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Determination of Critical Success Factors for Knowledge Management Implementation, Using Qualitative and Quantitative Tools (Case study: Bahman Automobile Industry)

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Abstract

The critical success factors (CSFs) of knowledge management (KM) systems are considered as areas that must be given the required attention for the successful implementation of knowledge management. In this respect and to reduce the failure risk of knowledge management projects, the current paper aims to arrive at a conceptual model by identifying and prioritizing factors for guiding research into the successful implementation of knowledge management systems. After reviewing the research literature, integration and summarization of the factors and conducting a field study, 26 indicators were found and categorized into five groups. Data were collected in two phases: a) performing semi-structured interviews; b) distribution and collection of questionnaires. The next step was data analysis. Transcripts of the interviews were coded and analysed in the qualitative phase and in the quantitative phase, a Friedman test was used for prioritization; confirmatory factor analysis (CFA) was applied to confirm the factors. In conclusion, the model is proposed and suggestions are offered.

Keywords

Bahman automobile industry, Critical success factors, Knowledge management, Knowledge management system implementation, Qualitative research tool.

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Introduction

Considering knowledge as a critical source has gained importance in recent years within the competitive context of businesses (Wu & Wang, 2006). Organizations make an effort to take true and on time advantage of their knowledge resources and environments. This approach has developed into a new concept called knowledge management (Amin Moghadam & Sotodeh Riazi, 2008).

Knowledge is the only reliable source for creating a sustainable and competitive advantage within the organization. As described by Nonaka and Takeuchi, knowledge is a "justified true belief" (Nonaka & Takeuchi, 1995). Every day, organizations continue to grasp that knowledge is intellectual capital. Globalization, government size reduction, the important role of citizens and the necessity of citizen participation has acquired special attention within the context of knowledge management. Wisdom suggests a strategic, irreplaceable and worthy value creator for stakeholders that boosts the production of innovative goods and services, and leads to gaining a sustainable competitive advantage. In the information age, knowledge is the most significant factor of long term success for both people and the organization. Peter Senge believes that the only competitive advantage in the world's future will be the knowledge owned by an organization, as well as the ability of the organization to continue learning (Duffy & John, 2000).

In the dynamic and challenging business environment, moving towards being a learning organization is a necessary requirement for success. Today, organizations must have the ability to acquire true knowledge in order to deliver innovative products, improve their processes, to distribute their gained knowledge among their employees and to utilize it within daily organizational activities. Identifying the effective factors of knowledge management is a preliminary effort in the eventual effective application of intellectual capital within an organization (Alvani *et al*., 2008).

It should be noted that this research is important from both a theoretical and practical perspective. Completing research in this area is important theoretically and together with a practical approach, it can be stated that findings from such research can potentially help the industry in terms of knowledge management implementation.

In recent years, a major challenge in the field of knowledge management has been the way in which knowledge management is implemented. Many organizations that make an effort to implement knowledge management do not sufficiently rely on selecting the best

approach for doing so (Moffet *et al*., 2002). The literature review suggests that an ideal approach is to simultaneously determine both social and technological factors (Wong & Spinwall, 2005). An organization's comprehension of critical success factors for knowledge management implementation can help them to achieve their goals (Valmohamadi, 2010).

Identifying critical success factors can help businesses to plan and implement knowledge management in order to reduce the risk of failure. The importance and major function of knowledge management's CSFs are to identify and supervise these factors in order to successfully implement knowledge management. Thus, any activity conducted by the organization to implement knowledge management should be considered in advance (Talebi & Saleemi Torkamani, 2012). Knowledge management implementation is not easy and requires sufficient research and the provisioning of the required infrastructure and CSFs for knowledge management system implementation.

This paper aims to answer three questions:

1. What are the critical success factors (CSFs) of knowledge management (KM) system implementation?
2. What conceptual model can be proposed for knowledge management (KM) system critical success factors (CSFs) in the Bahman automobile industry?
3. Which factors have a higher priority compared with other factors in this company?

