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Research Article

EVALUATING THE PERFORMANCE OF KNOWLEDGE MANAGEMENT IN THE HEAVY EQUIPMENT INDUSTRY, PROVIDING SOLUTIONS FOR IMPROVEMENT: CASE STUDY: HEPCO FACTORY

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ABSTRACT
Knowledge management, as a new approach in firm & organizations are some issues which their successful implementation needs a comprehensive appropriate understanding. Nowadays, knowledge is the most strategic source to maintain and bolster competitive advantage and effective knowledge management is one of the most serious organization's challenges. The research witch can be considered as descriptive and practical one. We have tried to evaluate the knowledge management success level in heavy equipment's production industry (HEPCO) and also ranking different aspects of knowledge management. We have tried to define the gap between the current and favorite situation beside the measurement of success aspects in the company, present the improvement strategies. Accordingly a 35 questions questioner with 8 aspects was designed and Hepco's experts filled it in.

Keywords*: Knowledge Management, Knowledge, Information Technology*

INTRODUCTION
The world; has faced with information revolution with knowledge as the main source after, agriculture revolution with land as the main source, and industrial revolution with capital and labor force as the main source (Nikookar and et al,2012). Knowledge is a combination of experiences, values, information and attitudes (Ramezani, 2004). World trade leaders; increasingly believe that; labor force knowledge is one of the most distinguished abilities of any organization (Hitt, 2005). Hendy; leading management theorist believe that, we are in a stage that the worth of organization's intellectual capital is several times more than financial assets (Probst and et al, 2006). On the other hand the necessity of knowledge management application in organizations is undeniable (Abtahi and et al, 2006). According to Draker's opinion knowledge management; step by step has improved its position in organizations in such a way that recently has turned to one of the success keys of organizations in twenty first century (Akbari and et al 2013). Jack Velch; chief executive of General Electric mentions: "the ability of organization in getting and transference knowledge , is the fundamental competitive advantage ".Due to this view point ,the Knowledge of organization; is its potential and has led to advent of a new management method ;based on information and knowledge which is called knowledge management (Xinye Lv,2004). Knowledge management analysis has helped us to know the current situation of the organization and we can understand which segments needs development. Therefore; we can obtain same information and the way we can improve it, facilitate it and optimize it (Ramezani, 2004). All famous economics and business theorists in our now world, know the defined knowledge as the final code and competitive advantage for modern firms. So, any pattern or model which can keep knowledge upgrading in it and shape its distribution can be considered (Mohammadloo, 2004).

Literature Review

Although; there are not any consensuses about knowledge concept, different scientists have different viewpoints about knowledge definition. Some have presented knowledge definition based on its application and some other based on the way it can be formed. Of course there are other definitions too (Rading, 2003).Knowledge; includes; formed knowledge patterns, laws, programing and procedure, skills and people's experiences. Beside this, we can add other parameters such as: communication, situation analysis; new solution development for problems and tasks performance cultural issues; customs and values such as communication with audiences too (Watson, 2003). But knowledge is a justified, favorable idea (Nonaka and Takeuchi, 2006). Dalkir believes that knowledge is an objective genuine way which is typically based on personal or experimental values, or experiences and perceptions. In addition, knowledge help us to identify problems; developments of people (Dalkir, 2005).

-Below is given a definition of knowledge:

-Knowledge as a strategic asset and a key competence of the 80'S was designed by Nonaka and was prospered in 90's, also appeared in the literature of strategic management organizations (Nonaka, 1994).

-Nonaka (1994) belief describes knowledge as verified honest believe according to traditional Epistemology. Although traditional topics of "being honest", as an essential feature of focus, but today, as a matter of "belief" is a personal account and have stressed the importance of "being verified" knowledge is emphasized.

-According to what McDermott (2001) tells about difference between information and knowledge, the knowledge is flow of messages or meanings that can be added to the knowledge, reorganize the structure or alter it.

