation	Creating research modules on new projects, training laboratory Simulation

current situation and for suggesting solution within the proposed algorithm. Following cases are instances of the issue:

a) In Kim and Hwan's (2001) model the implementation phase is introduced in four stages that is, initial, duplication, integration and turning to network. These stages happen in a hierarchical manner one after another. They have also included the features and necessary measures of the each stage in their model.
b) In the model of Lopez et al. (2001) which is presented by the APQC, they divided the process into 5 stages based on the Bell curve of the knowledge management measurement: 1) Enter and advocate, 2) Explore and experiment, 3) Discover and conduct pilots, 4) Expand and support 5) Institutionalize the KM.
c) The model provided by Frost and Langen (2001) emphasizes on the level of KM maturity in the organizations and puts it into the following stages: initial, repeated, defined, managed and optimizing level.

From reviewing this model, the study conclude that the implementation of knowledge management requires time to create structures and suitable condition for (human, process and technology) growth. The first stage mainly

starts with introduction and formation of small workgroups and creating pilot works. In the next steps, and with considering the degree of preparedness, the KM will be diffused and generalized to different parts of the organization and finally to the whole organization. In this way the provision of goods and services will be maintained. Moreover in initial stages of the work, the investment is mainly done on human, process and technology fields, (especially in human resources). The economical results of this investment gradually will become available and measurable. With all these notions in mind, in the study proposed algorithm, the approach was used for determining the CKM status in the organization. Suitable solutions will be found based on the provided models and through consideration of the organizational condition.

APPLICATION OF THE PRESENTED CKMM PROBLEM SOLVING ALGORITHM

In order to go through the phases of the algorithm, data collection on the following subjects is required:

a. Determination of CKM level of relevant people during the CKM Process, examine just in time (JIT) feature regarding their own organization and other organizations,
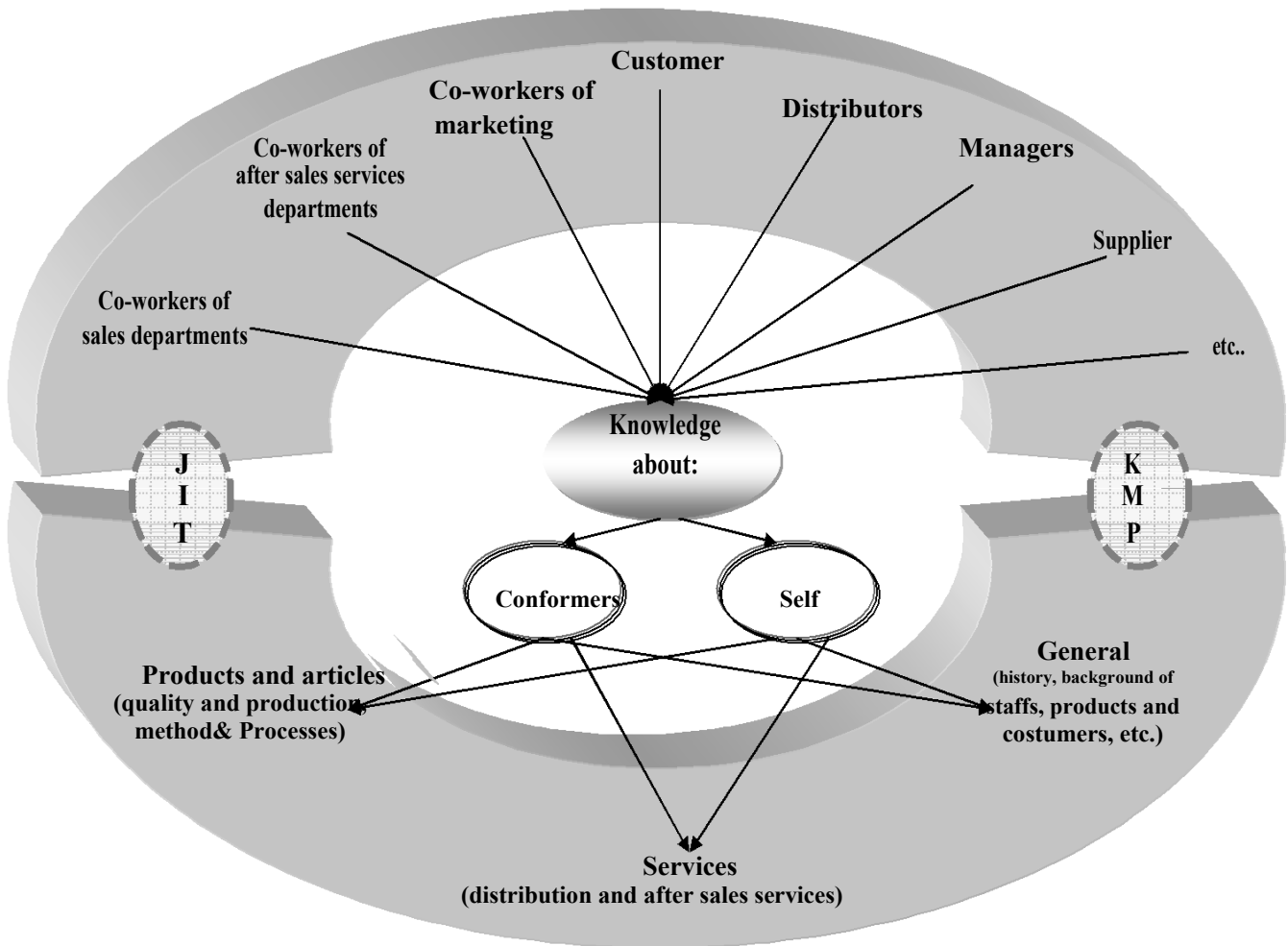b. Determination of causes that have led to the current status of the