Literature review

Knowledge management

Knowledge management is the current century's novel effort to protect, direct and intentionally increase the company's knowledge capital. Knowledge management is a process that assists organizations in searching for influential information and then to select, organize and distribute it. Knowledge management as a profession is essential for managing activities such as dynamic learning, problem solving, strategic planning and decision making (Spickens, cited in Danesh Fard & Shahabinia, 2011). "Knowledge management practices enhance the flow of insight and advice between employees and therefore they can benefit from [each] other's expertise" (Von Krogh *et al*., 2000). The following are some definitions that have been selected among the many expressed by knowledge management studies:

- Knowledge management is defined as "the creation, extraction, transformation and storage of the correct knowledge and information in order to design better policy, modify action and deliver results for both the employees and organizations in the life insurance business" (Horwitch & Armacost, 2002).
- Knowledge management is a process that helps companies to detect, select, organize and distribute important skills and information that is not usually accessible or organized, and can be considered as organizational memory. Knowledge management implementation in an organization will aid in effectively and efficiently solving learning problems and apply strategic planning and dynamic decision making (Gupta, 2000).
- Lopez noted that knowledge and organizational capabilities are forms of strategic capitals that promote the organization's long-term goals and have strategic application in dynamic contexts. One of the key goals of knowledge management is to transform implicit knowledge to explicit knowledge; this leads to a reduction in the loss of valuable knowledge due to performance declines, as well as a reduction in the loss of organizational memory (Rahnavard & Mohamadi, 2010).

A comprehensive definition of knowledge management, which includes many aspects of knowledge management and serves as a basic definition of the concept in this paper is presented by Davenport and Prusak, i.e., the "exploitation and development of knowledge assets in the organization, in [such] a way that goals are achieved" (Davenport & Prusak, 1998). Knowledge that is managed includes both explicit and implicit knowledge. Management of these types of knowledge includes all processes related to recognition, sharing and producing knowledge. This requires a system for producing and maintaining knowledge resources, as well as for broadcasting and smoothening knowledge sharing and organizational learning. Organizations that are successful in knowledge management consider knowledge as an organizational property and develop organizational rules and values to support its production and sharing. "Managing knowledge effectively can provide businesses with several competitive advantages, including [an] average level of knowledge management, service quality improvement, cost and time reductions, strengthened relationships among colleagues and quicker knowledge creation" (Su & Lin, 2006).

Knowledge management system implementation

The concept of a knowledge management system provides a better

understanding of knowledge management and its elements. A knowledge management system is an approach or tool that creates, maintains and shares both explicit and implicit knowledge (Rafiee, 2010). An organizational knowledge management system is a mechanism that improves the organizational learning process by smoothening the process of knowledge exchange and distribution (Messo & Smith, 2000). Such a system consists of a complex blend of infrastructures of technology, organizational structures, organizational culture, knowledge and people. Technological infrastructures are IT tools including hardware, software and protocols that provide the possibility of presenting electronic versions of organizational knowledge and which simplifies knowledge exchange. Successful knowledge management implementation requires a comprehensive approach to various organizational factors.

The primary challenge for organizations is how to perceive knowledge management and the way in which an organization implements it. The most important goal for organizations is to define a proper knowledge management system and administrate it in an appropriate manner; however, this depends on the true recognition of knowledge management system CSFs (Rahnavard & Mohamadi, 2010).

A selection of special activities should be conducted to implement a knowledge management system. An important aspect in this context is to be aware of the factors that need to be noticed in order to successfully implement a knowledge management system. For this paper, the researchers have studied some of these factors such as organizational structure, information technology and external environment (Danesh fard & Zakeri, 2012).

Knowledge management implementation: critical success factors

Ranjan and Bhatnagar (2008) believe that "CSFs are the crucial factors or parameters required for ensuring the continued success of an organization and these factors represent those managerial areas that must be given special and continual attention to cause high performance"(Ranjan & Bhatnagar, 2008). A definition by Rockart serves as the basic definition of CSF in this paper. According to Rockart's (1979) research findings, CSFs consist of a selection of limited activity areas that will yield successful and competitive performance.

As knowledge management encompasses a wide range of perspectives, the successful implementation of knowledge management is dependent on several critical factors (Huang & Lai,

2012). These factors play a key role in taking advantage of hidden benefits; however, achieving them can be complicated. These factors are called critical success factors or bottlenecks. Lacking these factors is a major organizational barrier for achieving organizational goals (Moghli, 2007). A survey by Skyrme and Amidon (1997) identified seven specific factors: business obligation to implement knowledge management, the existence of vision and a knowledge map, knowledge leadership, knowledge creation and sharing culture, continuous learning, proper technological infrastructure and systematic organizational knowledge processes.