-Data is a set of facts about a certain phenomenon. Information includes the organizing, grouping and categorization of data in a meaningful patterns and Knowledge, information and experience, context, interpretation and reflection makes it possible to combine the correct action (Jafari and Kalantar, 2003).

-Knowledge is an organized collection of data and information which other people in business with other organizations, create and keep it with rules, procedure and learned practices by the time (Schiffel, 2008).

-Maracas (1990), defines knowledge as knowledge is defined as "the use of instincts, ideas, rules, procedures, and information to guide actions and decisions in the context of solving a particular problem."

-Knowledge is a pattern, a relationship which is found in a set of data (Schiffel, 2008).

Researchers have investigated various aspects of knowledge management. However, due to the inherent difficulty of evaluating knowledge management strategies and their effects on organizational performance, little research exists about the relationship between knowledge management strategy and organizational performance (Choi and Jong, 2010).

There is not any universal definition of knowledge management that all the experts agree on that. For example, Davenport (1998), knowledge management as the collection, distribution and efficient use of resources.

O'Dell and Grayson (1998) know defines , knowledge management as an organizational strategy which has to be created in an organization to make sure knowledge transfer to right people at the right time and those people have shared their knowledge and use information for improving organizational performance.

A large number of researches in the field of knowledge management show that knowledge management has a positive impact on organizational performance. (Yang et al, 2009).

Quoted from Massey (2001) argues that successful knowledge management strategy requires identifying the critical factors and using it to get the work results and provide a framework that organizations can use new methods of managing knowledge management (Choi and Jong, 2010).

Haines (2001) recognizes knowledge management process based on four pillars:

A) Content: The type of knowledge (whether explicit or implicit) is concerned.

B) Skills: acquiring skills for knowledge extraction.

C) Culture: the culture of the organization has to be promoting the distribution of knowledge and information.

D) Organize: has to be organizing the exiting knowledge.

Bhatt believes (2001), knowledge management, process creation, approval, delivery, distribution and using knowledge.

Bounfour (2003), defines knowledge management as a set of procedures, technical and managerial infrastructure and tools which has been designed in order to create, share and use information and knowledge inside and outside the organization.

Amin et al (2001) also provides a definition similar to Bounfour definition "Processes and technologies for the capture, sharing and using collective knowledge to optimize decisions at the right time."

Crawford (2005) believes Knowledge management can be defined in two ways: Knowledge management as a goal and knowledge management as a process. He believes that the goal of knowledge management focuses on knowledge exchange.

While knowledge management as a process is trying to tacit knowledge becomes available. In other words, knowledge management is the process of converting knowledge interpretation. The conversion cycle knowledge, tacit and explicit knowledge can be converted into each other.

Alawi, Marzooqi and et al (2007), have done a study of organizational culture and knowledge sharing as key factors of the success in Bahrain. The results indicate that factors such as trust between individuals, communication between staff, information systems, rewards and organizational culture play an important role in defining the relationship between staff. This provides opportunities to overcome knowledge sharing barriers.

Lai and Lee (2007) have studied, Organizational culture relationships with scientificx activities they have considered the factors affecting the implementation of activities, organizations that have adopted knowledge management program. The results indicate that the activities of institutions that are providing knowledge should have an entrepreneurial culture.

In another study, it was shown that the relationship between structural empowerment, knowledge management and knowledge management performance indicators such as strategy and leadership, is positive and significant.

And also the relationship between knowledge management performance indicators of financial performance indicator is positive and significant (Tsang, 2009).