Figure 2. Main person and items that run in CKM.

three factors of KM that is human, process and technology,
c. Collecting the point of views and comments as well as relevant theoretical resources for improvement.

Questionnaire design

For collecting required data, it is necessary to put forward some relevant and proper question within the format of a questionnaire. By finding answers to this question, required information on the different aspects of KMP in the organization will be revealed. In this line, and according to the main phases of KMP, the contents of the proposed algorithm will be appeared as some main items and several sub-items.

The main items in the design of the questionnaire are selected based on the KMP stages including discovery, capturing, creating, sharing, save and storage, application and evaluation. For every main item some secondary questions also will be presented to determine its current status regarding just in time (JIT) (time, place, person, knowledge) customer product and etc. The status of the required KM essentials (human, process, structure, technology and tools) will be used to determine the current situation and the answers will be grouped under 5 levels ranging from very weak to very good (Likert scale). In this manner, besides determination of

the status of every individual item, the general conditions of that phase of process will be known as well. The calculation method will be discussed in the next part of the paper.

For finding the causes, the three main factors (human, process/structure, tools technology) was enquired on the every items, for determination of current status of each stage. This is to find out what are the effective factors in this regard. To find the solutions, that are aiming at solving the existing problems and promotion of current status a part should be considered in the stated questionnaire, for collecting the suggestions and comment of the study subjects. In Table 3 the general structure of the questionnaire was provided as an example of the main item of the stage of capture in the CKMP.