Wong and Spinwall (2005) discussed managerial factors that affect knowledge management's successful implementation within 11 frameworks. These factors are: leadership and leadership support, culture, information technology, goals and strategies, evaluation, organizational infrastructure, organizational activities and process, incentives, resources and training and human resource management. Valmohamadi (2010) claims those top managers' support, organizational culture, technological infrastructure, knowledge management strategy, performance appraisal, organizational infrastructure, activities and processes, rewards, resource limitations, education and training, human resource management and benchmarking. According to studies conducted by researchers about critical success factors, the most significant CSFs for knowledge management system implementation have been gathered in Table 1.

Table 1. The most significant CSFs for KM system implementation (Talebi & Saleemi Torkamani, 2012)

KM CSFs / **Researcher**	Leadership and support	culture	IT	Goals and strategies	Appraisal system	Organizational infrastructure	Activities and processes	Reward and motivation	Sources	Training and education	HRM
Skyrme and Amidon	√	√	√	√			√				
Halsapple and Joshi	√			√	√		√		√		
Davenport *et al*.	√	√	√	√	√	√	√	√	√		
Liebowitz	√	√	√	√		√		√			
Hasanali	√	√	√		√	√					
American Produtivity and Quality Center	√	√		√	√						
Wong and Spinwall	√	√	√	√	√	√	√	√	√	√	√
Rahman *et al*.	√	√	√	√		√	√				√
Valmohamadi	√	√	√	√	√	√	√			√	√
Mc dermott and O'Dell		√									
Alavi and Leidner			√								
Ahmadi *et al*.					√						
Akhavan *et al*.					√						√
Herschel and Nemati						√					
Yahya & Goh								√		√	√
Total	9	9	8	8	8	7	6	4	3	3	5

Many scientific studies have been conducted to identify knowledge management system CSFs, but these have been very general and have been unable to identify the key factors for implementing knowledge management. Valuable theoretical papers have been published but there has been less effort to evaluate the importance of influential factors in knowledge management success (Nissi & Rangbari Khini, 2010). The following is the proposed conceptual model of the paper for knowledge management system CSFs (Fig. 1).