Table1. Knowledge taxonomies and example (Akbari et al, 2013),(Alavi and et al,2001)

Knowledge type	Definitions
Tacit	Knowledge is rooted in actions experience, and involvement in specific context
Cognitive tacit	Mental models
Technical tacit	Know-how applicable to specific work
Explicit	Articulated, generalized knowledge
Individual	Created by and inherent in the individual
Social	Created by and inherent in collective actions of a group
Declarative	Know-about
Procedural	Know-how
Causal	Know-why
Conditional	Know-when
Relational	Know-with
pragmatic	Useful knowledge for an organization

Michael and et al (2009) in their study entitled "Knowledge management and organizational performance an exploratory analysis," have reviewed the relationship between knowledge management and output indicators of the performance. Results showed that there is a significant positive correlation indicator, between knowledge management and organizational performance.
Rezaeiyan and et al (2010) examined the role of ethics in their research focuses on knowledge management tasks. Results showed that the correlation between the ethical and practical aspects of knowledge management is significant.
Between individual and collective measures such as trust, honesty, respect of property, support and empathy, commitment, accountability, privacy, conscience, and the accuracy and correctness of functional aspects of knowledge management including creation, organization, dissemination and utilization of knowledge, there is a correlation.
In order to clarify the concept of knowledge and knowledge management, Akbari and Moradi (2013) reviewed the literature in this field with a set of definitions and theories have collected numerous categories and Knowledge Management. That each focus on a particular dimension that most of them are summarized in table 1.

RESEARCH METHODOLOGIES AND MODELS

This study has used the model of "management structure bases" by Probst, Rob and Romhart (2000) titled knowledge management structure fundamental derived from figure1. This model is the most complete performance models in practical models. The designers of this model define knowledge management as a dynamic cycle in constant rotation. The process consists of eight components make up two-cycle,s a cycle is a cycle of internal and external (Probst et al, 2000).
- Internal cycle by building blocks discovery (identification) acquiring, developing, sharing, application (operation) and maintenance of knowledge are created.
- External cycle consists of blocks of knowledge and knowledge evaluation goals that characterize the Knowledge management cycle, two cycles to complete the feedback. Components of this model are shown in the figure 1.

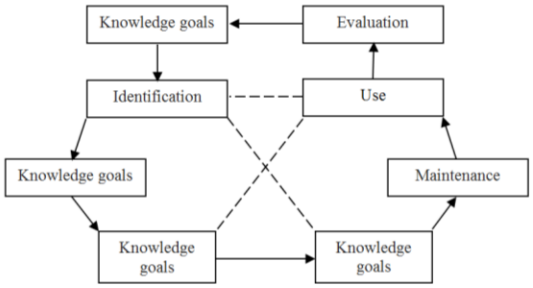

Figure 1 - The basic building Knowledge Management (Probst et al., 2000)

As the results of this research can be used in HEPCO, this study is a practical one and according to the researcher's presence in the organization and gathering information from experts, using a questionnaire survey research terms, this study is a case study.

Objectives and research questions

This research aims to measure knowledge management in HEPCO and evaluate success with the exiting gap and the results will provide ways to compensate this gap.
According to the research objectives, research questions include:
1-Each contributing index is in which level of knowledge management and how much is amount of each index gap with the desired level?

2-How much is the success of knowledge management in HEPCO and how much is the gap of each aspect in comparison with desirable level?
3-What are strategies to compensate each knowledge management aspect and how we can improve it in HEPCO?

The population

Heavy equipment manufacturing company, the first and biggest manufacturer in Middle East. Considering that many of the products are designed by experts and project managers in company so statistical the population chosen from mangers and among them. The population of this study was HEPCO experts and management experts with undergraduate and graduate degrees and work experience more than 10 years. This topic is shown in Figure 2.

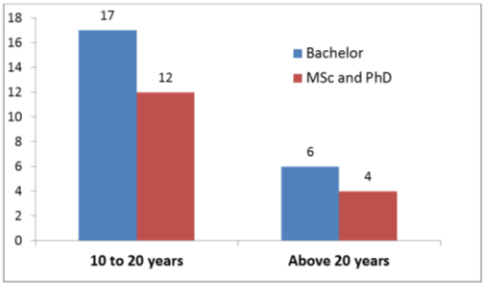

Figure 2: The population abundance based on education and work experience

Summary of Findings

First research question:

What's the level of each indicator contributing knowledge management in HEPCO?