Measurement method

In order to evaluate the current status and measuring the promotion of CKM, some indicators and metrics are required. The measurement indicators have already been introduced in the previous section of the paper so in this section only the measurement method will be briefly discussed. Determination of the CKM maturity level in the enterprises that are studied is the goal of measurement. The main indicators are the same as the stages of the process (that
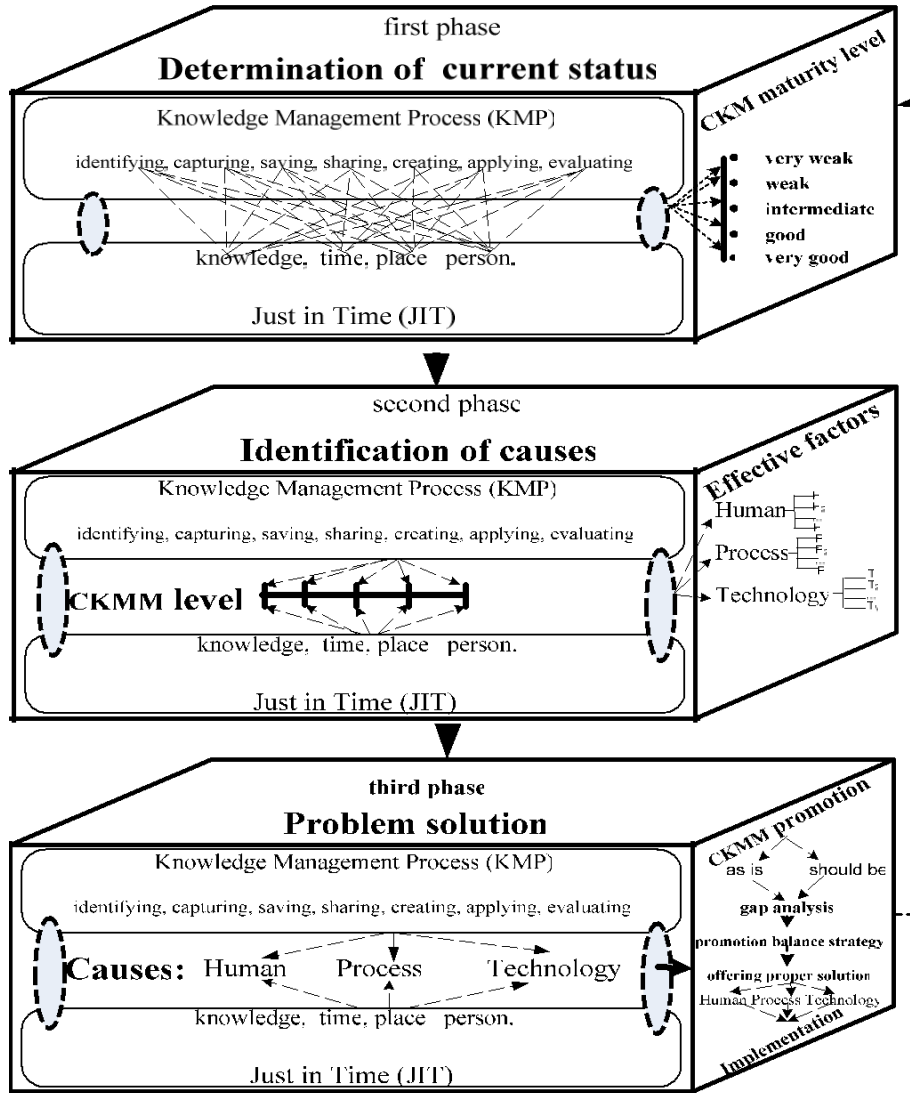
first phase

Determination of current status

Knowledge Management Process (KMP)

identifying, capturing, saving, sharing, creating, applying, evaluating

knowledge, time, place, person.

Just in Time (JIT)

CKM maturity level

- very weak
- weak
- intermediate
- good
- very good

second phase

Identification of causes

Knowledge Management Process (KMP)

identifying, capturing, saving, sharing, creating, applying, evaluating

CKMM level

knowledge, time, place, person.

Just in Time (JIT)

Effective factors

Human

Process

Technology

third phase

Problem solution

Knowledge Management Process (KMP)

identifying, capturing, saving, sharing, creating, applying, evaluating

Causes: Human   Process   Technology

knowledge, time, place, person.

Just in Time (JIT)

CKMM promotion

as is   should be

gap analysis

promotion balance strategy

offering proper solution
Human Process Technology

Implementation

Figure 3. The CKMM problem solving algorithm.

is the process (that is identification, capture, etc.). For each main factor, a number of sub-factors on items like type of knowledge (that is general information or knowledge on products and services) and JIT (time, place, person and knowledge) are determined. For presenting the degree of every item's existence, a five degree Likert scale was used. The scores are grouped from 0 to 100 in a way that 0 - 20 is the level one, and similarly 21 - 39 is the level two, 40 - 59 level three, 60 - 79 level four and 80 - 100 is level five. The method of measurement for every secondary sub-item, main phase and the total CKM is as follows.

1. The status of every sub-item in the scoring system was determined. Average scores of sub-items of each level of CKM indicate the status of that part of the CKP (Formula 1).