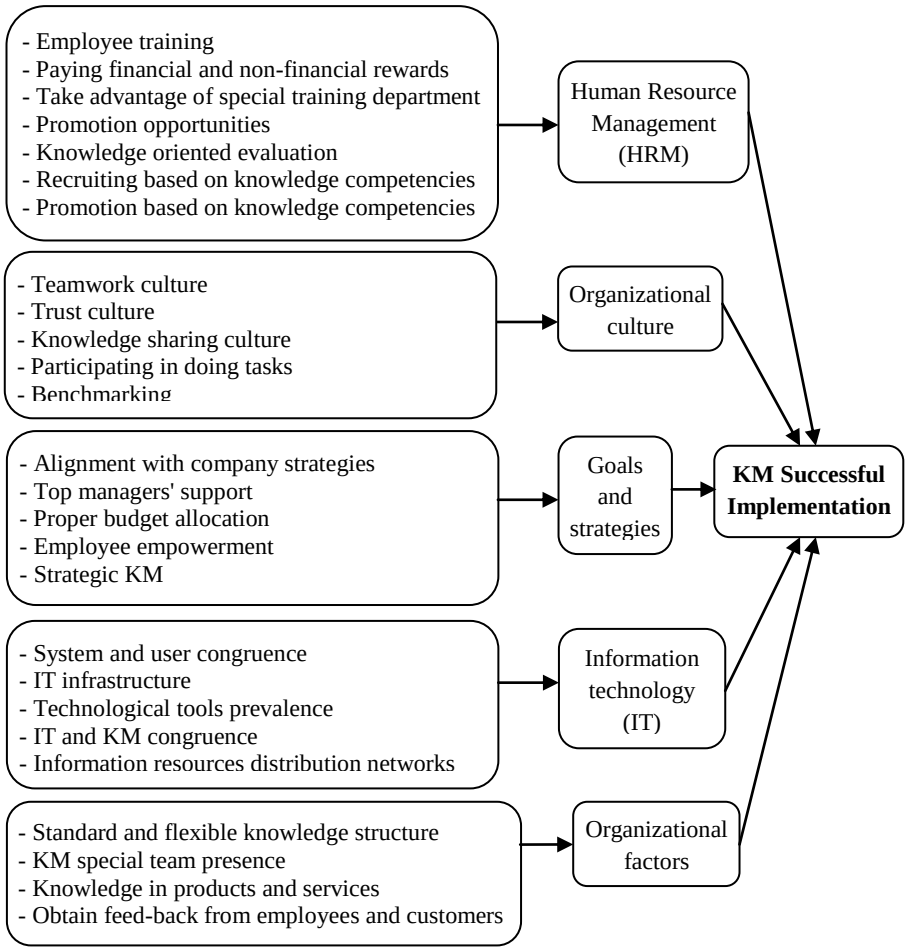

Fig. 1. proposed conceptual model for Bahman automobile industry

This model is the outcome of library studies surveying related papers, interviewing experts and managers within the Bahman automobile industry, and asking the opinion of experts in this field. The model has been adjusted to the conditions of the automobile industry in Iran. After taking expert opinions and analysing interview transcripts, inappropriate factors were eliminated and other factors were merged. As a result of the interview analysis, the main

dimensions of the model were identified and the links between factors and sub-factors became clear. Finally, knowledge management system CSFs were categorized into five primary dimensions and 26 sub-factors. The five main dimensions were organizational factors, organizational culture, information technology, goals and strategies and human resource management. Table 1 indicates most of these factors. Each of the 11 factors in Table 1, according to expert opinions, was related to one of the five main dimensions. These relations are shown in Table 2.

Table 2. Relations between the factors shown in Table 1 and the five main dimensions of the research

No.	Main dimension	Related factors from Table 1
1	Human resource management	Appraisal system factors, rewards and motivation, training, human resource.
2	Organizational culture	Culture, Activities and processes.
3	Goals and strategies	Leadership and support, sources.
4	Information technology	Organizational infrastructure, Activities and processes, information technology.
5	Organizational factors	Organizational infrastructure, Activities and processes.

From the 26 factors, seven were in the human resource management field: employee training, paying financial and non-financial rewards, taking advantage of special training departments, promotional opportunities, knowledge-oriented evaluation, recruiting based on knowledge competencies and promotion based on knowledge competencies. Five were in the organizational culture field: teamwork culture, trust culture, knowledge sharing culture, participating in doing tasks and benchmarking. Five were in the goals and strategies field: alignment with company strategies, top managers' support, proper budget allocation, employee empowerment and strategic knowledge management. Five were in the IT field: system and user congruence, IT infrastructure, technological tools prevalence, IT and knowledge management congruence and information resource distribution networks. Four were in the organizational factors field: standard and flexible knowledge structure, knowledge management special team presence, knowledge about products and services and obtaining feedback from employees and customers. It should be noted that the five main dimensions of the proposed model were related to one another. Furthermore, by utilizing a systematic and interactive way of thinking, the five main dimensions provided conditions for successfully implementing a knowledge management system.

Methods

Two different tools were used in the current paper for data collection.

The first is a qualitative tool (interview) and the second a quantitative tool (questionnaire). The design of the research was flexible and data gathering and analyses were largely determined by the subject matter in a case study. This prepares the investigator to deal with unexpected findings and requires them to reorient their study in light of developments (Becker, 1970).

Investigators generally look for a large variety of sources to supply their data (Fidel, 1984). In this way, a higher validity of the concept under study can be obtained. A qualitative tool was used in the current paper in order to gain a deeper perception of the subject and to elicit information that could not be gained through the questionnaire. However, to rectify the deficiencies of the qualitative tool (interview), a quantitative tool (questionnaire) was also adopted. Each of these methods and tools support the other and when used together, help to obtain a more comprehensive perspective. The quantitative method was based on the researcher's point of view, while the qualitative method was based on the statistical population's perspectives. To propose the model, after library studies and surveying related papers had been completed, experts and managers in the Bahman automobile industry were interviewed. Interviews were performed in order to make a preliminary, exploratory study and as a result, inappropriate factors were eliminated; some factors were consolidated and others were merged.