According to data collected by questionnaire and summarizing them status of knowledge management in HEPCO in any of the parameters in Table 2 were determined.

Table 2: Knowledge Management in HEPCO in each of the indicators

Aspects	Index	Average index (percent)	Rate gap (percent)
Knowledge Goals	How much the vision and future needs of HEPCO is clear?	60.26	14.74
	How much is priority of knowledge management in HEPCO strategies?	48.46	26.54
	How much is the HEPCO aware of its knowledge management in specialized field?	57.18	17.82
Identify knowledge	What database and the documentation in HEPCO have been identified?	71.54	3.46
	How much knowledge and expertise of the HEPCO's partners has been identified?	62.31	12.69
	What databases and documents outside of HEPCO have been identified?	55.38	19.62
	How much knowledge and expertise of users and partners of HEPCO has been identified?	49.74	25.26
Acquisition knowledge	How much does HEPCO uses the connoisseur's internal and external experts and consultants to obtain knowledge?	57.95	17.05
	How much is the common research projects of HEPCO with other organizations and research centers?	34.36	40.64
	How much is the participation percentage of HEPCO for holding national conference?	37.95	37.05

	How much is the participations percentage of HEPCO for holding international conferences?	24.62	50.38
	How much the specialized training courses and workshops has been held in He?	44.62	30.38
	How much is the availability of primary sources (Papers, journals, research projects, theses, patent license, patent, etc.) in HEPCO?	43.33	31.67
	How much is the availability of secondary sources (books, encyclopedia and review articles, etc.) in HEPCO?	56.92	18.08
	How much is the availability of websites and databases of local information in HEPCO??	74.62	0.38
	How much is the availability of websites and databases of foreign intelligence company in HEPCO?	68.46	6.54
	How effective access to the information superhighway via the Internet and Intranet are there?	74.87	0.13
	How much does HEPCO show interest in using electronic communication (e-mail)?	67.69	7.31
Aspects	Index	Average index (percent)	Rate gap (percent)
Development of knowledge	Due to environmental changes, how much HEPCO's knowledge is being updated?	53.85	21.15
	How much is effectiveness of gained Knowledge to change objectives and procedures and work processes HEPCO helps?	64.36	10.64
	How much is HEPCO agile to attract people with the knowledge?	41.79	33.21
Knowledge sharing	How much is the participation of faculty members to hold scientific meeting?	36.92	38.08
	How much is the attention of HEPCO to creating internal forum to exchange of ideas?	28.21	46.79
	How much is extent effective job rotation (human mobility) in HEPCO?	43.59	31.41
	How much is team working done in HEPCO?	60.77	14.23
Applying knowledge	How leveraging the knowledge attention to academics?	44.1	30.9
	How does HEPCO uses the advantage of academics knowledge?	52.56	22.44
	How much the knowledge base in update in HEPCO?	48.46	26.54
Maintain knowledge	How HEPCO has active the storage and maintenance procedures?	56.15	18.85
	HEPCO what extent, the creation of a knowledge bank (Eg, libraries, databases, and Web ...) is active?	51.03	23.97
	HEPCO how to update your knowledge base?	47.69	27.31
	How workers in HEPCO can have access to each other's academic and professional background?	51.79	23.21
Assessment of Knowledge	How feedback system is used in HEPCO?	40.51	34.49
	HEPCO of quality over quantity in how knowledge is preferable?	46.67	28.33
	How much the result of feedbacks has given to performance?	47.18	27.82

Second research question:
What is the success of knowledge management HEPCO?

Compare the success of knowledge management for each of the aspects and extent of the gap relative to the desired level is in the Table 3 and Figure 3.