Where
a_{ij} = the ith sub-item of the jth main stage of CKM, n_j = number sub-items of jth item of CKM, j = number of the KMP main stages (1, 5) and CKMP item j = the score of the jth main item in the CKM.

The average scores of main items of the CKMP indicate the total status of CKMP:

2. The above formulas can be used for measuring the different levels of CKMP for the JIT provided that the just in time (JIT) related items are considered. Radar Chart is a suitable method for depicting the status of different CKM related items. This method makes it possible to show the items either separately or in the form of different categories.

Case study

For testing the proposed algorithm, three Iranian oil companies were selected (Afrazeh and Danesh, 2006). One of them was considered as the study subject organization (Oil Company A); the other two organizations (Oil Company B and C, Table 4) were considered as similar counterpart organizations for comparison. This part of

Table 3. General schematic presentation of the questionnaire.

Questions on current status			Cause and Effective factors	Solution
CKM/Paf/Stage	M III K G I	**Value** ---.--.--	**Weight determination** Highest weight lowest weight	**Suggestion for improvement**
capturing	Knowledge	On the ... On	Human Process /Structure Technology/ Tools	1. Motivation 2. Education/ training 3. Facilities 1) ……………………….. 2) ……………………….. 3) ………………………
	JIT/the	On	Human Process /Structure Technology/ Tools	1. Motivation 2. Education/ training 3. Facilities 1) ……………………….. 2) ……………………….. 3) ………………………

Table 4. General status of three studied oil companies.

Company	Number of employees (staffs)	Product	Activities domain	Status of CKM related activities
Company A	520	Furfural, motor oil paraffin anti freeze wax, etc.	National /International	KM core
Company B	350	motor oil paraffin anti- freeze, wax, etc.	National /International	Testing (Pilot study)
Company C	950	motor oil paraffin,anti freeze wax, etc.	National /International	Not available

algorithm testing was the first step for determination of general status of the CKM in the organizations studied. Consequently and without entering to details, 29 questions in the form of a questionnaire were prepared. The questionnaires format was based on theoretical background mentioned earlier as well as the five main stages of the CKM (capture, saving and storage, sharing, application, evaluation). Then the questionnaires were distributed among the members of sample society, including customers, managers and staffs of marketing sales and after sales services departments of these three oil organizations. Some of the survey results are presented in the next part.

The current status of the three studied Iranian oil companies, regarding their CKM and JIT status were presented in Figures 5 and 6 by means of Formulae 1 and 2 and the collected data through the distributed questionnaires.

The general results of the study are as follows:

- The CKM and JIT maturity levels are directly related and there is a positive and meaningful correlation between them.

- Those companies that initiated to consider CKM and JIT (A and B) are in a relatively better conditions rather than company (C) that has not yet taken any step in this direction. However, even these companies are still in primary levels of development and they should continue their activities to attain to the CKM and JIT maturity.