The results of interviews in the next steps were gained due to the adjustment of the model to the conditions of the automobile industry in Iran. Next, the outcomes of adopting the qualitative tool were the reinforcement of the primary dimensions of the model and clarifying the links between factors and sub-factors. In this way, interviews helped to make the model more accurate.

With regard to the paper's aim, with respect to the data collection method, it is classified and implemented as descriptive research. It is descriptive because it describes the present situation, while also using a survey questionnaire to collect data. Survey research and library studies were also used to collect data. In the quantitative phase, data were analysed using descriptive and inferential statistics. The statistical population of this research was limited and included experts and managers working in the Bahman automobile industry who are familiar with knowledge management. The statistical population size was 105 people and the sample size in this study, based on Cochran's formula for determining an appropriate sample size, was 83 people (Cochran, 1977). A simple random sampling method was employed to choose people in this part of the study. Finally, the results of both

qualitative and quantitative methods were aggregated in order to propose a model for knowledge management CSFs in the Bahman automobile industry. It should be noted that Bahman automobile industry, as one of the most important industries in Iran, which produces and sells different passenger cars and vans, has realized the need for implementing a knowledge management system and has conducted the necessary research for doing so. Thus, they have initiated an implementation project, but remaining work still needs to be finalized.

Interviews

In the first part of this research, data were collected through individual interviews that were transcribed at the time of the interview. Participants comprised managers and experts from the Bahman automobile industry. A total number of 11 managers and experts were interviewed. A snowball sampling method was used to select interviewees. Snowball sampling is a consecutive sampling method; instead of choosing a fixed sample size, sample size increases to a stage where the researcher is satisfied that it is big enough (Banning, 2002). In this method, participants or informants that had already been contacted used their social networks to refer the researcher to other potential participants.

All participants had worked for more than six years in the automobile industry. The objectives of the research were explained and research questions were asked of each participant. If the participant agreed to take part in the research, an appointment was made for conducting an interview. Individual interviews were conducted in a private room at the participant's workplace. The interview consisted of some core open-ended questions for allowing the respondent to explain their own views and experiences as fully as possible. During the interviews, participants were asked to describe the knowledge management critical success factors they were familiar with and then to explain their own experiences and perceptions of CSFs for knowledge management implementation within the Bahman automobile industry. During the interviews, notes were made about the topics participants raised and these were formulated as questions at a later stage if participants had not already spontaneously responded. Some of these topics helped the researchers to develop interview guidelines over time.

The interviews were carried out by the same interviewer, transcribed verbatim and analysed consecutively. Depending on the workload, the tolerance and interest of the participant in explaining

their experience, the duration of the interview ranged from 20 to 60 minutes. A qualitative analysis method was used to analyse the interview transcriptions. As a validity check, three expert managers from the Bahman automobile industry and two other academics conducted peer checking on roughly 50% of all transcripts. There was more than a 90% agreement between different experts about the primary dimensions and sub-factors of the research.

Quantitative tool

The experts' questionnaires were disseminated among 13 experts. These experts were academics and professional experts from within the Bahman automobile industry. After collecting the experts' questionnaires, a slight reform was applied to the content and form of questionnaire and it was validated by experts. A mean of more than 3 for each factor showed that the factor was suitable and could be accepted. For defining the reliability of the questionnaires, data from 30 questionnaires were inserted into SPSS software and Cronbach's α coefficient for these questionnaires was given as (0.955), which showed good reliability of the instrument; this was significantly higher than 0.7 and indicated the high reliability of the questionnaire content.

Next, 83 questionnaires were distributed within the statistical population in order to be applied to inferential statistics. Questionnaires were personally distributed and collected. A Likert scale was used to measure participant responses. The questionnaire consisted of two sections. Demographic questions made up the first section and the primary questions including 26 factors comprised the second section. All questionnaire items were elicited from research literature; interviews and items were later rechecked by experts. Finally, data were analysed by descriptive statistics and inferential statistics. A Friedman test was applied in inferential statistics. SPSS V20 was employed in this research.