Table3: Comparison of the optimal level of each dimension of knowledge management

Aspects	Average (percent)	Rate gap (percent)
Knowledge Goals	55.3	19.7
Identifying knowledge	59.74	15.26
Schooling	53.22	21.78
Development of knowledge	53.33	21.67
Knowledge sharing	42.37	32.63
Applying knowledge	48.38	26.62
Knowledge keeping	51.67	23.33
Assessment of Knowledge	44.79	30.21
Sum total	51.6	23.4

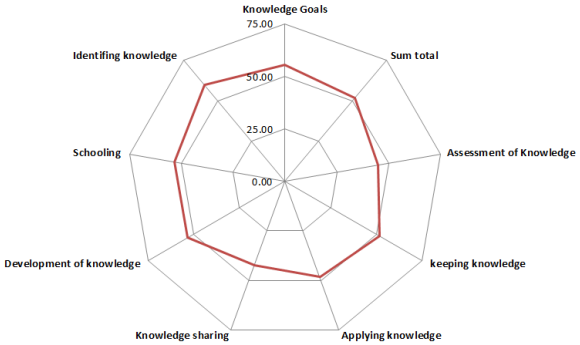

Figure 3: Compared to the existing state of knowledge management in aspects compared to the ideal situation

The third research question:
What are strategies to compensate the gap in knowledge management and improving it?
Researcher based on the results of the study shown in Figure 4. Has suggested the rate gap has proposed measures include:

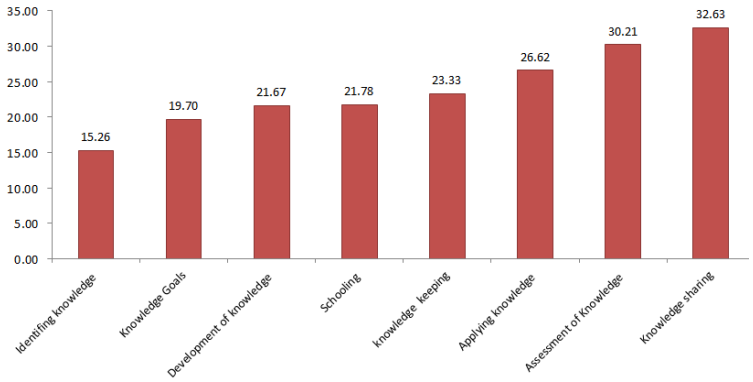

Figure 4: The amount of each aspect of knowledge management gaps than desirable

- ✓ The human resources department has to promote job rotation within an organization.

- ✓ In order to spread the knowledge of the organization, while strengthening training department, the conditions for holding seminars, scientific meetings and classes within the enterprise offers a chance.
- ✓ Public relations agencies with cultural activities, to promote a culture of teamwork.
- ✓ Strengthen the feedback receiving system.
- ✓ Management support for innovative designs and ideas applicable material and spiritual encouragement.
- ✓ Enhancing the relationship with universities and scientific institutions with the aim of benefiting their advice in decision-making and editing programs.
- ✓ Establishment of a department responsible for knowledge management in the organization.

RESULT

Organizations are always looking for the factors that led to the implementation of knowledge management .In order to gain competitive advantage over their rivals. This study, provides eight factors affecting the implementation of knowledge management that using them lead to organizations success. Scientists and researchers have offered different factors, all of which in some cases are common. This indicates that although there may be a discrepancy in some cases, but all of them are looking for something and the successful implementation of knowledge management.

In this study, a comprehensive set of factors has been collected together and the impact of each of them refers to the knowledge management. Looking at Tables 2 and 3 the results of the research will be achieved. The minimum gap between the knowledge management aspects is related to the identification of knowledge with 15.26 and the highest amount is related to knowledge-sharing and the number is 32.63 and we discover in HEPCO diagnostic tools are available, but a sharing knowledge of is not done well. Also, the maximum gap between the indicators relating to participation in the international conference with number 50.38 and the smallest gap index is related to effective access index to the information superhighway via the Internet and Intranet number is 0.13.

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