- Studied companies (A and B) have recently initiated to hold some training classes and to form primary KM cores in their organization. But they have still a long way to go and the impacts of their activities on the processes have
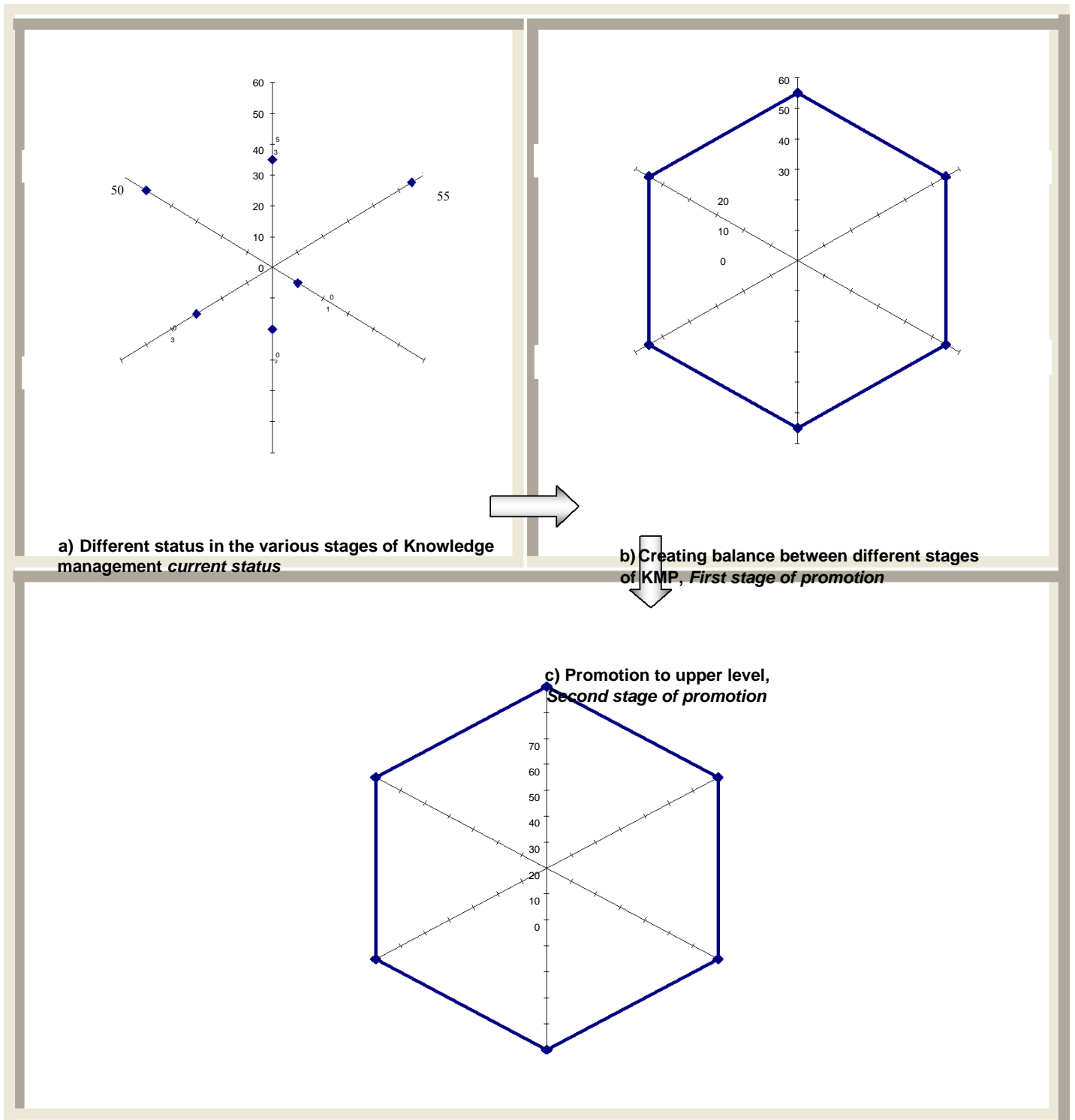
a) Different status in the various stages of Knowledge management *current status*

b) Creating balance between different stages of KMP, *First stage of promotion*

c) Promotion to upper level, *Second stage of promotion*

Figure 4. Promotion balance strategy.

not yet become very evident.