In order to confirm the identified factors, a measurement model for verifying the 26 measurement variables, written to represent five unobserved constructs, needed to be represented. The properties of five constructs involving 26 items in one confirmatory factor analysis (CFA) were assessed using LISREL 8.80 software. Two types of analyses were conducted to evaluate construct validity and reliability. First, confirmatory factor analysis (CFA) tested the five latent variables; Table 3 shows the fit measure of each scale. At a minimum level, fit measures for all latent variables were acceptable and all factor loadings were significant at 0.05 levels. Kliene (1994) states

that for judging factor loadings, a factor loading above 0.6 is considered high, a factor loading above 0.3 is considered moderately high and factor loadings under 0.3 can be ignored. With $\chi 2/df$ at 1.48, RMSEA of 0.08 and all t-values higher than 1.96, it can be confirmed that the questions had enough validity for measuring the five latent variables. Second, reliability analysis was employed to evaluate the internal consistency of each latent variable. The Cronbach's standardized alphas for five latent variables ranged from 0.764 to 0.890 (Table 3). Alphas for all factors in this study indicated good internal consistency for each latent variable.

Table 3.Confirmatory factor analysis and reliability analysis results

Organizational Culture	**Cronbach's α =0.817**	**Factor Loading**
1.Teamwork culture		0.94
2.Trust culture		0.48
3.Knowledge sharing culture		0.46
4.Participating in doing tasks		0.62
5.Benchmarking		0.93
Human Resource Management	**Cronbach's α = 0.890**	
1.Employee training		0.77
2.Paying financial and non-financial rewards		0.86
3.Take advantage of special training department		0.82
4.Promotion opportunities		0.73
5.Knowledge oriented evaluation		0.55
6.Recruiting based on knowledge competencies		0.77
7.promotion based on knowledge competencies		0.60
Goals & Strategies	**Cronbach's α = 0.812**	
1.alignment with company strategies		0.50
2.top manager's support		0.56
3.proper budget allocation		0.68
4.employee empowerment		0.82
5.strategic KM		0.79
Information Technology	**Cronbach's α = 0. 813**	
1.System and user congruence		0.72
2.IT infrastructure		0.76
3.technological tools prevalence		0.65
4.IT and KM congruence		0.66
5.information resource distribution networks		0.64
Organizational factors	**Cronbach's α = 0. 764**	
1.standard and flexible knowledge structure		0.73
2.KM special team presence		0.67
3.knowledge in products and services		0.66
4.obtan feedback from employees and customers		0.53

NOTE: SAMPLE SIZE **83;**
Chi-square = 428.99**; RMSEA** = 0.0.08; $\mathbf{X^2/df}$ = 1.48; **CFI** = 0.94; **IFI** = 0.94; **PGFI** = 0.57; **NNFI** = 0.94

By and large (Bagozzi *et al*., 1991; Hu & Bentler, 1999; Schermelleh-Engel *et al*., 2003), the CFA results presented an adequate level of fit. To sum up, these results suggest that the model marked out relationships among the measured variables well.

Analysis and results

Interview analysis

For analysing data collected through the interviews, it must be noted that the collection and analysis of data were conducted simultaneously. Each interview was transcribed verbatim and analysed before the next interview took place. Therefore, each interview provided additional direction for the next. Coding was applied to data and during coding, the transcript of each interview was reviewed multiple times and the data reduced to sub-factors; then, sub-factors that were found to be conceptually similar in nature or related in meaning were grouped into categories and labelled 'main dimensions'. This process allowed for links to be made between the primary dimensions and their sub-factors. The data were used to define the main dimensions and to generate a conceptual model for illustrating the relationships among dimensions. Although a variety of different levels of personnel were interviewed, themes that arose were consistent across interviews. However, participants used different terms to refer to similar concepts. Interviewing stopped when data saturation occurred.

Inferential statistics

In order to analyse the data collected through questionnaires, the results of the Friedman test were interpreted. In Table 4, according to the value of chi-square (13.799), the data exhibited less than a 5% error and 95% confidence; it can therefore be stated that the mean ranks of participants' answers within the Bahman automobile industry were different.

Table 4. Test Statistics[a]

Test statistics	
Number(n)	83
Chi-square	13.79
degree of freedom(df)	4
Asymptotic significance	0.008

In addition to expressing the significant differences among mean ranks, the Friedman test assisted in prioritizing the ranks of participants' answers about knowledge management system CSFs. In other words, this test highlighted which factors were ranked lower/higher. To achieve this, the results of the Friedman test were studied in SPSS software (ranks), as shown in Table 5. Mean ranks were as follows: the mean of “human resource management” is 2.66, which was the lowest rank; “organizational culture” is 3.49, which

was the highest rank among the five main factors. Table 5 shows these ranks.

Table 5. mean ranks of main dimensions of the model

No.	Main factors	Mean Rank
1	Organizational culture	3.49
2	Organizational factors	3.09
3	Information technology	2.93
4	Goals and strategies	2.84
5	Human resource management	2.66

In the "organizational culture" dimension, considering the calculated mean, it was found that most frequencies belonged to, in order: "teamwork culture" and "participating in doing tasks". In the "human resource management" dimension, most frequencies of answers belonged to "recruiting based on knowledge competencies" and "take advantage of special training department". In the "goals and strategies" dimension, most frequencies of answers belonged to "employee empowerment" and" top managers' support". In the "IT" dimension, most frequencies of answers belonged to "system and user congruence" and "information resources distribution networks". In the "organizational factors" dimension, most frequencies of answers belonged to "obtain feedback from employees and customers" and "knowledge in products and services".

Discussion and conclusion,

The aim of this study was to identify and prioritize CSFs for knowledge management implementation and to create a model suitable for the Bahman automobile industry, which has taken measures to implement knowledge management systems. Critical success factors of knowledge management system implementation that were identified in this study are: **organizational culture** dimension – includes teamwork culture, trust culture, knowledge sharing culture, participating in doing tasks and benchmarking; **human resource management** dimension – includes employee training, paying financial and non-financial rewards, taking advantage of special training departments, promotion opportunities, knowledge oriented evaluation, recruiting based on knowledge competencies and promotion based on knowledge competencies; **goals and strategies** dimension – includes alignment with company strategies, top managers' support, proper budget allocation, employee empowerment and strategic knowledge management; **information technology** dimension – includes system and user congruence, IT infrastructure, technological tools prevalence, IT and knowledge management

congruence and information resource distribution networks; **organizational factors** dimension – includes standard and flexible knowledge structure, knowledge management special team presence, knowledge of products and services and obtaining feedback from employees and customers.

In order to propose a conceptual model for knowledge management system CSFs in the Bahman automobile industry, this model is categorized into five dimensions: "organizational culture", "goals and strategies", "information technology", "organizational factors", "human resource management" and 26 sub-factors (Fig. 1). Prior to expressing the priority of knowledge management system CSFs, it should be noted whether the differences between the five main dimensions ranks were significant. As a result of the Friedman test with an asymptotic significance of 0.008, which is less than 0.05 according (Table 4), this difference can be considered verified. The five main dimensions of knowledge management system implementation CSFs that were prioritized using the Friedman test are shown in Table 5.

The current paper endeavoured to bring effective factors for knowledge management implementation together and to guide managers within the industry in adopting a systematic viewpoint. It would be impossible to excel a knowledge management factor to other factors. Hence, each of the factors is necessary for knowledge management implementation. Moffet *et al*. (2002) and Wong (2005) point out that concentrating only on technology or other factors will not lead to successful knowledge management implementation.

In recent years, many researchers from Iran and other countries (Davenport, 1998; Spin Wall, 2000) have conducted research in this field. Aspects of these studies that are being addressed include how successful organizations have been in creating knowledge management system CSFs, the imperfections in these systems and the factors that have received less attention.

In order to detect areas that need more consideration for successfully implementing a knowledge management system, both qualitative and quantitative research tools were applied in this study. Library studies and survey research was conducted in addition to interviewing 11 managers and experts from within the Bahman automobile industry. In the next step, the collected data were analysed and the results showed that the overall level of factors was not desirable. The mean of participants' answers confirmed this conclusion. In this regard, the first suggestion of this paper is to reconsider all the levels and dimensions of the proposed model in

order to continuously improve and develop in respect of the five main dimensions. Of course, this does not mean that all the efforts to date achieved by the Bahman automobile industry for implementing knowledge management systems have been inconclusive. It is clear that the automobile and related industries possess a valuable amount of knowledge and are from money-making/advantageous industries within the country. In this regard, the paper's suggestions attempt to amplify the efficiency of knowledge management implementation within this industry. Prioritization of these main factors will assist organizations to regulate knowledge management activities and guides for managing the five primary dimensions in better ways.