- Although, there are marketing, sales and after sales department in all three companies, due to la lack of a KM program in them, CRM is not so efficient. For these reason application of KM in the process of communication with customer seems necessary and
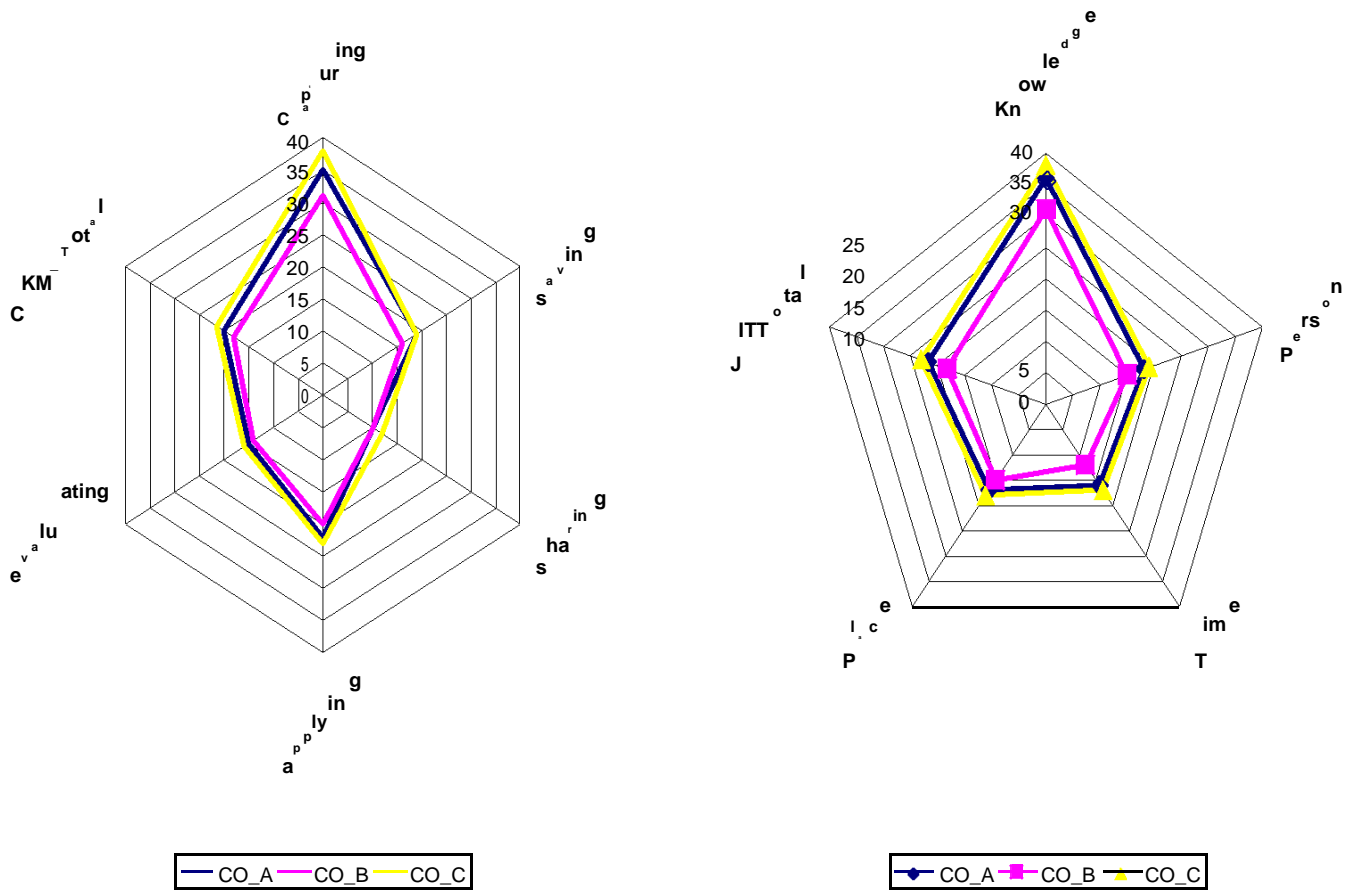
Figure 5. The KMP status of the studied three oil companies A, B and C.

effective.

- Lack of KM, has created an imbalance among the different aspect of processes that is capturing, applying, saving and storage, sharing and evaluation. As a result, the existing knowledge, due to issues like poor and improper conditions of preparation and saving and lack of information on the place and person, can not be used in an effective manner.

- In organizations that are relatively familiar with concepts of KM, the managers and staffs are more interested in using KM.

Conclusion

Applying KM in work processes including customer related processes, results in more efficiency in performing the works. In this line, the existence of marketing, sales and after sales departments can not be very useful otherwise their activities are integrated by means of KM techniques.

For implementing the CKM in an organization, it is necessary to determine the status of organization within the framework of a proper algorithm and to identify the

causes that have led to this status and suggest solutions or remedies with considering all effective factors of the process. This paper is seeking to integrate the CKM related theoretical concepts and to present it within the framework of three phase problem solving algorithm. The study proposed algorithm which measures and evaluate the current status regarding the aspects of Customer Knowledge Management Process (CKMP) and JIT. The algorithm is also applicable to study the causes in relation to different aspects (human, process, technology). Subsequently, regarding the CKMP maturity in the organization and engaged causes, some proper solution and strategies can be recommended to maintain the balance among the different organizational aspects.