Current research encourages other researchers to continue studies in this field by adopting a comprehensive view about factors already identified. It is also appropriate to mention that in research conducted by Ghazipour (2011) in a study on knowledge management CSFs within Iran Khodro's supply chain logistics department (SAPCO), 18 sub-factors were categorized within three groups: 'organizational factors', 'infrastructure factors' and 'human factors'; in the current paper, 'organizational culture' received prominent attention. In research conducted by Babazadeh (2004) under the title "Feasibility of knowledge management application in Shahid Beheshti University", four main factors were studied, i.e., 'organizational structure', 'information technology', 'human resources' and 'organizational culture'; in the current study 'goals and strategies' were also considered as a main factor.

Interview/questionnaire analysis indicates that:

- According to time and financial constraints within the Bahman automobile industry, identification and prioritization of the knowledge management system CSFs could assist in the better management of limited resources and help in the planning for accomplishing the necessary actions for knowledge management implementation.
    - There should be a change in methods of knowledge management implementation in this industry. Although top managers in the Bahman automobile industry are aware of the importance of knowledge management implementation, they should allocate more resources to implementing it.
    - Some factors such as "participating in doing tasks", "obtain feedback from employees and customers" and "system and user congruence" have been implemented; however, others such as "promotion opportunities", "recruiting based on knowledge

competencies" and "promotion based on knowledge competencies" have not yet been fully implemented.

- Preparing these factors prior to knowledge management implementation is entirely possible and there should be excellent planning for these five main dimensions in order to successfully implement knowledge management.
- Since knowledge management implementation requires information technology infrastructures for gaining significant amounts of information, there should be perfect planning for employees in order to empower them to correctly use resources and databases.
- Organizational vision and mission should take knowledge management into account. Top managers within the Bahman automobile industry should make organizational mission and knowledge strategies consistent by clarifying knowledge goals that are related to operational strategies.
- Organizational structure flexibility and adaptability to environmental changes, especially in the automobile industry in Iran, are important factors. Since the Bahman automobile industry is a changing, competitive environment, it should adopt a flexible organizational structure to successfully establish knowledge management. A flexible structure will assist the organization in adapting to sudden changes.
- The presence of a logical and integrated strategy will assist the Bahman automobile industry to clarify its reasons and philosophy for pursuing knowledge management and direct organizations to become knowledge driven. In addition, the presence of a specific knowledge management strategy will lead to establishing organizational values for employees and consequently see their attention focused on these values.

Suggestions

- According to Davenport *et al*. (1998) in their discussion about organizational culture, motivation and top managers' support, and Spinwall (2000) in his discussion about training and human resource management, the current paper's suggestion to the Bahman automobile industry is to launch essential aspects of a knowledge driven culture that contain specifications such as reliability, coordination and trust between employees at all organizational levels.

- According to the proposed model, within the human resource management dimension, there is also the need for changing employee performance evaluation systems in order to improve the process of knowledge creation and knowledge sharing at all organizational levels. Thus, paying more attention to employee creativity and innovation, and their tendencies to be involved in teamwork can motivate them to better create and share knowledge. It is suggested that group performance evaluation be replaced with individual performance evaluation. Organizing group meetings about various subjects also assists in clarifying the importance of teamwork for the organization's members.
- Regarding the organizational culture dimension of the proposed model, benchmarking is a sub-factor for knowledge management system implementation. It is suggested that Bahman automobile industry managers utilize this factor to benchmark some successful cases within a competitive context.
- The human resource management dimension needs to change the attitudes of employees in order to implement knowledge management in a better way. Equal job opportunities can play a key role in knowledge management implementation success and this is the duty of the HRM department.
- It should be acknowledged by an organization that a knowledge team is necessary for knowledge management implementation and the correcting of knowledge plans. The Bahman automobile industry should establish a competitive knowledge team with members from various operational sectors in order to improve the knowledge management implementation level. This team should be directed by a top manager or knowledge manager. The primary duty of the top knowledge manager is to identify the necessary core knowledge for achieving and maintaining a competitive advantage.
- Since this research was conducted for the automobile industry in Iran, and in particular the Bahman automobile industry, it is suggested that the managers of this industry consider all CSFs of the model as a whole and not to ignore certain parts thereof. Doing so can help to achieve success in knowledge management implementation.
- For future studies, it is suggested that research in other related industries and in other geographical areas be conducted in order to detect CSFs that were not studied in the current research.

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