The following issues can be suggested for future researches and studies on the proposed algorithm:

1. Determining the status of the weight of parameters relating to the conditions and cal cute them in the formulas that are given in this paper.

2. Establishing a skillful supporting decision making System in order to measure, determine causes, offer solutions. The system also should be able to save and document the information and reports for future decision making.

REFERENCES

Afrazeh A, Danesh P (2006). 'Customer Knowledge Management', Working Paper, Amirkabir University of Technology, Iran, (in Farsi).

Afrazeh A, Nezafati N (2007). 'A Method for Measurement of Knowledge in Organization Based on the SECI Model', Proceedings of the 4th International Conference on Knowledge Management, Knowledge Management: Innovation, Technology and Cultures, Series on Innovation and Knowledge Management. World Sci., 6: 115-130.

Afrazeh A, Bartsch H (2007). 'Integration of Information Quality Management and Process Quality Management in supply Chain, a Hybrid Model', in: Innovative Logistics Management Competitive Advantages through new Processes and Services, Kersten W, Blecker T, Herstatt C eds., Erich Schmidt Verlag GmbH and Co., Berlin, .

Afrazeh A (2006). 'A Three Phase Hybrid Problem Solving Algorithm for Presentation and Promotion of Customer Knowledge Management', Proceeding of 6th International Conference on Knowledge Management (I-KNOW '06), J. Univ. Comput. Sci., pp. 60-67.

Afrazeh A (2005). 'Knowledge Management (Introduction, Models,Measurement and Implementation)', Amirkabir University of Technology Pub. (in Farsi).

Afrazeh A, Bartsch H, Hinterhuber HH (2003). 'Effective Factors in Human Activities and Knowledge Sharing', Zuelch A., eds., European Series in Industrial Management , Vol. 6, Esim, Company Aachen, Germany.

Beckman W (1999).'The Current State of knowledge management', in., Knowledge Management, Liebwitz, M.,eds., CRC press.

d'Huy K (2002). 'Just in Time Knowledge Management', A state of the art report (HTTP://WWW.TELIN.NL). 8 October.

de Jong KY, Wagener A (2003). 'Just-in-Time Knowledge Management The problem, a model and practical applicability of the model', (HTTP://WWW.TELIN.NL), 22 Dec.

Frost B, Langen M (2001). Metriken im Wissensmanagement, Siemens AG, GTICI Münchener Kreis, (in Deutsch).

Garcı́a-Murillo M, Annabi H (2002). 'Customer knowledge management', J. Operational. Res. Soc., 53: 875–884.

Gibbert M, Leibold M, Probst G (2002). 'Five Styles of Customer Knowledge Management, and How Smart Companies Use Them To Create Value', Eur. Manage. J., 20(5): 459–469.

Hinterhuber HH (2002). Strategische Unternehmensführung 1, Strategisches Denken , 7. Auflage., WDEG Verlag, (in Germany) .

Kim Y, Lee JH (2001).' A stage model of organizational knowledge management: a latent content analysis'. Exp. Syst. Appl., 20: 299-3ll.

Lopez K (2001). Measurement for Knowledge Management, American Productivity and Quality Center, Issue October.

North K (2002). Wissensorientierte Unternehmensführung, 3. Aufl., Wiesbaden, Gabler(in Deutach).

Pawlowsky P (2000). Wozu Wissensmanagement, in: Wissensmanagement, Goetz, k., eds., Rainer Hampp Verlag., (in Germany).

Probst G, Gibbert M, Raub S (2002). Wissensmanagement, in: Handwörterbuch des Personalwesens, Oechsler W, Weber W eds.,. 3. Aufl, Schaeffer-Poeschel, Stuttgart., (in Deutach).

Stefanou J, Sarmaniotis C, Stafyla A (2003). 'CRM and customer-centric knowledge management: An empirical research Constantine's', Bus. Process. Manage. J., 9(5): 617-634.

Wiig KM, Establish G (1999). The Enterprise's Knowledge Practices. Arlington, TX: Schema Press.